

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549**

**AMENDMENT NO. 1 TO
FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

TWIST BIOSCIENCE CORPORATION

(Exact name of Registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

2836
(Primary Standard Industrial
Classification Code Number)

46-2058888
(I.R.S. Employer
Identification Number)

455 Mission Bay Boulevard South, Suite 545
San Francisco, CA 94158
(800) 719-0671

(Address, including zip code, and telephone number, including area code, of Registrant's principal executive offices)

Emily M. Leproust
President and Chief Executive Officer
Twist Bioscience Corporation
455 Mission Bay Boulevard South, Suite 545
San Francisco, CA 94158
(800) 719-0671

(Name, address including zip code, and telephone number including area code, of agent for service)

COPIES TO:

John V. Bautista, Esq.
Peter M. Lamb, Esq.
Christopher J. Austin, Esq.
Orrick, Herrington & Sutcliffe LLP
1000 Marsh Road
Menlo Park, CA 94025
(650) 614-7400

Mark Daniels, Esq.
General Counsel
Twist Bioscience Corporation
455 Mission Bay Boulevard
Suite 545
San Francisco, CA 94158
(844) 362-8978

Brian J. Cuneo, Esq.
B. Shayne Kennedy, Esq.
Latham & Watkins LLP
140 Scott Drive
Menlo Park, CA 94025
(650) 328-4600

Approximate date of commencement of proposed sale to the public:
As soon as practicable after this Registration Statement becomes effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Securities Exchange Act of 1934 (check one):

Large accelerated filer

Non-accelerated filer

Accelerated filer

Smaller reporting company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided to Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of each class of securities to be registered	Amount to be registered	Proposed maximum aggregate offering price per share	Proposed maximum aggregate offering price (1)	Amount of registration fee (2)
Common Stock, par value \$0.00001 per share	5,750,000	\$16.00	\$103,500,000.00	\$12,544.20

(1) Estimated pursuant to Rule 457(a) under the Securities Act of 1933, as amended. Includes the aggregate offering price of the 750,000 additional shares the underwriters have the option to purchase.

(2) The Registrant previously paid \$10,453.50 in connection with the initial filing of the Registration Statement on October 3, 2018.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to completion, dated October 17, 2018

PRELIMINARY PROSPECTUS

5,000,000 shares



Common stock

This is the initial public offering of shares of common stock of Twist Bioscience Corporation. Prior to this offering, there has been no public market for our common stock. The initial public offering price is expected to be between \$14.00 and \$16.00 per share.

We have applied to list our common stock on the Nasdaq Global Market under the symbol "TWST."

We are an "emerging growth company," as defined under the federal securities laws and, as such, we have elected to comply with certain reduced public company reporting requirements for this prospectus and future filings.

	Per Share	Total
Initial public offering price	\$	\$
Underwriting discounts and commissions ⁽¹⁾	\$	\$
Proceeds, before expenses, to Twist Bioscience Corporation	\$	\$

(1) See "Underwriting" for additional disclosure regarding underwriting discounts and commissions and estimated offering expenses.

We have granted the underwriters a 30-day option to purchase up to 750,000 additional shares of common stock from us at the initial public offering price less the underwriting discounts and commissions, solely to cover overallocments.

Certain of our stockholders, including stockholders affiliated with certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$30 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no shares in this offering to any of these stockholders, or any of these stockholders may determine to purchase more, fewer or no shares in this offering. The underwriters will receive the same underwriting discount on any shares purchased by these persons or entities as they will on any other shares sold to the public in this offering.

Investing in our common stock involves a high degree of risk. See the section entitled "[Risk factors](#)" beginning on page 20 to read about factors you should consider before buying shares of our common stock.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

The underwriters expect to deliver the shares of common stock to purchasers on or about _____, 2018.

Joint book running managers

J.P. Morgan

Cowen

Co-managers

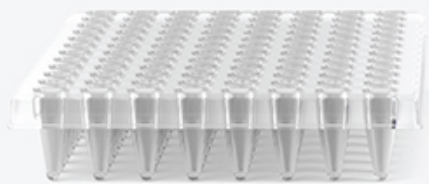
Allen & Company LLC

Baird

, 2018

TWIST SILICON PLATFORM

Leveraging silicon to transform DNA synthesis methods and achieve unprecedented levels of throughput and high-quality DNA at low cost and at scale



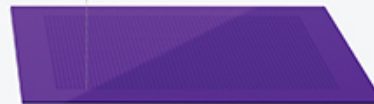
96 WELL PLATE

makes 1 gene

Legacy method not fit to meet rapidly growing demand for synthetic DNA



121 devices in 1 cluster



TWIST SILICON PLATFORM

can make 9,600 genes

Table of contents

Prospectus summary	1
The offering	14
Summary consolidated financial information	17
Risk factors	20
Special note regarding forward-looking statements	57
Industry and market data	59
Use of proceeds	60
Dividend policy	62
Capitalization	63
Dilution	65
Selected consolidated financial data	69
Management's discussion and analysis of financial condition and results of operations	72
Business	96
Management	128
Executive compensation	140
Certain relationships and related party transactions	155
Principal stockholders	160
Description of capital stock	163
Shares eligible for future sale	169
Material U.S. federal income tax considerations for non-U.S. holders	171
Underwriting	175
Experts	186
Where you can find more information	186
Twist Bioscience Corporation Index to consolidated financial statements	F-1

NEITHER WE NOR THE UNDERWRITERS HAVE AUTHORIZED ANYONE TO PROVIDE ANY INFORMATION OR TO MAKE ANY REPRESENTATIONS OTHER THAN THOSE CONTAINED IN THIS PROSPECTUS OR IN ANY FREE WRITING PROSPECTUSES WE HAVE PREPARED. NEITHER WE NOR THE UNDERWRITERS TAKE RESPONSIBILITY FOR, AND CAN PROVIDE NO ASSURANCE AS TO THE RELIABILITY OF, ANY OTHER INFORMATION THAT OTHERS MAY GIVE YOU. THIS PROSPECTUS IS AN OFFER TO SELL ONLY THE SHARES OFFERED HEREBY, BUT ONLY UNDER CIRCUMSTANCES AND IN JURISDICTIONS WHERE IT IS LAWFUL TO DO SO. THE INFORMATION CONTAINED IN THIS PROSPECTUS IS CURRENT ONLY AS OF ITS DATE.

For investors outside of the United States: We have not, and the underwriters have not, done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than the United States. Persons outside of the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of common stock and the distribution of this prospectus outside of the United States.

"Twist Bioscience," and "Sequencespace" are registered trademarks in the U.S. and, in some cases, in certain other countries and our logo is an unregistered trademark of Twist Bioscience Corporation. All other brand names or trademarks appearing in this prospectus are the property of their respective holders. Solely for convenience, the trademarks and trade names in this prospectus are referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Prospectus summary

This summary highlights information contained in greater detail elsewhere in this prospectus. Before making an investment in our common stock, you should carefully read this entire prospectus, including our consolidated financial statements and the related notes thereto and the information in the sections entitled "Risk factors," "Management's discussion and analysis of financial condition and results of operations" and "Business." The last day of our fiscal year is September 30.

Overview

We are a leading and rapidly growing synthetic biology company that has developed a disruptive DNA synthesis platform to industrialize the engineering of biology. The core of our platform is a proprietary technology that pioneers a new method of manufacturing synthetic DNA by "writing" DNA on a silicon chip. We have combined this technology with proprietary software, scalable commercial infrastructure and an e-commerce platform to create an integrated technology platform that enables us to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost than our competitors. We are leveraging our unique technology to manufacture a broad range of synthetic DNA-based products, including synthetic genes, tools for next generation sample preparation, and antibody libraries for drug discovery and development. Additionally, we believe our platform will enable new value-add opportunities, such as discovery partnerships for biologic drugs, and will enable new applications for synthetic DNA, such as digital data storage, which will drive growth in the market for our products. We sell our synthetic DNA and synthetic DNA-based products to a customer base of over 600 customers across a broad range of industries.

DNA is the fundamental building block of biology. The ability to design DNA and engineer biology, a field known as synthetic biology, is growing rapidly, and we believe this field represents one of the most exciting areas of growth and technological innovation in the 21st century. The ability to modify DNA to serve different purposes is leading to a broad range of applications for synthetic DNA and synthetic DNA-based products across multiple industries, including:

- healthcare for the discovery and production of new therapeutics and molecular diagnostics;
- industrial chemicals for cost-effective and sustainable production of new and existing specialty chemicals and materials, such as spider silk, nylon, rubber, fragrances, food flavors and food additives;
- agriculture for more effective and sustainable crop production;
- academic research for a broad range of applications; and
- technology for potential use as an alternative long-term data storage medium.

The synthetic biology market is growing rapidly and is being fueled by increased access to affordable and innovative tools that enable new applications. We believe this is analogous to the trends seen in the next generation sequencing, or NGS, market, where declining costs of sequencing drove adoption, new applications and market expansion. Similarly, tools that combine advanced production technology with modern digital technology and software capabilities, such as our DNA synthesis platform, are driving growth and market creation for synthetic DNA and synthetic DNA-based products. In calendar year 2017, the market for synthetic biology products was approximately \$4.4 billion and is expected to grow to \$13.9 billion by calendar year 2022. We believe this period of accelerated growth in the synthetic biology industry is in its early stages.

The applications of our DNA synthesis platform are broad. Our mission is to be the leading provider of synthetic genes, which are comprised of strands of synthetic DNA, and to leverage the versatility of our platform to expand our portfolio to include other synthetic DNA-based products and address additional market opportunities, including next generation sequencing sample preparation, biological drug discovery and development and digital data storage.

In April 2016, we launched the first applications of our platform, synthetic genes and high diversity collections of oligonucleotides, or oligo pools, to disrupt the gene synthesis market and make legacy DNA synthesis methods obsolete. We believe that the traditional DNA synthesis methods used by our competitors are inherently limited in scalability and are not optimized to satisfy the rapidly growing demand for high-quality, low-cost synthetic DNA. Our silicon-based chip technology is able to increase DNA production by a factor of 9,600 on a footprint similar to that of traditional DNA synthesis methods. Also, it significantly lowers the volume of required reagents, specifically the most expensive reagent by a factor of 1,000,000, and improves the precision of the synthesis process relative to legacy methods. This enables us to produce high-quality synthetic DNA on a much larger scale and at lower cost than competitors.

We have rapidly become a leading synthetic DNA provider. Between September 30, 2015 and June 30, 2018, the Company sold its products to more than 600 customers. In fiscal 2017, we served 286 customers including \$0.3 million in sales to seven of the top 20 pharmaceutical companies by revenue, \$4.3 million in sales to Ginkgo Bioworks, Inc., or Ginkgo Bioworks (which we believe is the largest global purchaser of synthetic DNA), \$0.3 million in sales to three of the largest agricultural biotechnology companies, \$2.7 million in sales to over 100 academic research institutions worldwide, and \$7.3 million in sales to innovative customers using synthetic DNA for new and emerging applications, such as Microsoft Corporation and the University of Washington for use of DNA as a digital data storage medium. We are also an original equipment manufacturer, or OEM, of synthetic DNA to four synthetic DNA manufacturers that also compete with us, which we believe is a strong demonstration of the superiority of our platform.

In the nine months ended June 30, 2018, we served 539 customers as follows: 56% to industrial chemicals, 25% to academic research, 2% to agriculture and 17% to healthcare sectors. Sales to industrial chemicals, academic research, agriculture and healthcare sectors accounted for 56%, 25%, 2% and 17% of the total \$17.0 million revenues for the nine months ended June 30, 2018. Sales to Ginkgo Bioworks amounted to \$5.5 million, or 32% and sales to customers other than Ginkgo Bioworks was \$11.5 million, or 68%, for the nine months ended June 30, 2018; an increase in revenue of 89% and 162%, respectively, as compared to the nine months ended June 30, 2017.

We have also leveraged the versatility of our platform to expand our product portfolio into other markets in which we believe we have a competitive advantage. In February 2018, we launched an innovative and comprehensive sample preparation kit for next generation sequencing at the Advances in Genome Biology and Technology conference. Our kit leverages our platform to precisely synthesize oligo pools and uniformly amplify the desired target DNA segments, considerably improving the accuracy of the downstream sequencing analysis. We have also commercialized a custom DNA library solution which enables more effective biologic drug discovery and development for our customers. We believe we can further leverage our platform to develop other proprietary tools, such as our G-protein coupled receptor, or GPCR, library and antibody optimization solution, to provide an end-to-end solution in biologics drug discovery and early development, from target to investigational new drug, or IND, application, adding value as a partner to biotechnology and pharmaceutical companies. We also aim to explore development of DNA as a digital data storage medium via internal research and industry partnerships.

Our currently marketed products target the synthetic DNA market, a sub-segment of the synthetic biology market, and NGS sample preparation, a large adjacent market opportunity. We estimate that the combined market opportunity was \$1.8 billion in calendar year 2016. We believe that current estimates understate our market potential because they reflect the costly, time-consuming, and cumbersome nature of legacy DNA synthesis technologies. We believe our solution has the potential to materially expand our initial market by providing end users access to high-quality and lower cost tools, encouraging adoption and facilitating new applications for our products.

We have built a scalable commercial platform that enables us to reach a diverse customer base that we estimate consists of over 100,000 synthetic DNA users today. In order to address this diverse customer base, we have employed a multi-channel strategy comprised of a direct sales force targeting synthetic DNA customers, a direct sales force focusing on the NGS market and an e-commerce platform. We launched our proprietary, innovative, and easy-to-use e-commerce platform in October 2017 to existing customers and expanded access to the general public in January 2018. Our platform allows customers to design, validate, and place on-demand orders of customized DNA online. This is a critical part of our strategy to address our large and diverse customer base, as well as drive commercial productivity, enhance the customer experience, and promote loyalty.

Since our formation in 2013, we have grown rapidly and achieved several key milestones that we believe position us for continued growth and success:

- In 2015, we demonstrated the benefits and validated the commercial utility of our proprietary silicon-based platform for DNA synthesis through a proof-of-concept program called the Alpha Access program, which provided initial access to our platform to select customers.
- In 2016, we (i) secured a long-term contract with Ginkgo Bioworks to provide up to 100 million base pairs of DNA, which we believe was the largest agreement for synthetic DNA at that time, (ii) launched our early commercial access program in April called the Beta Access program to select customers and expanded our existing relationship with Ginkgo Bioworks, (iii) acquired Genome Compiler Corporation to add software design capabilities for our e-commerce ordering system, (iv) laid the groundwork to pursue an opportunity in biologics drug discovery through a relationship with Distributed Bio, Inc., or Distributed Bio, and (v) supplied DNA to Microsoft Corporation for its work with the University of Washington to develop DNA as a data storage medium.
- In 2017, we continued to increase penetration with existing customers and expand our customer base, by (i) serving 286 customers (up from 97 customers in 2016), (ii) extending the scope of our relationship with Microsoft Corporation and the University of Washington, (iii) entering into an agreement to supply thousands of genes for public benefit through the BioBricks Foundation, (iv) successfully achieving industry-leading volumes of synthetic DNA shipped every month, (v) becoming an OEM supplier of synthetic DNA to four synthetic DNA manufacturers that also compete with us, (vi) launching our e-commerce platform to existing customers in October 2017, and (vii) shipping over 38,000 genes in the fourth quarter of fiscal 2017 compared to approximately 7,600 for the fourth quarter of fiscal 2016, which represents 400% year-over-year growth.
- In 2018, we continued to experience revenue growth greater than the estimated rate of growth of the synthetic biology market, expanded into new market opportunities for next-generation sequencing and antibody biologics discovery, and enhanced our global distribution capabilities by (i) launching our e-commerce platform to the general public, (ii) launching our NGS target enrichment solutions at a major

medical conference, (iii) completing a private financing with funds reserved for building Chinese operations, (iv) signing international distributors in Asia Pacific, (v) expanding our management team to support our entry into the biologics drug discovery and early development, (vi) signing a new agreement with Ginkgo Bioworks to deliver up to approximately 1.3 billion base pairs over a period of four years and (vii) shipping 19,794 genes in the third quarter of fiscal 2018 compared to 8,297 for the third quarter of fiscal 2017, which represents 139% year-over-year growth, and compared to shipping 2,650 genes in the third quarter of fiscal 2016.

We generated revenue of \$2.3 million in fiscal 2016 and \$10.8 million in fiscal 2017, representing 375% year-over-year growth, while incurring net losses of \$44.1 million in fiscal 2016 and \$59.3 million in fiscal 2017. In addition, we generated revenue of \$7.3 million and \$17.0 million in the nine months ended June 30, 2017 and 2018, representing 133% period-over-period growth, while incurring net losses of \$42.3 million and \$51.4 million in the nine months ended June 30, 2017 and 2018.

Our headquarters and manufacturing facilities are located in San Francisco, California. As of June 30, 2018, we had 221 full-time employees worldwide, including three locations in the San Francisco Bay Area and an international location in Tel Aviv, Israel. We also utilize a team of 14 dedicated commercial consultants across the European Union and the United Kingdom and five dedicated commercial consultants across Asia. We also recently received private funding to establish production facilities and commercial operations in Asia. We plan to begin operations in Asia in 2019. As of August 31, 2018, we have raised a total of \$291.5 million in gross proceeds from the sale of equity securities.

The synthetic biology industry

We operate in the field of synthetic biology, which is undergoing an era of rapid innovation and transformation. Synthetic biology is the engineering of biology to build new biological systems or re-design existing biological systems. The ability to design DNA and engineer biology is creating advances and benefits for a broad and growing range of applications for synthetic DNA and synthetic DNA-based products across multiple industries, including:

- healthcare for the discovery and production of new therapeutics and molecular diagnostics;
- industrial chemicals for cost-effective and sustainable production of new and existing specialty chemicals and materials, such as spider silk, nylon, rubber, fragrances food flavors and food additives;
- agriculture for more effective and sustainable crop production;
- academic research for a broad range of applications; and
- technology for potential use as an alternative long-term data storage medium.

According to BCC Research, the overall market for synthetic biology products was approximately \$4.4 billion in calendar year 2017 and is expected to grow to over \$13.9 billion by calendar year 2022. This industry momentum creates a significant opportunity for us to grow within our existing markets as well as expand our product offering.

Synthetic DNA is the fundamental building block of synthetic biology. Users of synthetic biology can design synthetic DNA to regulate the production of these proteins and molecules to achieve a specific functional purpose. While synthetic DNA has been produced for more than 40 years, the complexities of biology and the production constraints inherent in legacy processes have historically limited the applications and market opportunities for DNA synthesis.

Limitations of existing solutions

Traditional methods of DNA synthesis consist of a two-step process that initially involves the synthesis of oligonucleotides, also referred to as oligos, which are short strands of DNA. These oligos are then combined to create longer strands of DNA. Currently, there are two primary methodologies used by others to create synthetic DNA, the 96-well plate method and the microarray method, each having production limitations that we believe make these technologies sub-optimal to satisfy the rapidly growing demand for synthetic DNA. In addition, because the synthesis of oligos can introduce errors in the sequence order, all DNA synthesis methods require a process called cloning to produce many identical copies of a strand of DNA, such as a clonal gene. Today, all of our competitors use one of these two primary methods of DNA synthesis and require cloning for clonal genes.

96-well plate method of DNA synthesis

Introduced as early as the 1950s, a 96-well plate is a flat plastic plate, roughly the size of two smartphones, with eight rows of 12 wells that are used as small test tubes. Instead of creating one sequence of DNA at a time in a single test tube, the 96-well plate allows researchers to create 96 oligos in parallel, one in each well. While this process successfully achieves DNA synthesis, it requires high volumes of phosphoramidites, an expensive raw material, as well as other ancillary reagents. It also produces excessive amounts of the final product, significantly more than is required for most subsequent processes, resulting in material that is discarded and an unnecessary expense. Additionally, this process is not scalable to produce high volumes, as approximately 100 oligos are needed to assemble one gene and therefore only one gene can be made from each 96-well plate.

Microarray method of DNA synthesis

Unlike a 96-well plate, a microarray is a flat surface made of plastic or glass on which DNA is synthesized directly in an array of discrete locations. Microarrays allow large numbers of oligos to be synthesized in parallel, increasing DNA production by up to four orders of magnitude when compared to the 96-well plate. However, while this method can make 100 genes in parallel, it remains difficult to scale, requires many steps, and results in significant waste of materials.

Cloning

Cloning is a tedious process to filter out errors and produce many identical copies of a strand of DNA, such as a gene. While the cloning process results in a precise sequence, it is incredibly slow and labor intensive and generally takes around 10 business days to complete. As a result, it is time consuming, expensive, and, in many cases, not an efficient use of researchers' time. In general, more accurate DNA synthesis technology results in fewer errors in the sequence order and reduces the time and costs required or allocated to the cloning process.

Our platform

We developed the Twist Bioscience DNA synthesis platform to address the limitations of throughput, scalability, and cost inherent in legacy DNA synthesis methods. Our platform stems from extensive analyses of, and improvements to, the existing gene synthesis and assembly workflows. Our core technologies combine expertise in silicon, software, fluidics, chemistry, and motion and vision control to miniaturize thousands of parallel chemical reactions on silicon and write thousands of strands of DNA in parallel. With a footprint that is similar to the size of a 96-well plate that produces one gene, we are able to produce 9,600 genes in parallel. Based on current production needs, we have intentionally designed our latest chip to make 6,144 genes in parallel, but we have the current capability to increase this to 9,600 genes, as needed. We have combined our

DNA synthesis technology with propriety software and a scalable commercial infrastructure to create our vertically integrated DNA synthesis platform capable of delivering very large volumes of high-quality synthetic DNA at low cost.

Synthesis and Assembly Comparison

	96-well Plate	Microarray	TWIST BIOSCIENCE
Amount of DNA	Too much (waste) Nano-mol	Too little (amplification) <Femto-mol	Right amount (no amplification, no waste) Pico-mol
DNA processing	Pooling required	De-pooling required	No pooling No de-pooling
Genes per 96-well	1	96	9,600*

*Full scale capacity chip shown; current chip in production has the capacity to make 6,144 genes

We believe that buyers of DNA are looking for a product and purchasing experience that delivers on a number of key factors and that our platform is uniquely designed to meet these customer needs and overcome the limitations of legacy DNA synthesis methods in order to support the growing demand for synthetic DNA:

	Customer desires	Twist Bioscience advantages
<i>Quality and accuracy</i>	<ul style="list-style-type: none"> Quality and accuracy is a basic requirement for all customers. Deviations from customer specifications can render customers' downstream uses less productive or ineffective. 	<ul style="list-style-type: none"> Synthetic DNA providers are able to supply perfect clonal DNA to the customer. However, existing DNA synthesis technologies require significant cloning and error filtration to produce perfect clonal DNA. We are able to consistently produce high-quality oligos with what we believe is an industry-leading error rate of 1/1000 base pairs. This enables us to reduce the cloning and error filtration necessary to achieve perfect clonal DNA.
<i>Cost</i>	<ul style="list-style-type: none"> Cost is a critical consideration for both large and small-scale customers. Large-scale commercial DNA purchasers that outsource their DNA supply are becoming increasingly price sensitive due to their growing demand for DNA. 	<ul style="list-style-type: none"> Because we miniaturize the chemical reaction on a silicon chip, require lower volumes of reagents, and automate the production process, we are able to dramatically lower the production cost per base pair of DNA and offer our

	Customer desires	Twist Bioscience advantages
	<p>On the other hand, smaller-scale users, particularly academic users, typically have made their own DNA because of limited budgets relative to the prices charged by legacy DNA suppliers.</p>	<p>synthetic DNA at a lower price than competitors. As of September 2018, the publicly available pricing of our competitors for clonal DNA ranged from \$0.15—\$2.00 per base pair (assuming an order size of 150 base pairs). Our standard pricing for comparable DNA is \$0.09 per base pair for genes between 300 and 1,800 base pairs in length. One of the best demonstrations of our cost advantage is that we supply synthetic DNA to four other competing synthetic DNA providers.</p>
<i>Throughput/scale</i>	<ul style="list-style-type: none"> As the applications for synthetic biology have expanded, customers are increasingly seeking to purchase large quantities of DNA in relatively short periods of time, which often cannot be supplied by a single synthetic DNA provider due to production capacity constraints. Ordering from multiple suppliers to fulfill large orders can be costly and administratively cumbersome for customers. 	<ul style="list-style-type: none"> Our silicon chip technology is able to increase DNA production by a factor of 9,600 on a footprint similar to traditional DNA synthesis methods. We currently have the capability to manufacture 20 million oligonucleotides per month that can be combined into high-precision oligo pools of various sizes. These oligonucleotides can be used to create multiple products including genes. We currently have the capacity to produce more than 45,000 genes per month, which we believe is the highest in the industry. We have agreed to supply up to approximately 1.3 billion base pairs to Ginkgo Bioworks over a period of four years, which we believe is the largest volume supply commitment in the industry to date.
<i>Turnaround time</i>	<ul style="list-style-type: none"> The time between placement of the order and delivery is a key consideration for customers. For example, pharmaceutical companies are focused on shortening internal R&D timelines and ready availability of high-quality, synthetic DNA to meet their internal timelines. 	<ul style="list-style-type: none"> Because our platform enables the large-scale production of DNA, our turnaround time is largely independent of order size. We have enhanced our manufacturing capabilities and expect to reduce turnaround time on large commercial quantities of genes (i.e., orders of over 15,000 genes per month) to 10 business days.
<i>Product offering/complexity</i>	<ul style="list-style-type: none"> Customers require a broad range of products including different gene lengths, complicated sequences and a wide range of additional configurations to fulfill a diverse set of applications and uses. 	<ul style="list-style-type: none"> Because we synthesize each oligonucleotide individually, we can customize orders to almost any customer's specifications. We currently offer genes of up to 3,200 base pairs in length, which we believe satisfies a substantial portion of the market for

Customer desires	Twist Bioscience advantages
<p><i>Reliability</i></p> <ul style="list-style-type: none"> • Customers value the reliability of a supplier to deliver on promises of quality and turnaround time to allow them to plan their downstream workflow and hit internal deadlines. 	<p>synthetic DNA today. We expect to offer genes of up to 10,000 base pairs in the future. Unlike traditional DNA synthesis technologies, we can also manufacture a broad range of additional products on our same DNA synthesis platform, including antibody libraries and oligo pools, among others.</p> <ul style="list-style-type: none"> • Due to our throughput capability and proprietary integrated production and ordering process we have been able to consistently meet the specifications and turnaround time that we promise customers.
<p><i>E-commerce capability</i></p> <ul style="list-style-type: none"> • Customers, particularly smaller-scale customers, value an intuitive, seamless e-commerce experience that tracks orders from placement to delivery to simplify and automate the purchasing process. Some customers also value an application protocol interface, or an API, for electronic integration into their own procurement systems. 	<ul style="list-style-type: none"> • While some synthetic DNA providers have an e-commerce platform for ordering DNA, we believe we offer the most comprehensive e-commerce platform consisting of customized quotes, automated feedback on the feasibility of the sequence and the ability to track orders from placement to delivery. An API is also a core component of our e-commerce system.

Our target markets

Our currently marketed product offering addresses a market opportunity that was approximately \$1.8 billion in calendar year 2016. We believe our solution has the potential to materially expand our initial market by providing end-users with access to high-quality and lower cost tools, encouraging adoption and facilitating new applications for our products, such as pharmaceutical biologics drug discovery and digital data storage in DNA.

Synthetic DNA market

We believe that our current market opportunity for synthetic DNA was approximately \$1.3 billion in calendar year 2016. The market consists of those who buy DNA, or DNA Buyers, and those who make their own DNA, or DNA Makers. Driven by access to more affordable and high-quality synthetic DNA, we believe that there is a strong trend of DNA Makers converting to DNA Buyers. According to BCC Research, the size of the DNA Buyer market in 2016 was approximately \$300 million and is growing at a rate of approximately 20% annually as existing DNA Buyers develop new uses for synthetic DNA and existing DNA Makers convert to DNA Buyers. We estimate our market opportunity in the DNA Maker market to be approximately \$950 million. Our market estimate is based on the market sizes for products used in manual DNA synthesis, including the cloning and restriction digestion enzyme market in 2016, according to a report on Molecular Biology by Markets and Markets.

NGS sample preparation market

Our NGS sample preparation kits address the demand for better sample preparation products that improve the sequencing workflow, increase sequencing accuracy and lower sequencing costs. We offer kits consisting of

double-stranded DNA probes and a comprehensive target enrichment kit that are used for exome sequencing and custom targeted sequencing. Kalorama Information, a division of marketresearch.com, estimates the market for sample preparation for next generation sequencing was approximately \$500 million in calendar year 2016 and growing at approximately 20% annually.

Pharmaceutical biologics drug discovery

We believe we are uniquely positioned to capture a larger portion of the drug discovery value chain given that our synthetic DNA products are already used by our pharmaceutical partners throughout the drug development process. As part of our effort in this market, we recently launched our custom DNA library solution which facilitates biologic drug discovery and development. We are already in agreement with a top three pharmaceutical company by revenue to supply our custom DNA libraries instead of them producing their own. In addition to our custom DNA libraries, we are also developing other proprietary tools, such as a wholly-owned GPCR library and an antibody optimization solution, that we believe will enable us to provide an end-to-end solution in biologics drug discovery and early development, from target to investigational new drug, or IND, application, and adding value as a partner to biotechnology and pharmaceutical companies. These partnerships may include upfront, milestone and royalty payments.

Digital data storage in DNA

Due to the explosion of data across many industries, finding efficient means of storage has become more important. Through the Semiconductor Research Corporation, many leading semiconductor companies, including Microsoft Corporation, IBM Corporation, Micron Technology, Inc., Autodesk Inc., Mentor Graphics Corporation and GlobalFoundries Inc., are exploring DNA as a data storage medium. We have strategic relationships with Microsoft Corporation and the University of Washington through which we have demonstrated the feasibility of storing data on DNA and the unique benefits of longevity, density, and universality of this format. We believe that in three to five years, new DNA technologies and cost efficiencies could surpass mature information technology hardware solutions to allow data storage in DNA to become cost competitive with traditional storage media and enable us to target several large markets within data storage. The market for digital data storage is more than \$35 billion and we believe DNA can address several segments within this market.

Our growth strategy

Our objective is to be the leading provider of synthetic DNA worldwide and to leverage the versatility of our platform to build a leadership position in other synthetic DNA-based product markets in which we have a competitive advantage. We intend to accomplish this objective by executing on the following:

- Maintain and expand our position as the provider of choice for high-quality, affordable synthetic genes and DNA to customers across multiple industries;
- Become a leading supplier of NGS sample preparation products;
- Conduct antibody therapeutic discovery and optimization for our current customers and future partners;
- Continue to explore development of DNA as a digital data storage medium via internal research and government and industry partnerships; and
- Expand our global presence.

Beyond these opportunities, we are working with industry partners to create new markets for our products by leveraging the versatility of our platform.

Recent developments

Our financial results for the three months ended September 30, 2018 are not yet complete and will not be available until after the completion of this offering. Accordingly, we are presenting below certain preliminary estimated and unaudited data as of and for the three months ended September 30, 2018. The estimated unaudited data set forth below are preliminary and actual results remain subject to the completion of management's and our audit committee's reviews and our other financial closing processes as well as the completion and preparation of our consolidated financial data as of and for the three months ended September 30, 2018. Such estimated and unaudited data constitute forward-looking statements based solely on information available to us as of the date of this prospectus and may differ materially from actual results. This data should not be considered a substitute for the financial information to be filed with the SEC in our Annual Report on Form 10-K for the fiscal year ended September 30, 2018 once it becomes available. For additional information, see "Special note regarding forward-looking statements" and "Risk factors."

Our preliminary estimated and unaudited data contained in this prospectus have been prepared in good faith by, and are the responsibility of, management based upon our internal reporting as of and for the three months ended September 30, 2018. Our independent registered public accounting firm, PricewaterhouseCoopers LLP, has not audited, reviewed, compiled or performed any procedures with respect to the following preliminary estimated and unaudited data. Accordingly, PricewaterhouseCoopers LLP does not express an opinion or any other form of assurance with respect thereto.

Once our year-end financial closing process and external audit are completed, we may report financial results and other data that could differ, and the differences could be material. The following information and estimates contain certain forward-looking statements. While we believe that such information and estimates are based on reasonable assumptions, our actual results may vary, and such variations may be material. Factors that could cause the preliminary estimated and unaudited data to differ include, but are not limited to: (i) additional adjustments in the calculation of, or application of accounting principles for, the financial results for the year ended September 30, 2018; (ii) discovery of new information that affects accounting estimates, management judgment, or impacts valuation methodologies underlying these estimated results; and (iii) the completion of our audit for the fiscal year ended September 30, 2018.

Preliminary financial results as of and for the three months ended September 30, 2018

We have presented the following preliminary estimated and unaudited data as of and for the three months ended September 30, 2018:

(In thousands)	Three months ended	
	September 30, 2018	
	Estimated	
	Low	High
Consolidated statement of operations data:		
Revenues	\$ 7,961	\$ 8,292
Cost of revenues	\$ (9,156)	\$ (8,919)
Loss from operations	\$ (20,866)	\$ (19,468)

(In thousands, except customer numbers)	Three months ended September 30, 2018
	Estimated
Operational and other data:	
Customers served	498
Revenue from Ginkgo Bioworks	\$ 3,157

(In thousands)	Three months ended September 30, 2018
	Estimated
Order value:	
Synthetic genes	\$ 6,798
NGS tools	4,414
DNA libraries	576
Oligo pools	1,001
Total	\$ 12,789

(In thousands)	As of September 30, 2018
	Estimated
Consolidated balance sheet data:	
Cash, cash equivalents and short-term investments	\$ 80,756
Long-term debt, current and non-current	\$ 9,676

Below we have provided information regarding comparisons to prior quarters for context.

Revenue

Our preliminary estimated revenues for the three months ended September 30, 2018 range between \$8.0 million to \$8.3 million, which represent increases of 22% and 27%, respectively, from revenues of \$6.5 million for the three months ended June 30, 2018. This increase is primarily attributable to higher sales to Ginkgo Bioworks, which increased quarter-over-quarter from \$1.6 million in the three months ended June 30, 2018 to \$3.2 million in the three months ended September 30, 2018. In the three months ended September 30, 2018, our average monthly genes shipped was 23,611, a 86% and 828% growth in average monthly genes shipped of 12,675 and 2,544 in the three months ended September 30, 2017 and 2016, respectively.

Loss from operations

Our preliminary estimated loss from operations for the three months ended September 30, 2018 ranges between \$19.5 million and \$20.9 million, which represent increases of 11% and 19%, respectively, from loss from operations of \$17.5 million in the three months ended June 30, 2018.

Key business metrics—Value of orders received and Number of Customers

Value of orders received, which is a key business metric defined on page 75 of this prospectus in the section titled “Management’s discussion and analysis of financial condition and results of operations,” increased 20%, from \$10.7 million in the three months ended June 30, 2018 to \$12.8 million in the three months ended September 30, 2018. This estimated growth in order value is attributable to a \$2.9 million increase in order value for our NGS

tools, from \$1.5 million in the three months ended June 30, 2018 to \$4.4 million in the three months ended September 30, 2018, which represents quarter-over-quarter growth of 193%. This growth in value of orders received was offset by a \$0.3 million decline in order value from Ginkgo Bioworks, which declined 12% from \$2.5 million in the three months ended June 30, 2018 to \$2.2 million in the three months ended September 30, 2018. The decline in the value of orders received from Ginkgo Bioworks was attributable to the timing of receipt of orders from Ginkgo Bioworks between quarters.

We increased the number of customers, which is a key business metric defined on page 76 of this prospectus in the section titled "Management's discussion and analysis of financial condition and results of operations", by 33%, or 178 customers, in the three months ended September 30, 2018, and we shipped product to 717 customers in the twelve months ended September 30, 2018.

Risks related to our business

Investing in our common stock involves substantial risk. You should carefully consider all of the information in this prospectus prior to investing in our common stock. There are several risks related to our business that are described under "Risk factors" elsewhere in this prospectus. Among these important risks are the following:

- We are an early stage company with limited operating history, which may make it difficult to evaluate our current business and predict our future performance;
- We have incurred net losses in every period to date, and we expect to continue to incur significant losses as we develop our business and may never achieve profitability;
- Our consolidated financial statements contain a going concern qualification and we will require additional financing to achieve our goals;
- If we are unable to attract new customers and retain and grow sales from our existing customers, our business will be materially and adversely affected;
- Rapidly changing technology and extensive competition in synthetic biology could make the products we are developing obsolete or non-competitive unless we continue to develop new and improved products and pursue new market opportunities;
- We and our chief executive officer are currently involved in litigation with Agilent Technologies, Inc., or Agilent, in which Agilent has alleged a claim of trade secret misappropriation against Twist Bioscience and trade secret misappropriation and other related claims against our chief executive officer, and an adverse result could harm our business and results of operations;
- Our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a significant customer;
- The continued success of our business relies heavily on our disruptive technologies and products and our position in the market as a leading provider of synthetic DNA using a silicon chip; and
- If we are unable to obtain, maintain and enforce intellectual property protection, others may be able to make, use, or sell products and technologies substantially the same as ours, which could adversely affect our ability to compete in the market.

Corporate information

We were incorporated in Delaware on February 4, 2013. Our principal executive offices are located at 455 Mission Bay Boulevard South, Suite 545, San Francisco, CA 94158. Our telephone number at that location is (800) 719-0671. References in the prospectus to “we,” “our,” “us,” “Twist Bioscience” and the “Company” refer to Twist Bioscience Corporation and, where appropriate, its wholly-owned subsidiaries unless the context requires otherwise. Our corporate website address is www.twistbioscience.com. The information contained on our website is not incorporated by reference into this prospectus, and you should not consider any information contained on, or that can be accessed through, our website to be part of this prospectus. We have included our website address only as an inactive textual reference and do not intend it to be an active link to our website.

Implications of being an emerging growth company

We qualify as an “emerging growth company,” as defined in Section 2(a) of the Securities Act of 1933, as amended, or the Securities Act, as modified by the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. As such, we are eligible to take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not “emerging growth companies” including, but not limited to:

- an exemption from complying with the auditor attestation requirements of Section 404 of the Sarbanes Oxley Act of 2002, as amended, or Section 404;
- a requirement to have only two years of audited financial statements and only two years of related selected financial data and management’s discussion and analysis of financial condition and results of operations disclosure;
- reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements; and
- an exemption from the requirement to seek non-binding advisory votes on executive compensation.

We have not made a decision regarding whether to take advantage of these exemptions. If we do take advantage of any of these exemptions, we do not know if some investors will find our common stock less attractive as a result. The result may be a less active trading market for our common stock and our stock price may be more volatile.

In addition, Section 107 of the JOBS Act provides that an “emerging growth company” can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act for complying with new or revised accounting standards. In other words, an “emerging growth company” can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have irrevocably opted out of the extended transition period for complying with new or revised accounting standards pursuant to Section 107(b) of the JOBS Act.

We could remain an “emerging growth company” for up to five years, or until the earliest of (a) the last day of the first fiscal year in which our annual gross revenues exceed \$1.07 billion, (b) the date that we become a “large accelerated filer” as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended, or the Exchange Act, which would occur if the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the last business day of our most recently completed second fiscal quarter and (c) the date on which we have issued more than \$1 billion in non-convertible debt during the preceding three-year period.

The offering

The following information assumes that the underwriters do not exercise their option to purchase additional shares in the offering. See “Underwriting.”

Common stock offered by us 5,000,000 shares

Common stock to be outstanding after the offering 26,609,991 shares

Option to purchase additional shares of common stock The underwriters have an option to purchase a maximum of 750,000 additional shares of common stock from us, solely to cover overallotments. The underwriters can exercise this option at any time within 30 days from the date of this prospectus.

Use of proceeds We intend to use the net proceeds from this offering primarily to (i) improve and update our platform and core technologies, (ii) expand our sales and marketing capabilities in the U.S. and in other geographies, including China, (iii) continue to expand in the pharmaceutical biologics drug discovery and DNA data storage markets, (iv) establish our operations in China, and (v) for working capital and general corporate purposes. While we have no current agreements, commitments or understandings for any specific strategic acquisitions or in-licenses at this time, we may use a portion of the net proceeds for these purposes. See “Use of proceeds” for more information.

Listing We have applied to list our common stock on the Nasdaq Global Market under the symbol “TWST.”

Material U.S. federal income tax considerations for non-U.S. holders For a discussion of the material U.S. federal income tax considerations that may be relevant to prospective investors who are non-U.S. holders, please see “Material U.S. federal income tax considerations for non-U.S. holders.”

Risk factors Investing in our common stock involves a high degree of risk. You should carefully read and consider the information set forth under “Risk factors” and all other information in this prospectus before investing in our common stock.

Participation in the offering Certain of our stockholders, including stockholders affiliated with certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$30 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer

or no shares in this offering to any of these stockholders, or any of these stockholders may determine to purchase more, fewer or no shares in this offering.

We refer to our Series A redeemable convertible preferred stock, Series B redeemable convertible preferred stock, Series C redeemable convertible preferred stock and Series D redeemable convertible preferred stock as our “convertible preferred stock” in this prospectus, as well as for financial reporting-term purposes and in the financial tables included in this prospectus, as more fully explained in Note 13 to our audited annual consolidated financial statements. In this prospectus (as well as, for financial reporting-term purposes and in the financial tables included in this prospectus as more fully described in Note 12 to our audited annual consolidated financial statements), we refer to our outstanding warrants as either warrants to purchase shares of redeemable convertible preferred stock or warrants to purchase shares of common stock.

Effective October 16, 2018, we effected a one-for-0.101 reverse stock split, or the Reverse Stock Split, of our issued and outstanding common stock, convertible preferred stock, stock options, warrants to purchase shares of our convertible redeemable preferred stock and warrants to purchase shares of our common stock. We will make a cash payment to stockholders for all fractional shares which would otherwise be required to be issued as a result of the Reverse Stock Split.

Except as otherwise indicated, all information in this prospectus is based upon 21,609,991 shares of our common stock (including 146,745 unvested shares of restricted common stock subject to our repurchase right) outstanding as of June 30, 2018, and excludes:

- 564,848 shares of our common stock issuable upon conversion of 564,848 shares of Series D convertible preferred stock issued after June 30, 2018;
- 2,424,024 shares of our common stock issuable upon exercise of stock options outstanding as of June 30, 2018, having a weighted-average exercise price of \$8.04 per share;
- 130,578 shares of our common stock issuable upon exercise of stock options granted after June 30, 2018, having a weighted-average exercise price of \$11.25 per share;
- 5,856,505 shares of common stock reserved for future grant or issuance under our 2018 Equity Incentive Plan, or the 2018 Plan (which includes 928,974 shares of our common stock as of June 30, 2018 reserved for future grant under our 2013 Stock Plan, or the 2013 Plan, that will be added to the shares reserved for future issuance under our 2018 Plan upon effectiveness of that plan if the shares are not issued or subject to outstanding grants under the 2013 Plan at that time and up to a maximum of 2,432,831 additional shares upon the cancellation, forfeiture or repurchase of outstanding awards granted under the 2013 Plan), which will become effective in connection with this offering and contains provisions that automatically increase its share reserve each year, as more fully described in “Executive compensation—Equity incentive plans;”
- 275,225 shares of common stock reserved for future grant or issuance under our 2018 Employee Stock Purchase Plan, or the 2018 ESPP, which will become effective in connection with this offering and contains provisions that automatically increase its share reserve each year, as more fully described in “Executive Compensation—Equity incentive plans;”
- 64,127 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our common stock outstanding as of June 30, 2018, having an exercise price of \$6.24 per share, and an additional 64,126 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our common stock, having an exercise price of \$6.24 per share that would be exercisable upon the drawing down

of additional loans under our amended and restated loan and security agreement with Silicon Valley Bank, or SVB, dated September 6, 2017, or credit facility;

- 36,838 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series A convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$3.26 per share;
- 16,221 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series B convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$7.84 per share;
- 18,854 shares of our common stock, issuable upon the exercise of outstanding warrants to purchase Series C convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$14.85 per share; and
- 7,531 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series D convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$21.24 per share.

Except as otherwise indicated, all information in this prospectus reflects and assumes:

- a one-for-0.101 reverse stock split of our common stock and convertible preferred stock, which we effected on October 16, 2018;
- the conversion immediately prior to the completion of this offering of all of our outstanding shares of convertible preferred stock into an aggregate of 18,386,457 shares of common stock;
- the automatic conversion of warrants to purchase an aggregate of 79,444 shares of convertible preferred stock into warrants to purchase an aggregate of 79,444 shares of common stock immediately prior to the closing of this offering;
- no exercise or termination of outstanding stock options or warrants after June 30, 2018;
- the filing and effectiveness of our amended and restated certificate of incorporation and the adoption of our amended and restated bylaws immediately prior to the closing of this offering; and
- no exercise by the underwriters of their overallotment option to purchase additional shares of common stock from us.

Summary consolidated financial information

The following table summarizes our historical consolidated financial data and should be read together with our consolidated financial statements, the notes to our consolidated financial statements and the sections titled “Selected consolidated financial data” and “Management’s discussion and analysis of financial condition and results of operations” contained elsewhere in this prospectus.

We derived the summary consolidated statements of operations data and consolidated balance sheet data for the fiscal years ended September 30, 2016 and 2017 from our audited consolidated financial statements included elsewhere in this prospectus. We have derived the unaudited condensed consolidated statements of operations data for the nine months ended June 30, 2017 and 2018, and the unaudited condensed consolidated balance sheet data as of June 30, 2018, from our unaudited condensed consolidated financial statements included elsewhere in this prospectus. We have prepared the unaudited financial information on a basis consistent with our audited consolidated financial statements and have included, in our opinion, all adjustments, consisting only of normal recurring adjustments, that we consider necessary for a fair statement of the financial information set forth in those statements. The summary financial data included in this section are not intended to replace the financial statements and related notes included elsewhere in this prospectus. Our historical results are not necessarily indicative of our future performance, and our interim results are not necessarily indicative of the results to be expected for the full fiscal year.

(in thousands, except share and per share data)	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Consolidated statements of operations data:				
Revenues	\$ 2,269	\$ 10,767	\$ 7,301	\$ 17,020
Operating expenses:				
Cost of revenues	9,421	24,020	17,191	23,096
Research and development	18,230	19,169	14,318	14,282
Selling, general and administrative	18,274	26,060	17,651	30,497
Total operating expenses	45,925	69,249	49,160	67,875
Loss from operations	(43,656)	(58,482)	(41,859)	(50,855)
Interest income	241	412	225	590
Interest expense	(746)	(905)	(657)	(927)
Other income (expense), net	73	(55)	151	(76)
Loss before income taxes	(44,088)	(59,030)	(42,140)	(51,268)
Provision for income taxes	—	(280)	(161)	(166)
Net loss attributable to common stockholders	\$ (44,088)	\$ (59,310)	\$ (42,301)	\$ (51,434)
Other comprehensive loss				
Change in unrealized gain (loss) on investments	9	(9)	(25)	—
Foreign currency translation adjustment	—	33	6	35
Comprehensive loss	\$ (44,079)	\$ (59,286)	\$ (42,320)	\$ (51,399)
Net loss per share attributable to common stockholders—basic and diluted(1)	\$ (23.58)	\$ (24.49)	\$ (17.78)	\$ (18.92)
Weighted average shares used in computing net loss per share attributable to common stockholders—basic and diluted(1)				
	1,869,631	2,422,243	2,379,217	2,719,051
Pro forma net loss per share—basic and diluted(1)		\$ (3.84)		\$ (2.74)
Pro forma weighted-average shares used in computing pro forma net loss per share—basic and diluted(1)				
		15,392,026		18,780,785
(1) See Note 16 of the notes to our audited annual consolidated financial statements and Note 12 of the notes to our unaudited interim condensed consolidated financial statements included elsewhere in this prospectus for a description of the method used to compute basic and diluted net loss per share attributable to common stockholders and pro forma basic and diluted net loss per share.				

(In thousands)	As of June 30, 2018		
	Actual	Pro forma(2)	Pro forma as adjusted(3)
Consolidated balance sheet data:			
Cash, cash equivalents, and short-term investments	\$ 92,499	\$ 92,499	\$ 160,710
Working capital	85,688	85,688	154,415
Total assets	122,665	122,665	188,436
Total liabilities	26,919	26,209	25,693
Convertible preferred stock	278,505	—	—
Additional paid-in capital	8,226	287,441	353,728
Accumulated deficit	(191,053)	(191,053)	(191,053)
Total stockholders' equity (deficit)	(182,759)	96,456	162,743
<p>(2) The pro forma column reflects, effective immediately prior to the closing of this offering, the conversion of all outstanding shares of our convertible preferred stock into an aggregate of 18,386,457 shares of common stock.</p> <p>(3) The pro forma as adjusted column gives effect to the pro forma adjustments set forth in footnote 2 above and further reflects the sale by us of 5,000,000 shares of common stock in this offering at an assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each \$1.00 increase or decrease in the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, would increase or decrease, as applicable, our pro forma as adjusted cash, cash equivalents and short-term investments, working capital, total assets and total stockholders' equity by approximately \$4.65 million, assuming that the number of shares of our common stock offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase or decrease of 1.0 million shares in the number of shares offered by us would increase or decrease the amount of our cash, cash equivalents and short-term investments, working capital, total assets and total stockholders' equity by approximately \$13.95 million, assuming an initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.</p>			

Risk factors

Investing in our common stock involves a high degree of risk. You should consider carefully the risks and uncertainties described below, together with all of the other information in this prospectus, including our consolidated financial statements and related notes, before deciding whether to purchase shares of our common stock. If any of the following risks is realized, our business, financial condition, results of operations and prospects could be materially and adversely affected. In that event, the price of our common stock could decline, and you could lose part or all of your investment.

Risks related to our business

We are an early stage company with limited operating history, which may make it difficult to evaluate our current business and predict our future performance.

We are an early stage company and have a limited operating history. We were incorporated in February 2013 and began commercial operations in April 2016. Prior to engaging in commercial operations, we focused on research and development of DNA synthesis. Our revenue for the fiscal years ended September 30, 2016 and 2017 was \$2.3 million and \$10.8 million, respectively. Our revenue for the nine months ended June 30, 2017 and 2018, was \$7.3 million and \$17.0 million, respectively. We may never achieve commercial success and we have limited historical financial data upon which we may base our projected revenue. We also have limited historical financial data upon which we may base our planned operating expense or upon which you may evaluate our business and our prospects. Based on our limited experience in developing and marketing new products, we may not be able to effectively:

- drive adoption of our products;
- attract and retain customers for our products;
- anticipate and adapt to changes in our the existing and emerging markets in which we operate;
- focus our research and development efforts in areas that generate returns on these efforts;
- maintain and develop strategic relationships with suppliers to acquire necessary materials and equipment for the production of our products on appropriate timelines, or at all;
- implement an effective marketing strategy to promote awareness of our products with potential customers;
- scale our manufacturing activities to meet potential demand at a reasonable cost;
- avoid infringement of third-party intellectual property;
- obtain licenses on commercially reasonable terms to third-party intellectual property, as needed;
- obtain valid and enforceable patents that give us a competitive advantage;
- protect our proprietary technology;
- provide appropriate levels of customer training and support for our products; and
- attract, retain and motivate qualified personnel.

In addition, a high percentage of our expenses have been and will continue to be fixed. Accordingly, if we do not generate revenue as and when anticipated, our losses may be greater than expected and our operating results will suffer. You should consider the risks and difficulties frequently encountered by companies like ours in new and rapidly evolving markets when making a decision to invest in our common stock.

We have incurred net losses in every period to date, and we expect to continue to incur significant losses as we develop our business and may never achieve profitability.

We have incurred net losses in each year since inception and have generated limited revenue from product sales to date. We expect to incur increasing costs as we grow our business. We cannot be certain if or when we will produce sufficient revenue from our operations to support our costs. Even if profitability is achieved, we may not be able to sustain profitability. We incurred net losses of \$44.1 million and \$59.3 million for the years ended September 30, 2016 and 2017, respectively, and a net loss of \$51.4 million for the nine months ended June 30, 2018. As of June 30, 2018, we had an accumulated deficit of \$191.1 million. We expect to incur substantial losses and negative cash flow for the foreseeable future. In addition, as a public company, we will incur significant legal, accounting, and other expenses that we did not incur as a private company. These increased expenses will make it harder for us to achieve and sustain future profitability. We may incur significant losses in the future for a number of reasons, many of which are beyond our control, including the other risks described in this prospectus, the market acceptance of our products, future product development and our market penetration and margins.

Our consolidated financial statements contain a going concern qualification.

Our annual audited consolidated financial statements contain a going concern qualification. We have incurred net losses and used significant cash in operating activities since inception and have an accumulated deficit of \$191.1 million and working capital of \$85.7 million as of June 30, 2018. These factors raise substantial doubt about our ability to continue as a going concern. Our ability to continue as a going concern is dependent on our ability to raise adequate capital to fund operating losses until we are able to engage in profitable business operations. To the extent financing is not available, we may not be able to develop, or may be delayed in developing, our products and meeting our obligations. There can be no assurance that we will be able to obtain additional debt or equity capital required in order to continue our operations on terms acceptable to us or at all.

We will require additional financing to achieve our goals, and a failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product manufacturing and development and other operations.

Since our inception, substantially all of our resources have been dedicated to the development of our DNA synthesis platform. Net cash used in operating activities was \$38.6 million and \$51.3 million for the years ended September 30, 2016 and 2017, respectively, and \$49.5 million for the nine months ended June 30, 2018. As of September 30, 2017, we had working capital of \$58.4 million and capital resources consisting of cash, cash equivalents and short-term investments of \$62.2 million. As of the nine months ended June 30, 2018, we had working capital of \$85.7 million and capital resources consisting of cash, cash equivalents and short-term investments of \$92.5 million. We believe that we will continue to expend substantial resources for the foreseeable future as we expand into additional markets we may choose to pursue. These expenditures are expected to include costs associated with research and development, manufacturing and supply as well as marketing and selling existing and new products. In addition, other unanticipated costs may arise.

After giving effect to the anticipated net proceeds from this offering, we expect that our existing cash, cash equivalents and short-term investments will be sufficient to fund our planned operating expenses, capital expenditure requirements and debt service payments through at least the next 12 months. However, our operating plan may change as a result of factors currently unknown to us, and we may need to seek additional funds sooner than planned, through public or private equity or debt financings or other sources, such as strategic collaborations. Such financing may result in dilution to stockholders, imposition of debt covenants and repayment obligations, or other restrictions that may adversely affect our business. In addition, we may seek

additional capital due to favorable market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans.

Our future capital requirements depend on many factors, including:

- the number and characteristics of any additional products or manufacturing processes we develop or acquire to serve new or existing markets;
- the scope, progress, results and costs of researching and developing future products or improvements to existing products or manufacturing processes;
- the cost of manufacturing our DNA synthesis equipment and tools and any future products we successfully commercialize;
- our ability to establish and maintain strategic collaborations, licensing or other arrangements and the financial terms of such agreements;
- any lawsuits related to our products or commenced against us, including the costs associated with our current litigation with Agilent;
- the expenses needed to attract and retain skilled personnel;
- the costs associated with being a public company;
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing patent claims, including litigation costs and the outcome of such litigation; and
- the timing, receipt and amount of sales of, or royalties on, any future approved products, if any.

Additional funds may not be available when we need them, on terms that are acceptable to us, or at all. If adequate funds are not available to us on a timely basis, we may be required to:

- delay, limit, reduce or terminate our manufacturing, research and development activities; or
- delay, limit, reduce or terminate our establishment of sales and marketing capabilities or other activities that may be necessary to generate revenue and achieve profitability.

If we are unable to maintain adequate revenue growth or do not successfully manage such growth, our business and growth prospects will be harmed.

We have experienced significant revenue growth in a short period of time. We may not achieve similar growth rates in future periods. Investors should not rely on our operating results for any prior periods as an indication of our future operating performance. To effectively manage our anticipated future growth, we must continue to maintain and enhance our manufacturing, sales, financial and customer support administration systems, processes and controls. Failure to effectively manage our anticipated growth could lead us to over-invest or under-invest in development, operational, and administrative infrastructure; result in weaknesses in our infrastructure, systems, or controls; give rise to operational mistakes, losses, loss of customers, productivity or business opportunities; and result in loss of employees and reduced productivity of remaining employees.

Our continued growth could require significant capital expenditures and might divert financial resources from other projects such as the development of new products and services. As additional products are commercialized, we may need to incorporate new equipment, implement new technology systems, or hire new personnel with different qualifications. Failure to manage this growth or transition could result in turnaround time delays, higher manufacturing costs, declining product quality, deteriorating customer service, and slower responses to competitive challenges. A failure in any one of these areas could make it difficult for us to meet market expectations for our products, and could damage our reputation and the prospects for our business.

If our management is unable to effectively manage our anticipated growth, our expenses may increase more than expected, our revenue could decline or grow more slowly than expected and we may be unable to implement our business strategy. The quality of our products may suffer, which could negatively affect our reputation and harm our ability to retain and attract customers.

The estimates of market opportunity and forecasts of market growth included in this prospectus may prove to be inaccurate, and even if the market in which we compete achieves the forecasted growth, our business could fail to grow at similar rates, if at all.

Market opportunity estimates and growth forecasts are subject to significant uncertainty and are based on assumptions and estimates that may not prove to be accurate. For example, several of the reports rely on discussions with industry thought leaders, employ projections of future applications of synthetic biology and next generation sequencing technology in major end-user market segments and by technology type, and incorporate data from secondary sources such as company websites as well as industry, trade and government publications. The estimates and forecasts in this prospectus relating to the size and expected growth of our market may prove to be inaccurate. Even if the market in which we compete meets the size estimates and growth forecasted in this prospectus, our business could fail to grow at the rate we anticipate, if at all.

Our quarterly and annual operating results and cash flows have fluctuated in the past and might continue to fluctuate, causing the value of our common stock to decline substantially.

Numerous factors, many of which are outside our control, may cause or contribute to significant fluctuations in our quarterly and annual operating results. These fluctuations may make financial planning and forecasting difficult. In addition, these fluctuations may result in unanticipated decreases in our available cash, which could negatively affect our business and prospects. In addition, one or more of such factors may cause our revenue or operating expenses in one period to be disproportionately higher or lower relative to the others. As a result, comparing our operating results on a period-to-period basis might not be meaningful. You should not rely on our past results as indicative of our future performance. Moreover, our stock price might be based on expectations of future performance that are unrealistic or that we might not meet and, if our revenue or operating results fall below the expectations of investors or securities analysts, the price of our common stock could decline substantially.

Our operating results have varied in the past. As a result, our operating results could be unpredictable, particularly on a quarterly basis. In addition to other risk factors listed in this section, some of the important factors that may cause fluctuations in our quarterly and annual operating results are further described in "Risk factors—Risks relating to owning our stock and this offering."

In addition, a significant portion of our operating expense is relatively fixed in nature, and planned expenditures are based in part on expectations regarding future revenue. Accordingly, unexpected revenue shortfalls might decrease our gross margins and could cause significant changes in our operating results from quarter to quarter. If this occurs, the trading price of our common stock could fall substantially.

If we are unable to attract new customers and retain and grow sales from our existing customers, our business will be materially and adversely affected.

In order to grow our business, we must continue to attract new customers and retain and grow sales from our existing customers on a cost-effective basis. To do this, we aim to attract new and existing buyers of synthetic DNA, convert makers of synthetic DNA into buyers of synthetic DNA, and achieve widespread market acceptance by delivering both our current product offerings and new products and technologies at low-cost, with high-quality, reliable turn-around times and throughput, superior e-commerce services and effective technical support. For additional information on our growth strategy, see the section of this prospectus

captioned “Business—Business strategy.” We cannot guarantee that our efforts to provide these key requirements will be consistently acceptable to, and meet the performance expectations of, our customers and potential customers. If we are unable to successfully attract and retain customers, our business, financial position and results of operations would be negatively impacted.

Internet security poses a risk to our e-commerce sales.

We currently generate a small portion of our revenue through sales on our e-commerce platform. However, as part of our growth strategy, we intend to increase the level of customer traffic and volume of customer purchases through our e-commerce platform which we formally launched to the general public in January 2018. We manage our website and e-commerce platform internally and as a result any compromise of our security or misappropriation of proprietary information could have a material adverse effect on our business, financial condition and results of operations. We rely on encryption and authentication technology licensed from third parties to provide the security and authentication necessary to effect secure Internet transmission of confidential information, such as credit and other proprietary information. Advances in computer capabilities, new discoveries in the field of cryptography or other events or developments may result in a compromise or breach of the technology used by us to protect customer transaction data. Anyone who is able to circumvent our security measures could misappropriate proprietary information or cause material interruptions in our operations. We may be required to expend significant capital and other resources to protect against security breaches or to minimize problems caused by security breaches. To the extent that our activities or the activities of others involve the storage and transmission of proprietary information, security breaches could damage our reputation and expose us to a risk of loss and/or litigation. Our security measures may not prevent security breaches. Our failure to prevent these security breaches may result in consumer distrust and may adversely affect our business, results of operations and financial condition.

Our actual operating results may differ significantly from our guidance.

From time to time, we plan to release guidance in our quarterly earnings conference calls, quarterly earnings releases, or otherwise, regarding our future performance that represents our management’s estimates as of the date of release. This guidance, which will include forward-looking statements, will be based on projections prepared by our management. These projections will not be prepared with a view toward compliance with published guidelines of the American Institute of Certified Public Accountants, or AICPA, and neither our registered public accountants nor any other independent expert or outside party compiles or examines the projections. Accordingly, no such person will express any opinion or any other form of assurance with respect to the projections.

Projections are based upon a number of assumptions and estimates that, while presented with numerical specificity, are inherently subject to significant business, economic and competitive uncertainties and contingencies, many of which are beyond our control and are based upon specific assumptions with respect to future business decisions, some of which will change. We intend to state possible outcomes as high and low ranges which are intended to provide a sensitivity analysis as variables are changed but are not intended to imply that actual results could not fall outside of the suggested ranges. The principal reason that we release guidance is to provide a basis for our management to discuss our business outlook with analysts and investors. We do not accept any responsibility for any projections or reports published by any such third parties.

Guidance is necessarily speculative in nature, and it can be expected that some or all of the assumptions underlying the guidance furnished by us will not materialize or will vary significantly from actual results. Accordingly, our guidance is only an estimate of what management believes is realizable as of the date of release. Actual results may vary from our guidance and the variations may be material. In light of the foregoing, investors are urged not to rely upon our guidance in making an investment decision regarding our common stock.

Any failure to successfully implement our operating strategy or the occurrence of any of the events or circumstances set forth in this “Risk factors” section in this prospectus could result in the actual operating results being different from our guidance, and the differences may be adverse and material.

Rapidly changing technology and extensive competition in synthetic biology could make the products we are developing and producing obsolete or non-competitive unless we continue to develop and manufacture new and improved products and pursue new market opportunities.

The synthetic biology industry is characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry demands and standards. Our future success will depend on our ability to continually improve the products we are developing and producing, to develop and introduce new products that address the evolving needs of our customers on a timely and cost-effective basis and to pursue new market opportunities that develop as a result of technological and scientific advances. These new market opportunities may be outside the scope of our proven expertise or in areas which have unproven market demand, and the utility and value of new products and services developed by us may not be accepted in the markets served by the new products. Our inability to gain market acceptance of existing products in new markets or market acceptance of new products could harm our future operating results. Our future success also depends on our ability to manufacture these new and improved products to meet customer demand in a timely and cost-effective manner, including our ability to resolve manufacturing issues that may arise as we commence production of any new products we develop. Unanticipated difficulties or delays in replacing existing products with new products we introduce or in manufacturing improved or new products in sufficient quantities to meet customer demand could diminish future demand for our products and harm our future operating results.

In addition, there is extensive competition in the synthetic biology industry, and our future success will depend on our ability to maintain a competitive position with respect to technological advances. Technological development by others may result in our technologies, as well as products developed using our technologies, becoming obsolete. Our ability to compete successfully will depend on our ability to develop proprietary technologies and products that are technologically superior to and/or are less expensive than our competitors' technologies and products. Our competitors may be able to develop competing and/or superior technologies and processes, and compete more aggressively and sustain that competition over a longer period of time.

The continued success of our business relies heavily on our disruptive technologies and products and our position in the market as a leading provider of synthetic DNA using a silicon chip.

Our future profitability will depend on our ability to successfully execute and maintain a sustainable business model and generate continuous streams of revenue. Our business model is premised on the fact that we are the only DNA synthesis provider to synthesize DNA on a silicon chip and the competitive advantages this creates. Our DNA synthesis methods, among other things, reduce the amount of raw materials required, speed up the synthesis process and deliver large volumes of high-quality synthetic DNA at low unit cost. However, if other competitors develop and commercialize a manufacturing process using a silicon chip or other similar technologies providing for the development of competitive synthetic DNA products at scale, this could be disruptive to our business model and could adversely affect our business prospects, financial condition and results of operations. If we are unable to convert sufficient number of current manufacturers of synthetic DNA to buyers of our synthetic DNA, surpass our competitors regarding certain industry-related data points, and effectively implement our e-commerce platform which facilitates efficient order entry and fulfillment for our customers, our business, prospects, financial condition and results of operation will be adversely affected.

If we are unable to expand into adjacent addressable markets, our business may be materially and adversely affected.

Our future revenue growth and market potential may depend on our ability to leverage our DNA synthesis platform together with our custom libraries and other proprietary tools, such as our anti-GPCR library and antibody optimization solution, in adjacent businesses such as pharmaceutical biologics drug discovery and digital data storage in DNA. However, we may not be able to validate that our antibody libraries will accelerate the lead identification and lead optimization steps of antibody discovery or will allow us to discover more effective antibody drugs. In addition, our technology may not develop in a way that allows data storage in DNA to become cost competitive with traditional data storage media or in a way that otherwise enables us to address the markets opportunities that we believe exist. If we are unable to expand into adjacent addressable markets, our business, financial position and results of operations could be negatively impacted.

A significant portion of our sales depends on customers' capital spending budgets that may be subject to significant and unexpected variation, including seasonality.

Our customers' spending on research and development impacts our sales and profitability. Our customers and potential customers include healthcare, agriculture, industrial chemicals and academic research sectors, and their capital spending budgets can have a significant effect on the demand for our products. Their research and development budgets are based on a wide variety of factors, including factors beyond our control, such as:

- the allocation of available resources to make purchases;
- funding from government sources;
- changes in government programs that provide funding to research institutions and companies;
- the spending priorities among various types of research equipment;
- policies regarding capital expenditures during recessionary periods;
- macroeconomic conditions and the political climate;
- changes in the regulatory environment;
- differences in budgetary cycles; and
- market acceptance of relatively new technologies, such as ours.

Any decrease in capital spending or change in spending priorities of our customers and potential customers could significantly reduce the demand for our products. As we expand into new geographic markets, our revenue may be impacted by seasonal trends in the different regions, the seasonality of customer capital budgets in those regions and the mix of domestic versus international sales. Moreover, we have no control over the timing and amount of purchases by these customers and potential customers, and as a result, revenue from these sources may vary significantly due to factors that can be difficult to forecast. Any delay or reduction in purchases by customers and potential customers or our inability to forecast fluctuations in demand could harm our future operating results.

We generally do not have long-term contracts with our customers requiring them to purchase any specified quantities from us.

We generally do not have long-term contracts with our customers requiring them to purchase any specified quantities from us and without such contracts our customers are not obligated to order or reorder our products. As a result, we cannot accurately predict our customers' decisions to reduce or cease purchasing our

products. Additionally, even where we enter into contracts with our customers, there is no guarantee that such agreements will be negotiated on terms that are commercially favorable to us in the long-term. Therefore, if many of our customers were to substantially reduce their transaction volume or cease ordering products from us, this could materially and adversely affect our financial performance.

We have limited experience in sales and marketing of our products and, as a result, may be unable to successfully increase our market share and expand our customer base.

We have limited experience in sales and marketing of our products. Our ability to achieve profitability depends on our being able to increase our market share and expand our customer base. Although members of our sales and marketing teams have considerable industry experience and have engaged in marketing activities for our products, in the future we must expand our sales, marketing, distribution and customer support capabilities with the appropriate technical expertise to effectively market our products. To perform sales, marketing, distribution and customer support successfully, we will face a number of risks, including:

- we may not be able to attract, retain and manage the sales, marketing and service force necessary to publicize and gain broader market acceptance for our technology;
- the time and cost of establishing a specialized sales, marketing and service force for a particular product or service, which may be difficult to justify in light of the revenue generated; and
- our sales, marketing and service force may be unable to initiate and execute successful commercialization activities with respect to new products or markets we may seek to enter.

If our sales and marketing efforts, or those of any third-party sales and distribution partners, are not successful, our new technologies and products may not gain market acceptance, which could materially impact our business operations.

We have limited experience in manufacturing our DNA synthesis equipment and tools. If we are unable to expand our DNA synthesis manufacturing capacity, this would result in lost revenue and harm our business.

In order to expand our manufacturing capacity of new and existing products, we need to either build additional internal manufacturing capacity, contract with one or more partners, or both. Our technology and the production process for our DNA synthesis equipment and tools are complex, involving specialized parts, and we may encounter unexpected difficulties in manufacturing our DNA synthesis equipment and tools. There is no assurance that we will be able to continue to build manufacturing capacity internally or find one or more suitable partners, or both, to meet the volume and quality requirements necessary to be successful in our existing and potential markets. Manufacturing and product quality issues may arise as we increase the scale of our production. If our DNA synthesis equipment and tools do not consistently produce DNA products that meet our customers' performance expectations, our reputation may be harmed, and we may be unable to generate sufficient revenue to become profitable. Any delay or inability in establishing or expanding our manufacturing capacity could diminish our ability to develop or sell our products, which could result in lost revenue and materially harm our business, financial condition and results of operations.

We are substantially dependent on the success of our synthetic DNA products.

To date, we have invested nearly all of our efforts and financial resources in the research and development of our synthetic DNA products. The DNA synthesis business is very capital intensive, particularly for early stage companies that do not have significant off-setting revenues.

Our financial results are dependent on strengthening our core business while diversifying into other developing sectors such as pharmaceutical biologics drug discovery and data storage. Substantially all of our revenue generated to date is from our synthetic DNA products.

Our near-term prospects, including our ability to finance our Company and enter into strategic collaborations, will depend heavily on the successful development and commercialization of our synthetic DNA products. These initiatives will be substantially dependent on our ability to generate revenue from our synthetic DNA products and obtain other funding necessary to support these initiatives. Our inability to continue these initiatives and initiate new research and development efforts could result in a failure to develop new products, improve upon existing products such that sectors like pharmaceutical biologics drug discovery and data storage may never be fully developed, and expand our addressable market which could have a material and adverse impact on our sales, business, financial position and results of operations.

We and our chief executive officer are currently involved in litigation with Agilent Technologies, Inc., in which Agilent has alleged a claim of trade secret misappropriation against Twist Bioscience and trade secret misappropriation and other related claims against our chief executive officer, and an adverse result could harm our business and results of operations.

We and our chief executive officer are currently involved in litigation with Agilent in which Agilent has alleged a claim of trade secret misappropriation against our Company and trade secret misappropriation and other related claims against our chief executive officer. This litigation with Agilent could result in significant expense. Agilent has considerable resources available to it; we, on the other hand, are an early-stage commercial company with comparatively few resources available to us to engage in costly and protracted litigation. Intellectual property infringement claims asserted against us could be costly to defend and could limit our ability to use some technologies in the future. They will be time consuming, will divert our chief executive officer's, management's and scientific personnel's attention, may be used by Agilent in an effort to generate negative publicity with our customers and investors, and may result in liability for substantial damages. For example, we have incurred and anticipate that we will continue to incur significant expense and substantial time in defending against our current intellectual property infringement dispute with Agilent. We anticipate that Agilent may use litigation, including filing amended or new complaints, other court filings, public statements and press releases, regardless of merit in an attempt to disrupt our business and create uncertainty about our future prospects, which could create volatility in the trading price of our common stock or damage to our reputation in the marketplace.

An adverse judgment in the Agilent proceeding could require us to pay damages, attorneys' fees, costs and expenses, or result in injunctive relief, or generate negative publicity, any of which could materially adversely affect our business, financial condition, results of operations and prospects. For more information on our current legal and regulatory proceedings, see the section of this prospectus captioned

"Business — Legal proceedings." And for other risks related to our intellectual property, see the section of this prospectus captioned "Risks related to our intellectual property." We may also in the future be involved with other litigation. We expect that the number of such claims may increase as our scale and the level of competition in our industry segments grows.

We depend on one single-source supplier for a critical component for our DNA synthesis process. The loss of this supplier or its failure to supply us with the necessary component on a timely basis, could cause delays in the future capacity of our DNA synthesis process and adversely affect our business.

We depend on one single-source supplier for a critical component for our DNA synthesis process. We do not currently have the infrastructure or capability internally to manufacture this component. Although we have a substantial reserve of supplies and although alternative suppliers exist for this critical component of our synthesis process, our existing DNA synthesis manufacturing process has been designed based on the functions, limitations, features and specifications of the components that we currently utilize. We have a supply agreement in place with this component supplier. However, there can be no assurance that our supply of this component will not be limited, interrupted, or of satisfactory quality or continue to be available at acceptable

prices. Additionally, we do not have any control over the process or timing of the acquisition or manufacture of materials by our manufacturer, and cannot ensure that it will deliver to us the component we order on time, or at all.

The loss of this component provided by this supplier could require us to change the design of our manufacturing process based on the functions, limitations, features and specifications of the replacement components.

In addition, the lead time needed to establish a relationship with a new supplier can be lengthy, and we may experience delays in meeting demand in the event we must switch to a new supplier. The time and effort to qualify a new supplier could result in additional costs, diversion of resources or reduced manufacturing yields, any of which would negatively impact our operating results. Further, we may be unable to enter into agreements with a new supplier on commercially reasonable terms, which could have a material adverse impact on our business. Our dependence on this single-source supplier exposes us to certain risks, including the following:

- our supplier may cease or reduce production or deliveries, raise prices or renegotiate terms;
- we may be unable to locate a suitable replacement on acceptable terms or on a timely basis, if at all;
- if there is a disruption to our single-source supplier's operations, and if we are unable to enter into arrangements with alternative suppliers, we will have no other means of completing our synthesis process until they restore the affected facilities or we or they procure alternative manufacturing facilities or sources of supply;
- delays caused by supply issues may harm our reputation, frustrate our customers and cause them to turn to our competitors for future projects; and
- our ability to progress our DNA synthesis products could be materially and adversely impacted if the single-source supplier upon which we rely were to experience a significant business challenge, disruption or failure due to issues such as financial difficulties or bankruptcy, issues relating to other customers such as regulatory or quality compliance issues, or other financial, legal, regulatory or reputational issues.

Moreover, to meet anticipated market demand, our single-source supplier may need to increase manufacturing capacity, which could involve significant challenges. This may require us and our supplier to invest substantial additional funds and hire and retain the technical personnel who have the necessary experience. Neither we nor our supplier may successfully complete any required increase to existing manufacturing capacity in a timely manner, or at all. For additional information on our single-source and other suppliers, see the section of this prospectus captioned "Business — Suppliers."

We must continue to secure and maintain sufficient and stable supplies of raw materials.

Although historically we have not experienced price increases due to unexpected raw material shortages and other unanticipated events, there is no assurance that our supply of raw materials will not be significantly adversely affected in the future, adversely affecting our business, prospects, financial condition and results of operation.

In addition, as we grow, our existing suppliers may not be able to meet our increasing demand, and we may need to find additional suppliers. There is no assurance that we will always be able to secure suppliers who provide raw materials at the specification, quantity and quality levels that we demand (or at all) or be able to negotiate acceptable fees and terms of services with any such suppliers. Identifying a suitable supplier is an involved process that requires us to become satisfied with their quality control, responsiveness and service,

financial stability and labor and other ethical practices. Even if we are able to expand existing sources, we may encounter delays in production and added costs as a result of the time it takes to train suppliers in our methods, products and quality control standards.

We typically do not enter into agreements with our suppliers but secure our raw materials on a purchase order basis. Our suppliers may reduce or cease their supply of raw materials and outsourced services and products to us at any time in the future. If the supply of raw materials and the outsourced services and products is interrupted, our production processes may be delayed. If any such event occurs, our operation and financial position may be adversely affected.

A deterioration of our relationship with any of our suppliers, or problems experienced by these suppliers, could lead to shortages in our production capacity for some or all of our products. In such case, we may not be able to fulfill the demand of existing customers or supply new customers. A raw material shortage or an increase in the cost of the raw materials we use could result in decreased revenue or could impair our ability to maintain or expand our business.

For the years ended September 30, 2016 and 2017, our cost of raw materials accounted for approximately 27%, and 30%, respectively, of our total cost of revenues. And, for the nine months ended June 30, 2017 and 2018, our cost of raw materials accounted for approximately 29% and 30%, respectively, of our total cost of revenues. In the event of significant price increases for raw materials, we may have to pass the increased raw materials costs to our customers. However, we cannot assure you that we will be able to raise the prices of our products sufficiently to cover increased costs resulting from increases in the cost of our raw materials or overcome the interruption of a sufficient supply of qualified raw materials for our products. As a result, a price increase for our raw materials may negatively impact our business, financial position and results of operations.

We may encounter difficulties in managing our growth, and these difficulties could impair our profitability.

Currently, we are working simultaneously on multiple projects targeting several market sectors, including activities in the healthcare, agriculture, industrial chemicals and academic sectors. These diversified operations place significant demands on our limited resources and require us to substantially expand the capabilities of our technical, administrative and operational resources.

If we are unable to manage this growth effectively, our business and operating results could suffer. Our ability to manage our operations and costs, including research and development, costs of components, manufacturing, sales and marketing, requires us to continue to enhance our operational, financial and management controls, reporting systems and procedures and to attract and retain sufficient numbers of talented employees. Failure to attract and retain sufficient numbers of talented employees will further strain our human resources and could impede our growth.

Our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a significant customer.

We have derived, and believe we may continue to derive, a significant portion of our revenues from one large customer or a limited number of large customers. Our largest customer Ginkgo Bioworks accounted for 30% and 40% of our revenue for the years ended September 30, 2016 and 2017. Ginkgo Bioworks also accounted for 40% and 32% of our revenue for the nine months ended June 30, 2017 and 2018, respectively. Our customers may buy less of our products depending on their own technological developments, end-user demand for our products and internal budget cycles. In addition, existing customers may choose to produce some or all of their synthetic DNA requirements internally by using or developing manufacturing capabilities organically or by using capabilities from acquisitions of assets or entities from third parties with such capabilities. For example, in January 2017, Ginkgo Bioworks announced the acquisition of Gen9, Inc., which was a DNA synthesis

manufacturer. If Ginkgo Bioworks reduces the amount of products it purchases from us and increases the amount of synthetic DNA products it manufactures internally using the capabilities acquired in the Gen9 acquisition or otherwise, it could have a material adverse impact on our revenue, results of operations, cash flows and reputation in the marketplace. The loss of Ginkgo Bioworks as a customer, or the loss of any other significant customer or a significant reduction in the amount of product ordered by Ginkgo Bioworks or any other significant customer would adversely affect our revenue, results of operations, cash flows and reputation in the marketplace.

Our credit facility contains restrictions that limit our flexibility in operating our business.

In September 2017, we entered into an amended and restated loan and security agreement with SVB. Our credit facility contains various covenants that limit our ability to engage in specified types of transactions. These covenants limit our ability to, among other things:

- sell, transfer, lease or otherwise dispose of our assets;
- create, incur or assume additional indebtedness;
- engage in certain changes in business, management, control, or business location;
- encumber or permit liens on certain of our assets;
- make restricted payments, including paying dividends on, repurchasing or making distributions with respect to our common stock;
- make specified investments (including loans and advances);
- consolidate, merge, sell or otherwise dispose of all or substantially all of our assets or acquire other entities;
- make or permit any payment on any subordinated debt; and
- enter into certain transactions with our affiliates.

Our incurrence of this debt, and any future increases in our aggregate level of debt, may adversely affect our operating results and financial condition by, among other things:

- increasing our vulnerability to downturns in our business, to competitive pressures and to adverse economic and industry conditions;
- requiring the dedication of an increased portion of our expected cash flows from operations to service our indebtedness, thereby reducing the amount of expected cash flows available for other purposes, including capital expenditures, acquisitions and dividends; and
- limiting our flexibility in planning for, or reacting to, changes in our business and our industry.

A breach of any of these covenants could result in a default under our credit facility. Upon the occurrence of an event of default under our credit facility, SVB could elect to declare all amounts outstanding under our credit facility to be immediately due and payable and terminate all commitments to extend further credit. If we were unable to repay those amounts, the lenders under our credit facility could proceed against the collateral granted to them to secure such indebtedness. We have pledged substantially all of our assets, other than our intellectual property, as collateral under our credit facility.

We depend on the continuing efforts of our senior management team and other key personnel. If we lose members of our senior management team or other key personnel or are unable to successfully retain, recruit and train qualified researchers, engineering and other personnel, our ability to develop our products could be harmed, and we may be unable to achieve our goals.

Our future success depends upon the continuing services of members of our senior management team and scientific and engineering personnel. We are highly dependent on Emily Leproust, our President and Chief Executive Officer, who is employed "at will," meaning we or she may terminate the employment relationship at any time. In particular, our researchers and engineers are critical to our future technological and product innovations, and we will need to hire additional qualified personnel. We may not be able to attract and retain qualified personnel on acceptable terms, or at all. In addition, to the extent we hire personnel from competitors, we may be subject to allegations that they have been improperly solicited or that they have divulged proprietary or other confidential information, or that their former employers own their research output. Our industry, particularly in the San Francisco Bay Area, is characterized by high demand and intense competition for talent, and the turnover rate can be high. We compete for qualified management and scientific personnel with other life science companies, academic institutions and research institutions, particularly those focusing on genomics. Many of these employees could leave our company with little or no prior notice and would be free to work for a competitor. If one or more of our senior executives or other key personnel were unable or unwilling to continue in their present positions, we may not be able to replace them easily or at all, and other senior management may be required to divert attention from other aspects of the business. In addition, we do not have "key person" life insurance policies covering members of our management team or other key personnel except Emily Leproust. The loss of any of these individuals or our inability to attract or retain qualified personnel, including researchers, engineers and others, could prevent us from pursuing collaborations and adversely affect our product development and introductions, business growth prospects, results of operations and financial condition.

We may engage in strategic transactions, including acquisitions that could disrupt our business, cause dilution to our stockholders, reduce our financial resources, or prove not to be successful.

In the future, we may enter into transactions to acquire other businesses, products or technologies and our ability to do so successfully cannot be ensured. In April 2016, we acquired Genome Compiler Corporation, which became a wholly owned subsidiary. This acquisition allowed us to add software design capabilities for our e-commerce ordering system. However, to date, we have not successfully concluded other acquisitions, and we are pursuing opportunities in the life sciences industry that complement and expand our synthetic DNA product, products and markets both locally and internationally. If we identify suitable opportunities, we may not be able to make such acquisitions on favorable terms or at all. Any acquisitions we make may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt in connection with an acquisition or issue our common stock or other equity securities to the stockholders of the acquired company, which would reduce the percentage ownership of our existing stockholders. We could incur losses resulting from undiscovered liabilities of the acquired business that are not covered by any indemnification we may obtain from the seller. In addition, we may not be able to successfully integrate the acquired personnel, technologies and operations into our existing business in an effective, timely and non-disruptive manner. Acquisitions may also divert management attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. In addition, we cannot guarantee that we will be able to fully recover the costs of such acquisitions or that we will be successful in leveraging any such strategic transactions into increased business, revenue or profitability. We also cannot predict the number, timing or size of any future acquisitions or the effect that any such transactions might have on our operating results.

From time to time, we may consider other strategic transactions, including collaborations. The competition for collaborators is intense, and the negotiation process is time-consuming and complex. Any new collaboration may be on terms that are not optimal for us, and we may not be able to maintain any new collaboration. Any such collaboration may require us to incur non-recurring or other charges, increase our near- and long-term expenditures and pose significant integration or implementation challenges or disrupt our management or business. These transactions would entail numerous operational and financial risks, including exposure to unknown liabilities, disruption of our business and diversion of our management's time and attention to manage a collaboration, incurrence of substantial debt or dilutive issuances of equity securities to pay transaction consideration or costs, higher than expected collaboration, acquisition or integration costs, write-downs of assets or goodwill or impairment charges, increased amortization expenses, difficulty and cost in facilitating the collaboration or combining the operations and personnel of any acquired business, impairment of relationships with key suppliers, manufacturers or customers of any acquired business due to changes in management and ownership and the inability to retain key employees of any acquired business. Accordingly, although there can be no assurance that we will undertake or successfully complete any collaborations, any transactions that we do complete may be subject to the foregoing or other risks and have a material and adverse effect on our business, financial condition, results of operations and prospects. Conversely, any failure to enter any collaboration or other strategic transaction that would be beneficial to us could delay the development and potential commercialization of our products and technologies.

As we expand our development and commercialization activities outside of the United States, we will be subject to an increased risk of inadvertently conducting activities in a manner that violates the U.S. Foreign Corrupt Practices Act and similar laws. If that occurs, we may be subject to civil or criminal penalties which could have a material adverse effect on our business, financial condition, results of operations and growth prospects.

We are subject to the U.S. Foreign Corrupt Practices Act, or the FCPA, which prohibits corporations and individuals from paying, offering to pay, or authorizing the payment of anything of value to any foreign government official, government staff member, political party, or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. We are also subject to the UK Anti-Bribery Act, which prohibits both domestic and international bribery, as well as bribery across both public and private sectors.

In the course of establishing and expanding our commercial operations and complying with non-U.S. regulatory requirements, we will need to establish and expand business relationships with various third parties and we will interact more frequently with foreign officials, including regulatory authorities. Expanded programs to maintain compliance with such laws will be costly and may not be effective. Any interactions with any such parties or individuals where compensation is provided that are found to be in violation of such laws could result in substantial fines and penalties and could materially harm our business. Furthermore, any finding of a violation under one country's laws may increase the likelihood that we will be prosecuted and be found to have violated another country's laws. If our business practices outside the United States are found to be in violation of the FCPA, UK Anti-Bribery Act or other similar laws, we may be subject to significant civil and criminal penalties which could have a material adverse effect on our financial condition and results of operations.

We could engage in exporting or related activity that contravenes international trade restraints, or regulatory authorities could promulgate more far reaching international trade restraints, which could give rise to one or more of substantial legal liability, impediments to our business and reputational damage.

Our international business activities must comport with U.S. export controls and other international trade restraints, including the U.S. Department of Commerce's Export Administration Regulations and economic sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls.

We have established an international trade compliance program that encompasses best practices for preventing, detecting and addressing noncompliance with international trade restraints. Furthermore, to date our exports have not been licensable under export controls; however, we could fail to observe the compliance program requirements in a manner that leaves us in noncompliance with export controls or other international trade restraints. In addition, authorities could promulgate international trade restraints that impinge on our ability to prosecute our business as planned. One or more of resulting legal penalties, restraints on our business or reputational damage could have material adverse effects on our business and financial condition.

Adverse conditions in the global economy and disruption of financial markets may significantly harm our revenue, profitability and results of operations.

The global economy has a significant impact on our business and volatility and disruption of financial markets could limit our customers' ability to obtain adequate financing or credit to purchase and pay for our products in a timely manner or to maintain operations, which could result in a decrease in sales volume that could harm our results of operations. General concerns about the fundamental soundness of domestic and international economies may also cause our customers to reduce their purchases. Changes in banking, monetary and fiscal policies to address liquidity and increase credit availability may not be effective. Significant government investment and allocation of resources to assist the economic recovery of sectors which do not include our customers may reduce the resources available for government grants and related funding for life sciences research and development. Continuation or further deterioration of these financial and macroeconomic conditions could significantly harm our sales, profitability and results of operations.

We operate in a highly competitive industry and if we are not able to compete effectively, our business and operating results will likely be harmed.

We face competition from a broad range of providers of core synthetic biology products such as GenScript Biotech Corporation, GENEWIZ, Integrated DNA Technologies, Inc., DNA 2.0 Inc. d/b/a/ ATUM, GeneArt (owned by Thermo Fisher Scientific Inc.), Eurofins Genomics LLC, Sigma-Aldrich Corporation (an indirect wholly owned subsidiary of Merck & Company), Promega Corporation, OriGene Technologies, Inc., Blue Heron Biotech, LLC and others. Additionally, we compete with both large and emerging providers in the life sciences tools and diagnostics industries focused on sample preparation for next generation sequencing such as Thermo Fisher Scientific Inc., Illumina, Inc., Integrated DNA Technologies, Inc., Agilent, and Roche NimbleGen, Inc. In the antibody discovery market, we compete with clinical research organizations, such as LakePharma (mouse hybridoma, llama immune libraries, XOMA phage display library) and Aldevron, LLC (genetic mouse immunization coupled with hybridoma), and antibody discovery biotechnology companies, such as Iontas (human phage display libraries, human phage display library focused on ion channels), Adimab (human synthetic yeast display libraries), and Distributed Bio (human synthetic phage display library, lead optimization libraries). In the field of DNA digital data storage, we compete with Catalog Technologies, Inc., ETH Zurich, Helixworks, Iridia, Inc., North Shore Bio and Roswell. We may not be successful in maintaining our competitive position for a number of reasons. Some of our current competitors, as well as many of our potential competitors, have significant name recognition, substantial intellectual property portfolios, longer operating histories, greater resources to invest in new technologies, substantial experience in new product development and manufacturing capabilities and more established distribution channels to deliver products to customers than we do. These competitors may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or customer requirements. Our competitors may develop disruptive technologies or products that are comparable or superior to our technologies and products. In light of these advantages, even though we believe our technology is superior to the products offerings of our competitors, current or potential customers might accept competitive products in lieu of purchasing our products. Increased competition is likely to result in continued pricing pressures, which could harm our sales, profitability or market share. Our failure to continue competing effectively or winning additional business with

our existing customers could materially and adversely affect our business, financial condition or results of operations.

We may be subject to significant pricing pressures.

Over time, increasing customer demand for lower prices could force us to discount our products and result in lower margins. The impact may be further exacerbated if we are unable to successfully control production costs. Alternatively, if due to rising market prices, our suppliers increase prices or reduce discounts on their supplies, we may be unable to pass on any cost increase to our customers, thereby resulting in reduced margins and profits. Furthermore, changes in our product mix may negatively affect our gross margins. Overall, these pricing pressures may adversely affect our business, financial position and results of operations.

Ethical, legal and social concerns surrounding the use of genetic information could reduce demand for our technology.

Our products may be used to create DNA sequences of humans, agricultural crops and other living organisms. Our products could be used in a variety of applications, which may have underlying ethical, legal and social concerns. Governmental authorities could, for safety, social or other purposes, impose limits on or implement regulation of the use of gene synthesis. Such concerns or governmental restrictions could limit the use of our DNA synthesis products, which could have a material adverse effect on our business, financial condition and results of operations. In addition, public perception about the safety and environmental hazards of, and ethical concerns over, genetically engineered products and processes could influence public acceptance of our technologies, products and processes. These concerns could result in increased expenses, regulatory scrutiny, delays or other impediments to our programs.

We use biological and hazardous materials that require considerable expertise and expense for handling, storage and disposal and may result in claims against us.

We work with materials, including chemicals, biological agents, and compounds and DNA samples that could be hazardous to human health and safety or the environment. Our operations also produce hazardous and biological waste products. Federal, state and local laws and regulations govern the use, generation, manufacture, storage, handling and disposal of these materials and wastes. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental laws and regulations may restrict our operations. If we do not comply with applicable regulations, we may be subject to fines and penalties.

In addition, we cannot eliminate the risk of accidental injury or contamination from these materials or wastes, which could cause an interruption of our commercialization efforts, research and development programs and business operations, as well as environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations. Furthermore, environmental laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. While our property insurance policy provides limited coverage in the event of contamination from hazardous and biological products and the resulting cleanup costs, we do not currently have any additional insurance coverage for legal liability for claims arising from the handling, storage or disposal of hazardous materials. Accordingly, in the event of contamination or injury, we could be liable for damages or penalized with fines in an amount exceeding our resources and our operations could be suspended or otherwise adversely affected.

We could develop DNA sequences or engage in other activity that contravenes biosecurity requirements, or regulatory authorities could promulgate more far reaching biosecurity requirements that our standard business practices cannot accommodate, which could give rise to substantial legal liability, impediments to our business and reputational damage.

The Federal Select Agent Program, or the FSAP, involves rules administered by the Centers for Disease Control and Prevention and Toxins and the Animal and Plant Health Inspection Service that regulate possession, use and transfer of biological select agents and toxins that have the potential to pose a severe threat to public, animal or plant health or to animal or plant products.

We have established a biosecurity program under which we follow biosafety and biosecurity best practices and avoid DNA synthesis activities that implicate FSAP rules; however, we could err in our observance of compliance program requirements in a manner that leaves us in noncompliance with FSAP or other biosecurity rules. In addition, authorities could promulgate new biosecurity requirements that restrict our operations. One or more resulting legal penalties, restraints on our business or reputational damage could have material adverse effects on our business and financial condition.

Third parties may use our products in ways that could damage our reputation.

After our customers have received our products, we do not have any control over their use and our customers may use them in ways that are harmful to our reputation as a supplier of synthetic DNA products. In addition, while we have established a biosecurity program designed to comply with biosafety and biosecurity requirements and perform export control screening in an effort to ensure that third parties do not obtain our products for malevolent purposes, we cannot guarantee that these preventative measures will eliminate or reduce the risk of the domestic and global opportunities for the misuse of our products. Accordingly, in the event of such misuse, our reputation, future revenue and operating results may suffer.

Any damage to our reputation or brand may materially and adversely affect our business, financial condition and results of operations.

We believe that developing and maintaining our brand is important to our success and that our financial success is influenced by the perception of our brand by our customers. Furthermore, the importance of our brand recognition may become even greater to the extent that competitors offer more products similar to ours. Many factors, some of which are beyond our control, are important to maintaining our reputation and brand. These factors include our ability to comply with ethical, social, product, labor and environmental standards. Any actual or perceived failure in compliance with such standards could damage our reputation and brand.

Because we are subject to existing and potential additional governmental regulation, the markets for our products may be narrowed.

We are subject, both directly and indirectly, to the adverse impact of existing and potential future government regulation of our operations and markets. For example, export of our products is subject to strict regulatory control in a number of jurisdictions. The failure to satisfy export control criteria or obtain necessary clearances could delay or prevent shipment of products, which could adversely affect our revenues and profitability. Moreover, the life sciences industry, which is currently the primary market for our technology, has historically been heavily regulated. There are, for example, laws in several jurisdictions restricting research in genetic engineering, which can operate to narrow our markets. Given the evolving nature of this industry, legislative bodies or regulatory authorities may adopt additional regulation that adversely affects our market opportunities. Our business is also directly affected by a wide variety of government regulations applicable to business enterprises generally and to companies operating in the life science industry in particular. Failure to comply with these regulations or obtain or maintain necessary permits and licenses could result in a variety of

fines or other censures or an interruption in our business operations which may have a negative impact on our ability to generate revenues and could increase the cost of operating our business.

Our products could in the future be subject to additional regulation by the U.S. Food and Drug Administration or other domestic and international regulatory agencies, which could increase our costs and delay our commercialization efforts, thereby materially and adversely affecting our business and results of operations.

The U.S. Food and Drug Administration, or FDA, regulates medical devices, including in vitro diagnostics, or IVDs. IVDs include reagents, instruments, and systems intended for use in diagnosis of disease or other conditions, including a determination of the state of health, in order to cure, mitigate, treat, or prevent disease or its sequelae. IVDs are intended for use in the collection, preparation, and examination of specimens taken from the human body. A research use only, or RUO, IVD product is an IVD product that is in the laboratory research phase of development and is being shipped or delivered for an investigation that is not subject to FDA's investigational device exemption requirements. As such, an RUO IVD is not intended for use in clinical investigations or in clinical practice. Such RUO products do not require premarket clearance or approval from the FDA, provided that they be labeled "For Research Use Only. Not for use in diagnostic procedures" pursuant to FDA regulations. Our IVD products are not intended for clinical or diagnostic use, and we market and label them as RUO. Accordingly, we have not sought clearance or approval from the FDA to market our products. However, the FDA may disagree with our assessment that our products are properly marketed as RUO, and may determine that our products are subject to pre-market clearance, approval, or other regulatory requirements. If the FDA determines that our products are subject to such requirements, we could be subject to enforcement action, including administrative and judicial sanctions, and additional regulatory controls and submissions for our tests, all of which could be burdensome.

Further, in the future, certain of our products or related applications could be subject to additional FDA regulation. Even where a product is not subject to FDA clearance or approval requirements, the FDA may impose restrictions as to the types of customers to which we can market and sell our products. Such regulation and restrictions may materially and adversely affect our business, financial condition and results of operations. Other regulatory regimes that do not currently present material challenges but that could in the future present material challenges include export controls and biosecurity.

Similarly, even though our products and services are not currently covered and reimbursed by third-party payors, including government healthcare programs such as Medicare and Medicaid, to the extent our products or related applications become eligible for coverage and reimbursement by such payors, we could be subject to healthcare fraud and abuse laws of both the federal government and the states in which we conduct our business. Because of the breadth of these laws and the narrowness of available statutory and regulatory exceptions, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If we or our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines, imprisonment, and the curtailment or restructuring of our operations, any of which could materially adversely affect our ability to operate our business and our financial results.

Many countries have laws and regulations that could affect our products. The number and scope of these requirements are increasing. Unlike many of our competitors, this is an area where we do not have expertise. We may not be able to obtain regulatory approvals in such countries or may incur significant costs in obtaining or maintaining foreign regulatory approvals.

Certain of our potential customers may require that we become certified under the Clinical Laboratory Improvement Amendments of 1988.

Although we are not currently subject to the Clinical Laboratory Improvement Amendment of 1988, or CLIA, we may in the future be required by certain customers to obtain a CLIA certification. CLIA, which extends federal oversight over clinical laboratories by requiring that they be certified by the federal government or by a federally approved accreditation agency, is designed to ensure the quality and reliability of clinical laboratories by mandating specific standards in the areas of personnel qualifications, administration and participation in proficiency testing, patient test management, quality control, quality assurance and inspections. If our customers require a CLIA certification, we will have to continually expend time, money and effort to ensure that we meet the applicable quality and safety requirements, which may divert the attention of management and disrupt our core business operations.

If we experience a significant disruption in, or breach in security of, our information technology systems, or if we fail to implement new systems and software successfully, our business could be adversely affected.

We rely on several centralized information technology systems throughout our company to provide products, keep financial records, process orders, manage inventory, process shipments to customers and operate other critical functions. Our information technology systems may be susceptible to damage, disruptions or shutdowns due to power outages, hardware failures, computer viruses, attacks by computer hackers, telecommunication failures, user errors, catastrophes or other unforeseen events. Our information technology systems also may experience interruptions, delays or cessations of service or produce errors in connection with system integration, software upgrades or system migration work that takes place from time to time. If we were to experience a prolonged system disruption in the information technology systems that involve our interactions with customers or suppliers, including negatively impacting our order fulfillment and order entry on our e-commerce platform, it could result in the loss of sales and customers and significant incremental costs, which could adversely affect our business. In addition, security breaches of our information technology systems could result in the misappropriation or unauthorized disclosure of confidential information belonging to us or to our employees, partners, customers or suppliers, which could result in our suffering significant financial or reputational damage. Further, such a breach may require notification to governmental agencies, the media or individuals pursuant to various federal and state privacy and security laws. We would also be exposed to a risk of litigation and potential liability, which could materially adversely affect our business, results of operations and financial condition.

Our facilities in California are located near known earthquake faults, and the occurrence of an earthquake or other catastrophic disaster could cause damage to our facilities and equipment, which could require us to cease or curtail operations.

Our facilities in the San Francisco Bay Area are located near known earthquake fault zones and are vulnerable to damage from earthquakes. We are also vulnerable to damage from other types of disasters, including fire, floods, power loss, communications failures and similar events. If any disaster were to occur, our ability to operate our business at our facilities would be seriously, or potentially completely, impaired. In addition, the nature of our activities could cause significant delays in our research programs and commercial activities and make it difficult for us to recover from a disaster. The insurance we maintain may not be adequate to cover our losses resulting from disasters or other business interruptions. Accordingly, an earthquake or other disaster could materially and adversely harm our ability to conduct business.

Delivery of our products could be delayed or disrupted by factors beyond our control, and we could lose customers as a result.

We rely on third-party carriers for the timely delivery of our products. As a result, we are subject to carrier disruptions and increased costs that are beyond our control, including employee strikes, inclement weather and increased fuel costs. Any failure to deliver products to our customers in a timely and accurate manner may damage our reputation and brand and could cause us to lose customers. If our relationship with any of these third-party carriers is terminated or impaired or if any of these third parties is unable to deliver our products, the delivery and acceptance of our products by our customers may be delayed which could harm our business and financial results. The failure to deliver our products in a timely manner may harm our relationship with our customers, increase our costs and otherwise disrupt our operations.

Doing business internationally creates operational and financial risks for our business.

During our fiscal years ended September 30, 2016 and 2017, approximately 22% and 23%, respectively, of our revenue was generated from customers located outside of the United States. During the nine month period ended June 30, 2018, approximately 29% of our revenue was generated from customers located outside of the United States. In connection with our growth strategy, we intend to further expand in international markets. Conducting and launching operations on an international scale requires close coordination of activities across multiple jurisdictions and time zones and consumes significant management resources. If we fail to coordinate and manage these activities effectively, our business, financial condition or results of operations could be adversely affected. International sales entail a variety of risks, including longer payment cycles and difficulties in collecting accounts receivable outside of the United States, currency exchange fluctuations, challenges in staffing and managing foreign operations, tariffs and other trade barriers, unexpected changes in legislative or regulatory requirements of foreign countries into which we sell our products, difficulties in obtaining export licenses or in overcoming other trade barriers, laws and business practices favoring local companies, political and economic instability, difficulties protecting or procuring intellectual property rights, and restrictions resulting in delivery delays and significant taxes or other burdens of complying with a variety of foreign laws.

Changes in the value of the relevant currencies may affect the cost of certain items required in our operations. Changes in currency exchange rates may also affect the relative prices at which we are able to sell products in the same market. Our revenue from international customers may be negatively impacted as increases in the U.S. dollar relative to our international customers' local currency could make our products more expensive, impacting our ability to compete. Our costs of materials from international suppliers may increase if in order to continue doing business with us they raise their prices as the value of the U.S. dollar decreases relative to their local currency. Foreign policies and actions regarding currency valuation could result in actions by the United States and other countries to offset the effects of such fluctuations. The recent global financial downturn has led to a high level of volatility in foreign currency exchange rates and that level of volatility may continue, which could adversely affect our business, financial condition or results of operations.

Our ability to use our net operating loss carryforwards to offset future taxable income may be subject to certain limitations.

In general, under Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, a corporation that undergoes an "ownership change" is subject to limitations on its ability to use its pre-change net operating loss carryforwards, or NOLs, to offset future taxable income. If the Internal Revenue Service challenges our analysis that our existing NOLs will not expire before utilization due to previous ownership changes, our ability to use our NOLs could be limited by Section 382 of the Code. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change under Section 382 of the Code. Furthermore, our ability to use NOLs of companies that we may acquire in the future may be subject to

limitations. For these reasons, we may not be able to use a material portion of the NOLs reflected on our balance sheet, even if we attain profitability.

The enactment of legislation implementing changes in taxation of international business activities, the adoption of other corporate tax reform policies, or changes in tax legislation or policies could impact our future financial position and results of operations.

Corporate tax reform, base-erosion efforts and tax transparency continue to be high priorities in many tax jurisdictions where we intend to have business operations. As a result, policies regarding corporate income and other taxes in numerous jurisdictions are under heightened scrutiny and tax reform legislation is being proposed or enacted in a number of jurisdictions. For example, the Tax Cuts and Jobs Act of 2017, or the Tax Act, signed into law on December 22, 2017, adopting broad U.S. corporate income tax reform will, among other things, reduce the U.S. corporate income tax rate, but will impose base-erosion prevention measures on non-U.S. earnings of U.S. entities as well as a one-time mandatory deemed repatriation tax on accumulated non-U.S. earnings of U.S. entities.

In addition, many countries are beginning to implement legislation and other guidance to align their international tax rules with the Organisation for Economic Co-operation's Base Erosion and Profit Shifting recommendations and action plan that aim to standardize and modernize global corporate tax policy, including changes to cross-border tax, transfer-pricing documentation rules, and nexus-based tax incentive practices.

Such legislative initiatives may materially and adversely affect our plans to expand internationally and may negatively impact our financial condition and results of operations generally.

Our inability to collect on our accounts receivable by a significant number of customers may have an adverse effect on our business, financial condition and results of operations.

Sales to our customers are generally made on open credit terms. Management maintains an allowance for potential credit losses. The average days sales outstanding of our trade receivables as of September 30, 2016 and 2017 were 57 and 78 days outstanding, respectively. The average days sales outstanding of our trade receivables as of June 30, 2018 was 60 days. If our customers' cash flow, working capital, financial conditions or results of operations deteriorate, they may be unable or even unwilling to pay trade receivables owed to us promptly or at all. As a result, we could be exposed to a certain level of credit risk. If a major customer experiences, or a significant number of customers experience, financial difficulties, the effect on us could be material and have an adverse effect on our business, financial condition and results of operations.

Risks related to being a public company

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired, which would adversely affect our business.

Ensuring that we have adequate internal financial and accounting controls and procedures in place to produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be re-evaluated frequently. The rapid growth of our operations and the planned initial public offering has created a need for additional resources within the accounting and finance functions due to the increasing need to produce timely financial information and to ensure the level of segregation of duties customary for a U.S. public company. We have hired additional resources in the accounting and finance function and continue to reassess the sufficiency of finance personnel in response to these increasing demands and expectations.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the

preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Our management does not expect that our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within our company will have been detected.

Commencing with our fiscal year ending September 30, 2019, we must perform system and process evaluation and testing of our internal control over financial reporting to allow management to report on the effectiveness of our internal control over financial reporting in our Form 10-K filing for that year, as required by Section 404 of the Sarbanes Oxley Act. We expect to expend significant resources in developing the necessary documentation and testing procedures required by Section 404. We cannot be certain that the actions we will be taking to improve our internal controls over financial reporting will be sufficient, or that we will be able to implement our planned processes and procedures in a timely manner. In addition, if we are unable to produce accurate financial statements on a timely basis, investors could lose confidence in the reliability of our financial statements, which could cause the market price of our common stock to decline and make it more difficult for us to finance our operations and growth.

We are an emerging growth company and we cannot be certain if the reduced disclosure requirements applicable to emerging growth companies will make our common stock less attractive to investors.

We are an "emerging growth company" as defined in the JOBS Act. Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not "emerging growth companies."

For as long as we continue to be an emerging growth company, we also intend to take advantage of certain other exemptions from various reporting requirements that are applicable to other public companies including, but not limited to, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We cannot predict if investors will find our common stock less attractive because we will rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

We will remain an emerging growth company until the earliest of (i) the last day of the fiscal year in which we have total annual gross revenue of \$1.07 billion or more; (ii) the last day of our fiscal year following the fifth anniversary of the date of the closing of this offering; (iii) the date on which we have issued more than \$1.0 billion in nonconvertible debt during the previous three years; or (iv) the date on which we are deemed to be a large accelerated filer under the rules of the SEC.

The requirements of being a public company may strain our resources, divert management's attention and affect our ability to attract and retain qualified board members.

As a public company, we will be subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, the listing requirements of the stock exchange on which our common stock is traded and other applicable securities rules and regulations. The SEC and other regulators have continued to adopt new rules and regulations and make additional changes to existing regulations that require our compliance. Stockholder activism, the current

political environment, and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact, in ways we cannot currently anticipate, the manner in which we operate our business. Compliance with these rules and regulations may cause us to incur additional accounting, legal and other expenses that we did not incur as a private company. We also anticipate that we will incur costs associated with corporate governance requirements, including requirements under securities laws, as well as rules and regulations implemented by the SEC and the Nasdaq Global Market, particularly after we are no longer an “emerging growth company.” We expect these rules and regulations to increase our legal and financial compliance costs and to make some activities more time-consuming and costly. Furthermore, these rules and regulations could make it more difficult or more costly for us to obtain certain types of insurance, including director and officer liability insurance, and we may be forced to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers. We are currently evaluating and monitoring developments with respect to these rules and regulations, and we cannot predict or estimate the amount of additional costs we may incur or the timing of such costs.

Risks related to our intellectual property

Our ability to protect our intellectual property and proprietary technology through patents and other means is uncertain.

Our commercial success depends in part on our ability to protect our intellectual property and proprietary technologies. We rely on patent protection, where appropriate and available, as well as a combination of copyright, trade secret and trademark laws, and nondisclosure, confidentiality and other contractual restrictions to protect our proprietary technology. However, these legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage. As of June 30, 2018, we own nine issued U.S. patents and two issued international patents in China. There are 81 pending patent applications, including 39 in the United States, 31 international applications and 11 applications filed under the Patent Cooperation Treaty.

Several patent applications covering our technologies have been filed recently. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patent, or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful opposition to these patents or any other patents owned by or, if applicable in the future, licensed to us could deprive us of rights necessary for the practice of our technologies or the successful commercialization of products that we may develop. Since patent applications in the U.S. and most other countries are confidential for a period of time after filing, we cannot be certain that we were the first to file any patent application related to our technologies or products. Furthermore, an interference proceeding can be provoked by a third party or instituted by the U.S. Patent and Trademark Office, or the USPTO, to determine who was the first to invent any of the subject matter covered by the patent claims of our applications.

Patent law can be highly uncertain and involve complex legal and factual questions for which important principles remain unresolved. In the United States and in many international jurisdictions, policy regarding the breadth of claims allowed in patents can be inconsistent. The U.S. Supreme Court and the Court of Appeals for the Federal Circuit have made, and will likely continue to make, changes in how the patent laws of the United States are interpreted. Similarly, international courts have made, and will continue to make, changes in how the patent laws in their respective jurisdictions are interpreted. We cannot predict future changes in the interpretation of patent laws or changes to patent laws that might be enacted into law by U.S. and international legislative bodies.

Moreover, the United States Leahy-Smith American Invents Act, enacted in September 2011, brought significant changes to the U.S. patent system, including a change from a “first to invent” system to a “first to file” system. Under a “first to file” system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. Other changes affect the way the patent applications are prosecuted, redefine prior art, and may affect patent litigation. The USPTO developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act became effective on March 16, 2013. The Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, which could have a material adverse effect on our business and financial condition.

If we are unable to obtain, maintain and enforce intellectual property protection, others may be able to make, use, or sell products and technologies substantially the same as ours, which could adversely affect our ability to compete in the market.

We may not pursue or maintain patent protection for our products in every country or territory in which we sell our products and technologies. In addition, our pending U.S. and foreign patent applications may not issue as patents or may not issue in a form that will be sufficient to protect our proprietary technology and gain or keep our competitive advantage. Any patents we have obtained or do obtain may be subject to re-examination, reissue, opposition or other administrative proceeding, or may be challenged in litigation, and such challenges could result in a determination that the patent is invalid or unenforceable.

Patents have a limited lifespan. Patent terms may be shortened or lengthened by, for example, terminal disclaimers, patent term adjustments, supplemental protection certificates, and patent term extensions. Although extensions may be available, the life of a patent, and the protection it affords, is limited. Patent term extensions and supplemental protection certificates, and the like, may be impacted by the regulatory process and may not significantly lengthen patent term. Non-payment or delay in payment of patent fees or annuities, delay in patent filings or delay in extension filing, whether intentional or unintentional, may also result in the loss of patent rights important to our business. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case. In addition, certain countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to other parties. Furthermore, many countries limit the enforceability of patents against other parties, including government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of any patents.

We cannot be certain that the steps we have taken will prevent unauthorized use or unauthorized reverse engineering of our technology. In addition, competitors may be able to design alternative methods or devices that avoid infringement of our patents. To the extent our intellectual property, including licensed intellectual property, offers inadequate protection, or is found to be invalid or unenforceable, we are exposed to a greater risk of direct competition. If our intellectual property does not provide adequate protection against our competitors' products, our competitive position could be adversely affected, as could our business. Both the patent application process and the process of managing patent disputes can be time consuming and expensive.

Monitoring unauthorized use of our intellectual property is difficult and costly. From time to time, we review our competitors' products, and may in the future seek to enforce our patents or other rights against potential infringement. However, the steps we have taken to protect our proprietary rights may not be adequate to prevent misappropriation of our intellectual property. We may not be able to detect unauthorized use of, or take appropriate steps to enforce, our intellectual property rights. We cannot guarantee that any of our patent searches or analyses, including but not limited to the identification of relevant patents, the scope of patent

claims or the expiration of relevant patents, are complete or thorough, nor can we be certain that we have identified each and every third party patent and pending application in the United States and abroad that is relevant to or necessary for the commercialization of our products in any jurisdiction. For example, U.S. applications filed before November 29, 2000 and certain U.S. applications filed after that date that will not be filed outside the United States remain confidential until patents issue. Patent applications in the United States and elsewhere are published approximately 18 months after the earliest filing for which priority is claimed. Therefore, patent applications covering our product candidates or technologies could have been filed by others without our knowledge. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our platform technologies, our products or the use of our products or technologies. The scope of a patent claim is determined by an interpretation of the law, the written disclosure in a patent and the patent's prosecution history. Our interpretation of the relevance or the scope of a patent or a pending application may be incorrect, which may negatively impact our ability to market our products. We may incorrectly determine that our products are not covered by a third party patent or may incorrectly predict whether a third party's pending application will issue with claims of relevant scope. Our determination of the expiration date of any patent in the United States or abroad that we consider relevant may be incorrect, which may negatively impact our ability to develop and market our product candidates.

Any inability to meaningfully protect our intellectual property could result in competitors offering products or technologies that incorporate our products or technologies, which could reduce demand for our products or technologies. A court or other judicial body may decide that the patent we seek to enforce is invalid or unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that the patent in question does not cover the technology in question. An adverse result in any litigation could put one or more of our patents at risk of being invalidated or interpreted narrowly. Some of our competitors may be able to devote significantly more resources to intellectual property litigation, and may have significantly broader patent portfolios to assert against us if we assert our rights against them.

We cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. For example:

- we might not have been the first to make the inventions covered by each of our pending patent applications;
- we might not have been the first to file patent applications for these inventions;
- others may independently develop similar or alternative products and technologies or duplicate any of our products and technologies;
- it is possible that none of our pending patent applications will result in issued patents, and even if they issue as patents, they may not provide a basis for commercially viable products, or may not provide us with any competitive advantages, or may be challenged and invalidated by third parties;
- we may not develop additional proprietary products and technologies that are patentable;
- the patents of others may have an adverse effect on our business; and
- we apply for patents covering our products and technologies and uses thereof, as we deem appropriate. However, we may fail to apply for patents on important products and technologies in a timely fashion or at all.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on our technologies and products in all countries throughout the world would be prohibitively expensive. In addition, the laws of some non-U.S. countries do not protect

intellectual property rights to the same extent as the laws of the United States, and many companies have encountered significant problems in protecting and defending such rights in foreign jurisdictions. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own technologies and products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient enough to prevent them from competing.

The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement of our patents. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business, could put our own patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop.

If we are unable to protect the confidentiality of our proprietary information and know-how, the value of our technology and products could be adversely affected.

In addition to pursuing patents on our technology, we take steps to protect our intellectual property and proprietary technology by entering into confidentiality agreements and intellectual property assignment agreements with our employees, consultants, corporate partners and, when needed, our advisors. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure. Monitoring unauthorized disclosure is difficult, and we do not know whether the steps we have taken to prevent such disclosure are, or will be, adequate. If we were to enforce a claim that a third party had illegally obtained and was using our trade secrets, it would be expensive and time consuming, and the outcome would be unpredictable. In addition, courts outside the United States may be less willing to protect trade secrets.

Trade secrets and know-how can be difficult to protect as trade secrets, and know-how will over time be disseminated within the industry through independent development, the publication of journal articles, and the movement of personnel skilled in the art from company to company. In addition, because we may rely on third parties in the development of our products, we may, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, consulting agreements or other similar agreements with third parties prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, including our trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. If we are unable to prevent material disclosure of the intellectual property related to our technologies to third parties, we will not be able to establish or maintain a competitive advantage in our market, which could materially adversely affect our business, results of operations and financial condition.

Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either lawfully or through breach of our agreements with third parties, independent development or publication of information by any of our third-party collaborators. Competitors could willfully infringe our intellectual property rights, design around our protected technology or develop their own competitive technologies that fall outside of our intellectual property rights. In addition, if any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have an adverse effect on our business and results of operations.

We may also be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents or other intellectual property. Other than the currently pending litigation filed by Agilent, described under the captions "Business – Legal proceedings" and "Risk factors – We and our chief executive officer are currently involved in litigation with Agilent in which Agilent has alleged a claim of trade secret misappropriation against Twist Bioscience and trade secret misappropriation and other related claims against our chief executive officer, and an adverse result could harm our business and results of operations," no legal claims against us are currently pending. Some of our employees were previously employed at universities or biotechnology or biopharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that these employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights. A loss of key research personnel or their work product could hamper our ability to commercialize, or prevent us from commercializing, our products and technologies. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and distraction to management and other employees.

We may be involved in lawsuits to protect or enforce our patents and proprietary rights, to determine the scope, coverage and validity of others' proprietary rights, or to defend against third party claims of intellectual property infringement that could require us to spend significant time and money and could prevent us from selling our products or impact our stock price.

Litigation may be necessary for us to enforce our patent and proprietary rights and/or to determine the scope, coverage and validity of others' proprietary rights. Litigation on these matters has been prevalent in our industry and we expect that this will continue. As the biotechnology and synthetic biology industries expand and more patents are issued, the risk increases that there may be patents issued to third parties that relate to our technologies and products of which we are not aware or that we may need to challenge to continue our operations as currently contemplated. In addition, our competitors and others may have patents or may in the future obtain patents and claim that the use of our products or processes infringes these patents. As we move into new markets and applications for our products and processes, incumbent participants in such markets may assert their patents and other proprietary rights against us as a means of slowing our entry into such markets or as a means to extract substantial license and royalty payments from us.

To determine the priority of inventions, we may have to initiate and participate in interference proceedings declared by the USPTO that could result in substantial legal fees and could substantially affect the scope of our patent protection. Also, our intellectual property may be subject to significant administrative and litigation proceedings such as invalidity, unenforceability, re-examination and opposition proceedings against our patents. Whether merited or not, we may additionally face allegations that we have infringed the trademarks, copyrights, patents and other intellectual property rights of third parties, including patents held by our

competitors or by non-practicing entities. If we fail to identify and correctly interpret relevant patents, we may be subject to infringement claims. We may also face allegations that our employees have misappropriated the intellectual property rights of their former employers or other third parties. The outcome of any litigation or other proceeding is inherently uncertain and the results might not be favorable to us. For more information on our current legal and regulatory proceedings, see the section of this prospectus captioned "Business — Legal proceedings."

In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement during prosecution. The outcome following legal assertions of invalidity and unenforceability during patent litigation is unpredictable. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on certain aspects of our platform technology. Such a loss of patent protection could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Patent infringement suits can be expensive, lengthy and disruptive to business operations. We could incur substantial costs and divert the attention of our management and technical personnel in prosecuting or defending against any claims, and may harm our reputation. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. There can be no assurance that we will prevail in any suit initiated against us by third parties, successfully settle or otherwise resolve patent infringement claims. If we are unable to successfully settle claims on terms acceptable to us, we may be required to engage in or continue costly, unpredictable and time-consuming litigation and may be prevented from or experience substantial delays in marketing our technologies and products. Furthermore, parties making claims against us may be able to obtain injunctive or other relief, which could block our ability to develop, commercialize and sell products, and could result in the award of substantial damages against us, including treble damages and attorneys' fees and costs in the event that we are found to be a willful infringer of third party patents.

In the event of a successful claim of infringement against us, we may be required to obtain one or more licenses from third parties, which we may not be able to obtain at a reasonable cost, if at all. We could therefore incur substantial costs related to royalty payments for licenses obtained from third parties, which could negatively affect our gross margins. In addition, we could encounter delays in product introductions while we attempt to develop alternative methods or products to avoid infringing third-party patents or proprietary rights. Defense of any lawsuit or failure to obtain any required licenses on favorable terms could prevent us from commercializing our products, and the risk of a prohibition on the sale of any of our products could adversely affect our ability to grow and gain market acceptance for our products.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, during the course of this kind of litigation, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. Finally, any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise the funds necessary to continue our operations.

In addition, our agreements with some of our suppliers, distributors, customers and other entities with whom we do business may require us to defend or indemnify these parties to the extent they become involved in infringement claims against us, including the claims described above. We could also voluntarily agree to defend or indemnify third parties in instances where we are not obligated to do so if we determine it would be important to our business relationships. If we are required or agree to defend or indemnify any of these third parties in connection with any infringement claims, we could incur significant costs and expenses that could adversely affect our business, operating results, or financial condition.

We may not be successful in obtaining or maintaining necessary rights to our products and technologies through acquisitions and in-licenses, and our intellectual property agreements with third parties may involve unfavorable terms or be subject to disagreements over contract interpretation.

We may find that our programs require the use of proprietary rights held by third parties, and the growth of our business may depend in part on our ability to acquire, in-license or use these proprietary rights. We may be unable to acquire or in-license compositions, methods of use, processes or other third party intellectual property rights from third parties that we identify as necessary for our products and technologies. The licensing and acquisition of third-party intellectual property rights is a competitive area, and other companies may also be pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These companies may have a competitive advantage over us due to their size, financial resources and greater commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. Moreover, collaboration arrangements are complex and time-consuming to negotiate, document, implement and maintain. We may not be successful in our efforts to establish and implement collaborations or other alternative arrangements should we so choose to enter into such arrangements. We also may be unable to license or acquire third-party intellectual property rights on terms that that would be favorable to us or would allow us to make an appropriate return on our investment.

We engage in discussions regarding other possible commercial and cross-licensing agreements with third parties from time to time. There can be no assurance that these discussions will lead to the execution of commercial license or cross-license agreements or that such agreements will be on terms that are favorable to us. Even if we are able to obtain a license to intellectual property of interest, we may not be able to secure exclusive rights, in which case others could use the same rights and compete with us. In addition, if we enter into cross-licensing agreements, there is no assurance that we will be able to effectively compete against others who are licensed under our patents.

In addition, provisions in our licensing and other intellectual property agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could affect the scope of our rights to the relevant intellectual property or technology, or affect financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

We have not yet registered some of our trademarks in all of our potential markets, and failure to secure those registrations could adversely affect our business.

Some of our trademark applications may not be allowed for registration, and our registered trademarks may not be maintained or enforced. In addition, in the U.S. Patent and Trademark Office and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings.

In addition, third parties may file first for our trademarks in certain countries. If they succeed in registering such trademarks, and if we are not successful in challenging such third party rights, we may not be able to use

these trademarks to market our products and technologies in those countries. Over the long-term, if we are unable to establish name recognition based on our trademarks, then our marketing abilities may be materially adversely impacted.

We depend on certain technologies that are licensed to us. We do not control these technologies and any loss of our rights to them could prevent us from selling our products.

We rely on, or may in the future rely on, licenses in order to be able to use various proprietary technologies that are material to our business. We do not or will not own the patents that underlie these licenses. Our rights to use the technology we license are subject to the negotiation of, continuation of and compliance with the terms of those licenses. In some cases, we do not or will not control the prosecution, maintenance, or filing of the patents to which we hold licenses, or the enforcement of these patents against third parties. Some of our patents and patent applications were either acquired from another company who acquired those patents and patent applications from yet another company, or are licensed from a third party. For example, Twist Bioscience acquired Genome Compiler Corporation in 2016, and Genome Compiler had a non-exclusive license to U.S. Patent No. 7,805,252 owned by DNA 2.0. Thus, these patents and patent applications are not written by us or our attorneys, and we did not have control over the drafting and prosecution. The former patent owners and our licensors might not have given the same attention to the drafting and prosecution of these patents and applications as we would have if we had been the owners of the patents and applications and had control over the drafting and prosecution. We cannot be certain that drafting and/or prosecution of the licensed patents and patent applications by the licensors have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents and other intellectual property rights.

Our rights to use the technology we license is subject to the validity of the owner's intellectual property rights. Enforcement of our licensed patents or defense or any claims asserting the invalidity of these patents is often subject to the control or cooperation of our licensors. Legal action could be initiated against the owners of the intellectual property that we license. Even if we are not a party to these legal actions, an adverse outcome could harm our business because it might prevent these other companies or institutions from continuing to license intellectual property that we may need to operate our business.

Our licenses contain or will contain provisions that allow the licensor to terminate the license upon specific conditions. Our rights under the licenses are subject to or will be subject to our continued compliance with the terms of the license, including the payment of royalties due under the license. Termination of these licenses could prevent us from marketing some or all of our products. Because of the complexity of our products and the patents we have licensed, determining the scope of the license and related royalty obligation can be difficult and can lead to disputes between us and the licensor. An unfavorable resolution of such a dispute could lead to an increase in the royalties payable pursuant to the license. If a licensor believed we were not paying the royalties due under the license or were otherwise not in compliance with the terms of the license, the licensor might attempt to revoke the license. If such an attempt were successful, we might be barred from producing and selling some or all of our products.

Risks related to doing business in China

The People's Republic of China, or the PRC, government has the ability to exercise significant influence and control over our proposed wholly owned foreign entity in China.

The PRC plays a significant role in regulating industrial development by imposing business regulations. It also exercises significant control over the country's economic growth through the allocation of resources, controlling payment of foreign currency-denominated obligations, setting monetary policy and providing preferential treatment to particular industries or companies.

[Table of Contents](#)

Additional factors that we may experience in connection with setting up operations in China that may adversely affect our business and results of operations include:

- our inability to enforce or obtain a remedy under our agreements;
- PRC restrictions on foreign investment that could impair our ability to conduct our business or acquire or contract with other entities in the future;
- restrictions on currency exchange that may limit our ability to use cash flow most effectively or to repatriate our investments;
- fluctuations in currency values;
- increased challenges of defending our intellectual property;
- cultural, language and managerial differences that may reduce our overall performance; and
- political instability in China.

We may not be able to enforce our rights in China.

China's legal and judicial system may negatively impact foreign investors. The legal system in China is evolving rapidly, and enforcement of laws is inconsistent. It may be impossible to obtain swift and equitable enforcement of laws or enforcement of the judgment of one court by a court of another jurisdiction. China's legal system is based on civil law or written statutes and a decision by one judge does not set a legal precedent that must be followed by judges in other cases. In addition, the interpretation of Chinese laws may vary to reflect domestic political changes.

There are substantial uncertainties regarding the interpretation and application to our business of PRC laws and regulations, since many of the rules and regulations that companies face in China are not made public. The effectiveness of newly enacted laws, regulations or amendments may be delayed, resulting in detrimental reliance by foreign investors. We cannot predict what effect the interpretation of existing or new PRC laws or regulations may have on the proposed business of our wholly foreign owned entity.

China is a developing nation governed by a one-party communist government and susceptible to political, economic, and social upheaval that could disrupt the economy.

China is a developing country governed by a one-party government. China is also a country with an extremely large population, wide income gaps between rich and poor and between urban and rural residents, minority ethnic and religious populations, and growing access to information about the different social, economic, and political systems found in other countries. China has also experienced extremely rapid economic growth over the last decade, and its legal and regulatory systems have had to change rapidly to accommodate this growth. If China experiences political or economic upheaval, labor disruptions or other organized protests, nationalization of private businesses, civil strife, strikes, acts of war and insurrections, this may disrupt China's economy and could materially and adversely affect the financial performance of our proposed wholly foreign owned entity.

If relations between China and the U.S. deteriorate, our business in China may be materially and adversely affected.

The relationship between China and the U.S. is subject to periodic tension. Relations may also be compromised if the U.S. becomes a more active advocate of Taiwan or pressures the PRC government regarding its monetary, economic or social policies. Changes in political conditions in China and changes in the state of China-U.S. relations are difficult to predict and could adversely affect the operations or financial condition of our proposed wholly owned foreign owned entity. In addition, because of our involvement in the Chinese market, any deterioration in political or trade relations might cause a public perception in the U.S. or elsewhere that might cause our products

to become less attractive. A proposed enhancement of U.S. export controls is expected to apply to U.S. technology exports to China and Chinese companies, in addition to more stringent review of foreign investment in U.S. technology companies by the committee on foreign investment in the United States. We cannot predict what effect any changes in China-U.S. relations may have on our ability to access capital or effectively do business in China, including through the proposed business of our proposed wholly foreign owned entity.

Governmental control of currency conversion may limit our ability to utilize our revenues effectively and affect the value of your investment.

The PRC government imposes controls on the convertibility of the Chinese currency, Renminbi, into foreign currencies and, in certain cases, the remittance of currency out of China. Under existing PRC foreign exchange regulations, payments of current account items, including profit distributions, interest payments and trade and service-related foreign exchange transactions, can be made in foreign currencies without prior approval of State Administration of Foreign Exchange, or SAFE, by complying with certain procedural requirements. However, in practice sometimes payment of current account items may be subject to delay and other restrictions. Furthermore, approval from or registration with appropriate government authorities is required where Renminbi is to be converted into foreign currency and remitted out of China to pay capital expenses such as the repayment of loans denominated in foreign currencies.

In light of the flood of capital outflows of China in 2016 due to the weakening Renminbi, the PRC government has imposed more restrictive foreign exchange policies and stepped up scrutiny of major outbound capital movement including overseas direct investment. More restrictions and substantial vetting process are put in place by SAFE to regulate cross-border transactions falling under the capital account. The PRC government may at its discretion further restrict access in the future to foreign currencies for current account transactions. Therefore, if we receive revenues in Renminbi by our proposed wholly foreign owned entity or otherwise, due to China's foreign exchange control, such revenues may not be converted to foreign currency and remitted out of China in a timely manner.

Risks relating to owning our common stock and this offering

Our share price may be volatile, and you maybe unable to sell your shares at or above the offering price.

The market price of our common stock is likely to be volatile and could be subject to wide fluctuations in response to many risk factors listed in this section, and others beyond our control, including:

- actual or anticipated fluctuations in our financial condition and operating results, including fluctuations in our quarterly and annual results;
- announcements of technological innovations by us or our competitors;
- overall conditions in our industry and the markets in which we operate;
- addition or loss of significant customers, or other developments with respect to significant customers;
- changes in laws or regulations applicable to our products;
- actual or anticipated changes in our growth rate relative to our competitors;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures or capital commitments;
- additions or departures of key personnel;
- competition from existing products or new products that may emerge;

[Table of Contents](#)

- issuance of new or updated research or reports by securities analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- disputes or other developments related to proprietary rights, including patents, litigation matters including the Agilent litigation, and our ability to obtain intellectual property protection for our technologies;
- announcement or expectation of additional financing efforts;
- sales of our common stock by us or our stockholders;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- the expiration of contractual lock-up agreements with our executive officers, directors and stockholders; and
- general economic and market conditions.

Furthermore, the stock markets have experienced price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions such as recessions, interest rate changes or international currency fluctuations, may negatively impact the market price of our common stock. If the market price of our common stock after this offering does not exceed the initial public offering price, you may not realize any return on your investment in us and may lose some or all of your investment. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We may be the target of this type of litigation in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

No public market for our common stock currently exists, and an active trading market may not develop or be sustained following this offering.

Prior to this offering, there has been no public market for our common stock. Although we will apply to have our common stock listed on the Nasdaq Global Market, an active trading market may not develop following the closing of this offering or, if developed, may not be sustained. The lack of an active market may impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the fair market value of your shares. An inactive market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to acquire other companies or technologies by using our shares as consideration. The initial public offering price was determined by negotiations between us and the underwriters and may not be indicative of the future prices of our common stock.

If securities or industry analysts do not publish research or reports about our business or publish negative reports about our business, our share price and trading volume could decline.

The trading market for our common stock will depend on the research and reports that securities or industry analysts publish about us or our business. Currently, we do not have any analyst coverage and we may not obtain analyst coverage in the future. In the event we obtain analyst coverage, we will not have any control over such analysts. If one or more of the analysts who cover us downgrade our shares or change their opinion of our shares, our share price would likely decline. If one or more of these analysts cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our share price or trading volume to decline.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our stockholders and could cause the stock price of our common stock to decline.

We may issue additional securities following the completion of this offering. In the future, we may sell common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time. We also expect to issue common stock to employees and directors pursuant to our equity incentive plans. If we sell common stock, convertible securities or other equity securities in subsequent transactions, or common stock is issued pursuant to equity incentive plans, investors may be materially diluted. New investors in such subsequent transactions could gain rights, preferences and privileges senior to those of holders of our common stock.

Future sales of our common stock in the public market could cause our share price to fall.

Sales of a substantial number of shares of our common stock in the public market after this offering, or the perception that these sales might occur, could depress the market price of our common stock and could impair our ability to raise capital through the sale of additional equity securities. Based on the number of shares of common stock outstanding as of June 30, 2018, upon the closing of this offering, we will have 26,609,991 shares of common stock outstanding, assuming no exercise of our outstanding options.

All of the common stock sold in this offering will be freely tradable without restrictions or further registration under the Securities Act of 1933, as amended, or the Securities Act, except for any shares held by our affiliates as defined in Rule 144 under the Securities Act. The remaining 21,609,991 shares of common stock outstanding after this offering, based on shares outstanding as of June 30, 2018, will be restricted as a result of securities laws, lock-up agreements or other contractual restrictions that restrict transfers for at least 180 days after the date of this prospectus, subject to certain extensions.

The underwriters may, in their sole discretion, release all or some portion of the shares subject to lock-up agreements with the underwriters prior to expiration of the lock-up period. See also the section of this prospectus captioned "Shares eligible for future sale." For more information regarding the lock-up agreements with the underwriters see the section of this prospectus captioned "Underwriting."

The holders of 20,545,416 shares of common stock, or 95.2% based on shares outstanding on an as-converted basis as of June 30, 2018, will be entitled to rights with respect to registration of such shares under the Securities Act pursuant to a registration rights agreement between such holders and us. See "Certain relationships and related party transactions—Registration rights agreement" below. If such holders, by exercising their registration rights, sell a large number of shares, they could adversely affect the market price for our common stock. If we file a registration statement for the purpose of selling additional shares to raise capital and are required to include shares held by these holders pursuant to the exercise of their registration rights, our ability to raise capital may be impaired. We intend to file a registration statement on Form S-8 under the Securities Act to register 6,131,730 shares of common stock for issuance under the 2018 Plan, the 2013 Plan and the 2018 ESPP. Both the 2018 Plan and the 2018 ESPP provide for automatic increases in the shares reserved for issuance under the plans which could result in additional dilution to our stockholders. Once we register the shares under these plans, they can be freely sold in the public market upon issuance and vesting, subject to a 180-day lock-up period and other restrictions provided under the terms of the applicable plan and/or the option agreements entered into with option holders.

Our management team may invest or spend the proceeds of this offering in ways with which you may not agree or in ways which may not yield a return.

Our management will have broad discretion in the application of the net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being used appropriately. Accordingly, investors will need to rely on our judgment with respect to the use of these proceeds. We intend to

use the proceeds from this offering primarily to improve and update our platform and core technologies, to expand our sales and marketing capabilities in the U.S. and in other geographies, including China, to establish our operations in China, to continue to expand in the pharmaceutical biologics drug discovery and DNA data storage markets, and for working capital and general corporate purposes. While we have no current agreements, commitments or understandings for any specific strategic acquisitions or in-licenses at this time, we may use a portion of the net proceeds for these purposes. For more information see, "Use of proceeds." The failure by our management to apply these funds effectively could adversely affect our ability to continue maintaining and expanding our business. Until the net proceeds are used, they may be placed in investments that do not produce significant income or that may lose value.

We have never paid dividends on our capital stock and we do not intend to pay dividends for the foreseeable future. Consequently, any gains from an investment in our common stock will likely depend on whether the price of our common stock increases.

We have never declared or paid any dividends on our common stock and do not intend to pay any dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the operation of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments. Furthermore, we are party to a credit agreement with Silicon Valley Bank which contains negative covenants that limit our ability to pay dividends. For more information, see the section of this prospectus captioned "Management's discussion and analysis of financial condition and results of operation – Liquidity and capital resources." For more information regarding the negative covenants in our loan and security agreement with Silicon Valley Bank, see "Risk factors—Our credit facility contains restrictions that limit our flexibility in operating our business."

Our charter documents and Delaware law could prevent a takeover that stockholders consider favorable and could also reduce the market price of our stock.

Our amended and restated certificate of incorporation and our amended and restated bylaws will contain provisions that could delay or prevent a change in control of our company. These provisions could also make it more difficult for stockholders to elect directors and take other corporate actions. These provisions include:

- providing for a classified board of directors with staggered, three year terms;
- authorizing our board of directors to issue preferred stock with voting or other rights or preferences that could discourage a takeover attempt or delay changes in control;
- prohibiting cumulative voting in the election of directors;
- providing that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- prohibiting the adoption, amendment or repeal of our amended and restated bylaws or the repeal of the provisions of our amended and restated certificate of incorporation regarding the election and removal of directors without the required approval of at least 66.67% of the shares entitled to vote at an election of directors;
- prohibiting stockholder action by written consent;
- limiting the persons who may call special meetings of stockholders; and
- requiring advance notification of stockholder nominations and proposals.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is

responsible for appointing the members of our management. In addition, the provisions of Section 203 of the Delaware General Corporate Law, or the DGCL, govern us. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time without the consent of our board of directors.

These and other provisions in our amended and restated certificate of incorporation and our amended and restated bylaws and under Delaware law could discourage potential takeover attempts, reduce the price investors might be willing to pay in the future for shares of our common stock and result in the market price of our common stock being lower than it would be without these provisions. For more information, see the section of this prospectus captioned "Description of capital stock—Anti-takeover effects of Delaware law and our amended and restated certificate of incorporation and amended and restated bylaws."

Insiders have substantial control over us and will be able to influence corporate matters.

As of September 30, 2018, our directors and executive officers and their affiliates will beneficially own, in the aggregate, approximately 30.4% of our outstanding capital stock upon the completion of this offering (based on the assumed initial public offering price of \$15.00 per share, the midpoint of the estimated price range set forth on the cover page of this prospectus, and assuming no exercise of the underwriters' option to purchase additional shares). In addition, certain of our stockholders whose Twist shares are beneficially owned by certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$6 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. If such stockholders purchase all shares they have indicated an interest in purchasing, our directors and executive officers and their affiliates will beneficially own in the aggregate, approximately 31.8% of our outstanding capital stock upon the completion of this offering (based on the assumed initial public offering price of \$15.00 per share, the midpoint of the estimated price range set forth on the cover page of this prospectus, and assuming no exercise of the underwriters' option to purchase additional shares). As a result, these stockholders will be able to exercise significant influence over all matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions, such as a merger or other sale of our company or its assets. This concentration of ownership could limit stockholders' ability to influence corporate matters and may have the effect of delaying or preventing a third party from acquiring control over us.

Claims for indemnification by our directors and officers may reduce our available funds to satisfy successful third-party claims against us and may reduce the amount of money available to us.

Our amended and restated certificate of incorporation and amended and restated bylaws provide that we will indemnify our directors and officers, in each case to the fullest extent permitted by Delaware law.

In addition, as permitted by Section 145 of the DGCL, our amended and restated bylaws and our indemnification agreements that we have entered into with our directors and officers provide that:

- We will indemnify our directors and officers for serving us in those capacities or for serving other business enterprises at our request, to the fullest extent permitted by Delaware law. Delaware law provides that a corporation may indemnify such person if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the registrant and, with respect to any criminal proceeding, had no reasonable cause to believe such person's conduct was unlawful;
- We may, in our discretion, indemnify employees and agents in those circumstances where indemnification is permitted by applicable law;
- We are required to advance expenses, as incurred, to our directors and officers in connection with defending a proceeding, except that such directors or officers shall undertake to repay such advances if it is ultimately determined that such person is not entitled to indemnification;

- We will not be obligated pursuant to our amended and restated bylaws to indemnify a person with respect to proceedings initiated by that person against us or our other indemnitees, except with respect to proceedings authorized by our board of directors or brought to enforce a right to indemnification;
- The rights conferred in our amended and restated bylaws are not exclusive, and we are authorized to enter into indemnification agreements with our directors, officers, employees and agents and to obtain insurance to indemnify such persons; and
- We may not retroactively amend our amended and restated bylaw provisions to reduce our indemnification obligations to directors, officers, employees and agents.

Our amended and restated certificate of incorporation to be in effect upon completion of this offering will provide that the Court of Chancery of the State of Delaware and the federal district courts of the United States will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or other employees.

Our amended and restated certificate of incorporation to be in effect upon completion of this offering provides that the Court of Chancery of the State of Delaware is the sole and exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, any action asserting a claim against us arising pursuant to any provisions of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws to be in effect upon completion of this offering, any action or proceeding asserting a claim as to which the Delaware General Corporation Law confers jurisdiction upon the Court of Chancery of the State of Delaware or any action asserting a claim against us that is governed by the internal affairs doctrine, subject in each case to the Court of Chancery having personal jurisdiction over the parties named as defendants therein. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. If a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions.

Our amended and restated certificate of incorporation to be in effect upon completion of this offering further provides that the federal district courts of the United States will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act.

Because the public offering price of our common stock will be substantially higher than the net tangible book value per share of our outstanding common stock following this offering, new investors will experience immediate and substantial dilution.

The public offering price of our common stock is substantially higher than the net tangible book value per share of our common stock immediately following this offering based on the total value of our tangible assets less our total liabilities. Therefore, if you purchase shares of our common stock in this offering, you will experience immediate dilution of approximately \$8.96 per share, the difference between the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, and the net tangible book value per share of our common stock as of June 30, 2018, after giving effect to the issuance of shares of our common stock in this offering. Furthermore, if the underwriters exercise their overallotment option, or outstanding options and warrants are exercised, you could experience further dilution. For a further description of the dilution that you will experience immediately after the offering, see the section of this prospectus captioned "Dilution."

Special note regarding forward-looking statements

This prospectus includes forward-looking statements within the meaning of the federal securities laws. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends affecting the operating results and financial condition of our business. Forward-looking statements should not be read as a guarantee of future performance or results, and will not necessarily be accurate indications of the times at, or by, which such performance or results will be achieved. Forward-looking statements are based on information available at the time those statements are made and/or management's good faith belief as of that time with respect to future events, and are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in or suggested by the forward-looking statements. Important factors that could cause such differences include, but are not limited to, statements about:

- our ability to increase our revenue and our revenue growth rate;
- estimates of our expenses, future revenues, capital requirements and our needs for additional financing; our estimates of the size of our market opportunities;
- our expectations regarding our ability to increase DNA production, reduce turnaround times and drive cost reductions for our customers;
- our ability to effectively manage our growth;
- our ability to successfully enter new markets and manage our international expansion;
- our ability to protect our intellectual property, including our proprietary DNA synthesis platform;
- costs associated with defending intellectual property infringement and other claims;
- the effects of increased competition in our business;
- our ability to keep pace with changes in technology and our competitors;
- our ability to successfully identify, evaluate and manage any future acquisitions of businesses, solutions or technologies;
- the success of our marketing efforts;
- the potential purchases of common stock by certain of our existing stockholders and their affiliated entities, including stockholders who are associated with certain of our directors, in this offering;
- significant disruption in, or breach in security of our information technology systems and resultant interruptions in service and any related impact on our reputation;
- the attraction and retention of qualified employees and key personnel;
- the effects of natural or man-made catastrophic events;
- the effectiveness of our internal controls;
- changes in government regulation affecting our business;
- the impact of adverse economic conditions;
- our use of the net proceeds from this offering; and
- other risk factors included under "Risk factors" in this prospectus.

[Table of Contents](#)

In addition, in this prospectus, the words “believe,” “may,” “will,” “estimate,” “continue,” “anticipate,” “intend,” “expect,” “predict,” “potential” and similar expressions, as they relate to our company, our business and our management, are intended to identify forward-looking statements. In light of these risks and uncertainties, the forward-looking events and circumstances discussed in this prospectus may not occur and actual results could differ materially from those anticipated or implied in the forward-looking statements.

Forward-looking statements speak only as of the date of this prospectus. You should not put undue reliance on any forward-looking statements. We assume no obligation to update forward-looking statements to reflect actual results, changes in assumptions or changes in other factors affecting forward-looking information, except to the extent required by applicable laws. If we update one or more forward-looking statements, no inference should be drawn that we will make additional updates with respect to those or other forward-looking statements.

You should read this prospectus and the documents that we reference in this prospectus and have filed with the Securities and Exchange Commission as exhibits to the registration statement of which this prospectus is a part with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect.

Industry and market data

This prospectus contains estimates, projections and other information concerning our industry, our business, and the markets for our products, including data regarding our current manufacturing capacity, product features and benefits, product quality, turnaround time, reliability and cost, as well as data regarding market research, estimates and forecasts prepared by our management. Information that is based on estimates, forecasts, projections, market research or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances that are assumed in this information. Unless otherwise expressly stated, we obtained this industry, business, market and other data from reports, research surveys, studies and similar data prepared by market research firms and other third parties, industry, medical and general publications, government data and similar sources. In some cases, we do not expressly refer to the sources from which this data is derived. In that regard, when we refer to one or more sources of this type of data in any paragraph, you should assume that other data of this type appearing in the same paragraph is derived from the same sources, unless otherwise expressly stated or the context otherwise requires.

Use of proceeds

We estimate that the net proceeds from our issuance and sale of shares of our common stock in this offering will be approximately \$66.3 million, or approximately \$76.8 million if the underwriters exercise their option to purchase additional shares of our common stock in full, assuming an initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

A \$1.00 increase or decrease in the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, would increase or decrease our net proceeds from this offering by approximately \$4.65 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase or decrease of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase or decrease our net proceeds from this offering by approximately \$13.95 million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. We do not expect that a change in the offering price or the number of shares by these amounts would have a material effect on our intended uses of the net proceeds from this offering, although it may impact the amount of time prior to which we may need to seek additional capital.

As of June 30, 2018, we had cash, cash equivalents and short-term investments of \$92.5 million. We currently estimate that we will use the net proceeds from this offering, together with our existing cash, cash equivalents and short-term investments as follows:

- Approximately \$15 million to \$20 million to improve and update our platform and core technologies by investing in equipment, expanding our research and development capabilities and establishing new (and scalable) operation facilities;
- Approximately \$15 million to \$18 million to expand our sales and marketing capabilities in the U.S., Europe and Asia, including approximately \$2 million to \$3 million to establish our sales and marketing capabilities in China;
- Approximately \$12 million to \$14 million to continue to expand in the pharmaceutical biologics drug discovery and DNA data storage markets;
- Approximately \$5 million to \$10 million to establish our operations in China; and
- Any proceeds not applied to the foregoing will be used for working capital and general corporate purposes.

We believe opportunities may exist from time to time to expand our current business through strategic acquisitions or in-licenses of complementary companies or technologies. While we have no current agreements, commitments or understandings for any specific strategic acquisitions or in-licenses at this time, we may use a portion of the net proceeds for these purposes.

This expected use of the net proceeds from this offering and our existing cash, cash equivalents and short-term investments represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. As of the date of this prospectus, we cannot predict with certainty all of the particular uses for the proceeds to be received upon the completion of this

[Table of Contents](#)

offering or the actual amounts that we will spend on the uses set forth above. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering.

After giving effect to the anticipated net proceeds from this offering, we expect that our existing cash, cash equivalents and short-term investments will be sufficient to fund our planned operating expenses, capital expenditure requirements and debt service payments through at least the next 12 months. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. For additional information regarding our potential capital requirements, see “We will require additional financing to achieve our goals, and a failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product manufacturing and development and other operations” under the heading “Risk factors.”

Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities.

Dividend policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any cash dividends in the foreseeable future.

Any decision to declare and pay dividends in the future will be made at the discretion of our board of directors and will depend on, among other things, our results of operations, cash requirements, financial condition, contractual restrictions including compliance with covenants under our credit facilities and other factors that our board of directors may deem relevant. In addition, under the terms of our current credit facilities, we are prohibited from paying cash dividends without the prior consent of Silicon Valley Bank.

Capitalization

The following table sets forth our cash, cash equivalents and short-term investments and capitalization as of June 30, 2018 on:

- An actual basis;
- A pro forma basis, to give effect to (i) the conversion of the outstanding shares of our convertible preferred stock as of June 30, 2018 into 18,386,457 shares of our common stock immediately prior to the closing of this offering, (ii) the automatic conversion of warrants to purchase 79,444 shares of our convertible preferred stock into warrants to purchase 79,444 shares of common stock immediately prior to the closing of this offering; and (iii) the effectiveness of our amended and restated certificate of incorporation, as if such conversions, and effectiveness had occurred immediately prior to the closing of this offering; and
- A pro forma as adjusted basis, giving effect to (i) the pro forma adjustments set forth above and (ii) the sale and issuance of shares of our common stock by us in this offering, based upon the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

You should read this table together with the section of this prospectus entitled “Management’s discussion and analysis of financial condition and results of operations” and our consolidated financial statements and related notes included elsewhere in this prospectus.

(In thousands, except share and per share data)	As of June 30, 2018		
	Actual	Pro forma	Pro forma as adjusted ⁽¹⁾
Cash, cash equivalents and short-term investments	\$ 92,499	\$ 92,499	\$ 160,710
Long-term debt	\$ 9,535	\$ 9,535	\$ 9,535
Convertible preferred stock warrant liabilities	710	—	—
Convertible preferred stock, \$0.00001 par value: 15,173,388 shares authorized, 18,386,457 shares issued and outstanding, actual; no shares authorized, no shares issued and outstanding, pro forma and pro forma as adjusted	278,505	—	—
Stockholders' equity (deficit):			
Common stock, \$0.00001 par value: 27,775,000 shares authorized, 3,223,534 shares issued and outstanding, actual; 27,775,000 shares authorized, 21,609,991 shares issued and outstanding, pro forma; 110,000,000 shares authorized, 26,069,991 shares issued and outstanding, pro forma as adjusted	—	—	—
Additional paid-in capital	8,226	287,441	353,728
Accumulated other comprehensive income	68	68	68
Accumulated deficit	(191,053)	(191,053)	(191,053)
Total stockholders' equity (deficit)	(182,759)	96,456	162,743
Total capitalization	\$ 105,991	\$ 105,991	\$ 172,278

- (1) Each \$1.00 increase or decrease in the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, would increase or decrease, as applicable, our cash, cash equivalents and short-term investments, working capital, total assets and total stockholders' equity and total capitalization by approximately \$4.26 million, assuming that the number of shares of our common stock offered by us, as set forth on the cover page of this prospectus, remains the same and after

[Table of Contents](#)

deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase or decrease of 1.0 million shares in the number of shares offered by us would increase or decrease the amount of our cash, cash equivalents, and short-term investments working capital, total assets and total stockholders' equity by approximately \$13.95 million, assuming an initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The total number of shares of our common stock reflected in the discussion and table above is based upon 21,609,991 shares of our common stock (including 146,745 unvested shares of restricted common stock subject to our repurchase right) outstanding on a pro forma basis as of June 30, 2018, and excludes:

- 564,848 shares of our common stock issuable upon conversion of 564,848 shares of Series D convertible preferred stock issued after June 30, 2018;
- 2,424,024 shares of our common stock issuable upon the exercise of options to purchase shares of our common stock outstanding as of June 30, 2018, with a weighted-average exercise price of \$8.04 per share;
- 130,578 shares of our common stock issuable upon the exercise of options to purchase shares of our common stock granted after June 30, 2018, with a weighted-average exercise price of \$11.25 per share;
- 64,127 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our common stock outstanding as of June 30, 2018, having an exercise price of \$6.24 per share and an additional 64,126 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our common, having an exercise price of \$6.24 per share that would be exercisable upon the drawing down of additional loans under our credit facility;
- 36,838 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series A convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$3.26 per share;
- 16,221 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series B convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$7.84 per share;
- 18,854 shares of our common stock, issuable upon the exercise of outstanding warrants to purchase Series C convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$14.85 per share;
- 7,531 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series D convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$21.24 per share; and
- 3,698,899 shares of common stock reserved for future grants, excluding shares that may become issuable under the 2018 Plan upon cancellation, forfeiture or repurchase of outstanding awards under the 2013 Plan, which are reflected above, under our stock-based compensation plans, consisting of:
 - 944,123 shares of common stock reserved for future grants under the 2013 Plan as of June 30, 2018, of which, 928,974 shares will be added to the shares to be reserved under the 2018 Plan, which will become effective upon completion of this offering and contains provisions that automatically increase its share reserve each year, as more fully described in "Executive compensation—Equity incentive plans";
 - 2,494,700 shares of common stock reserved for future grants under the 2018 Plan, which will become effective upon completion of this offering; and
 - 275,225 shares of common stock reserved for future issuance under the 2018 ESPP, which will become effective upon completion of this offering.

Dilution

If you invest in our common stock, your interest will be diluted to the extent of the difference between the public offering price per share of our common stock and the pro forma as adjusted net tangible book value per share of our common stock after this offering. Our historical net tangible book value as of June 30, 2018 was \$(187.1) million, or \$(58.04) per share of common stock. Our net tangible book value per share represents total tangible assets less total liabilities and convertible preferred stock, divided by the number of shares of common stock outstanding as of June 30, 2018. Our pro forma net tangible book value at June 30, 2018, before giving effect to this offering, was \$92.1 million, or \$4.26 per share of our common stock. Our pro forma net tangible book value before the issuance of shares in this offering gives effect to the conversion of our outstanding convertible preferred stock into our common stock immediately prior to the completion of this offering, the conversion of our warrants to purchase convertible preferred stock to warrants to purchase common stock and the related reclassification of the convertible preferred stock warrant liability into additional paid-in capital immediately prior to the closing of this offering.

After giving effect to our sale of 5,000,000 shares of our common stock in this offering at an assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of June 30, 2018 would have been \$160.8, or \$6.04 per share. This represents an immediate increase in net tangible book value of \$1.78 per share to our existing stockholders and an immediate dilution of \$8.96 per share to new investors purchasing shares of common stock in this offering. The following table illustrates this dilution on a per share basis:

Assumed initial public offering price per share	<u>\$15.00</u>
Historical net tangible book value per share as of June 30, 2018	\$(58.04)
Pro forma increase in net tangible book value per share attributable to automatic conversion of convertible preferred stock	62.30
Pro forma net tangible book value per share as of June 30, 2018 before giving effect to this offering	4.26
Increase in net tangible book value per share attributable to new investors purchasing shares in this offering	<u>\$ 1.78</u>
Pro forma as adjusted net tangible book value per share after giving effect to this offering	6.04
Dilution in pro forma net tangible book value per share to new investors in this offering	<u>\$ 8.96</u>

Each \$1.00 increase or decrease in the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, would increase or decrease, as applicable, our pro forma as adjusted net tangible book value by approximately \$4.65 million, or approximately \$0.17 per share, and would increase or decrease, as applicable, dilution per share to new investors in this offering by \$0.83, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase or decrease of 1,000,000 shares in the number of shares offered by us would increase or decrease, as applicable, our pro forma as adjusted net tangible book value by approximately \$13.95 million, and would decrease or increase dilution per share to new investors in this offering by approximately \$0.29 per share and \$0.31 per share, respectively, assuming an

Table of Contents

initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. The pro forma as adjusted information discussed above is illustrative only and will be adjusted based on the actual public offering price and other terms of this offering determined at pricing. If the underwriters exercise their overallotment option to purchase additional shares in full, the pro forma as adjusted net tangible book value per share would be \$6.26 per share, and the dilution per share to new investors in this offering would be \$8.74 per share.

The following table summarizes the pro forma on an as adjusted basis as described above, as of June 30, 2018, the differences between the existing stockholders and new investors with respect to the number of shares of common stock purchased from us, the total consideration paid to us and the average price per share paid or to be paid to us at an assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, before deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us:

	Shares purchased		Total consideration		Weighted Average price per share
	Number	Percent	Amount	Percent	
Existing stockholders	21,609,991	81.2%	\$ 287,851,327	79.3%	\$ 13.32
New investors(1)	5,000,000	18.8%	\$ 75,000,000	20.7%	\$ 15.00
Total	26,609,991	100.0%	\$ 362,851,327	100.0%	\$ 13.64

(1) Certain of our stockholders, including stockholders affiliated with certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$30 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no shares in this offering to any of these stockholders, or any of these stockholders may determine to purchase more, fewer or no shares in this offering. The underwriters will receive the same underwriting discount on any shares purchased by these persons or entities as they will on any other shares sold to the public in this offering. The presentation in this table regarding ownership by existing stockholders does not give effect to any purchases in this offering by such investors.

Each \$1.00 increase or decrease in the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, would increase or decrease, as applicable, the total consideration paid to us by new investors and total consideration paid to us by all stockholders by \$5.0 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase or decrease of 1,000,000 shares in the number of shares offered by us would increase or decrease the total consideration paid to us by new investors and total consideration paid to us by all stockholders by \$15.0 million, assuming an initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

If all of the outstanding options and warrants noted below were exercised, (1) the number of shares of our common stock held by existing stockholders would be increased to 24,241,712 shares, or 82.9% of the total number of shares of our common stock outstanding after this offering, and the percentage of shares of common stock held by new investors participating in the offering would be decreased to 17.1% of the total number of shares of our common stock outstanding after this offering, (2) the consideration paid by existing stockholders would be increased to \$308.9 million, or 80.5% of the total consideration paid by stockholders after this offering, and the percentage of consideration paid by new investors participating in the offering would be decreased to 19.5% of the total consideration paid by stockholders after this offering, and (3) the average price per share paid by existing stockholders would decrease to \$12.74 per share.

Table of Contents

Assuming the exercise of all of our outstanding options and warrants as of June 30, 2018, the amounts set forth in the table immediately above would change as follows:

	Shares purchased		Total consideration		Weighted Average price per share
	Number	Percent	Amount	Percent	
Existing stockholders	24,241,712	82.9%	\$ 308,864,027	80.5%	\$ 12.74
New investors	5,000,000	17.1%	\$ 75,000,000	19.5%	\$ 15.00
Total	29,241,712	100.0%	\$ 383,864,027	100.0%	\$ 13.13

The total number of shares of our common stock reflected in the discussion and table above is based upon 21,609,991 shares of our common stock (including 146,745 unvested shares of restricted common stock subject to our repurchase right) outstanding on a pro forma basis as of June 30, 2018 and excludes:

- 564,848 shares of our common stock issuable upon conversion of 564,848 shares of Series D convertible preferred stock issued after June 30, 2018;
- 2,424,024 shares of our common stock issuable upon exercise of stock options outstanding as of June 30, 2018, having a weighted-average exercise price of \$8.04 per share;
- 130,578 shares of our common stock issuable upon exercise of stock options granted after June 30, 2018, having a weighted-average exercise price of \$11.25 per share;
- 64,127 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our common stock outstanding as of June 30, 2018, having an exercise price of \$6.24 per share and an additional 64,126 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our common, having an exercise price of \$6.24 per share that would be exercisable upon the drawing down of additional loans under our credit facility
- 36,838 shares of our common stock issuable upon the exercise of outstanding warrants to purchase our Series A convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$3.26 per share;
- 16,221 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series B convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$7.84 per share;
- 18,854 shares of our common stock issuable upon the exercise of outstanding warrants to purchase Series C convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$14.85 per share; and
- 7,531 shares of our common stock, issuable upon the exercise of outstanding warrants to purchase Series D convertible preferred stock outstanding as of June 30, 2018, having an exercise price of \$21.24 per share.
- 3,698,899 shares of common stock reserved for future grants, excluding shares that may become issuable under the 2018 Plan upon cancellation, forfeiture or repurchase of outstanding awards under the 2013 Plan, which are reflected above, under our stock-based compensation plans, consisting of:
 - 944,123 shares of common stock reserved for future grants under the 2013 Plan as of June 30, 2018, of which, 928,974 shares will be added to the shares to be reserved under the 2018 Plan, which will become effective upon completion of this offering and contains provisions that automatically increase its share reserve each year, as more fully described in "Executive compensation – Equity incentive plans";
 - 2,494,700 shares of common stock reserved for future grants under the 2018 Plan, which will become effective upon completion of this offering; and

[Table of Contents](#)

- 275,225 shares of common stock reserved for future issuance under the 2018 ESPP, which will become effective upon completion of this offering.

To the extent that any outstanding options or warrants are exercised, new options are issued under our stock-based compensation plans or we issue additional shares of common stock in the future, there will be further dilution to investors participating in this offering.

Selected consolidated financial data

You should read the selected consolidated financial data set forth below in conjunction with our consolidated financial statements, the notes to our consolidated financial statements and "Management's discussion and analysis of financial condition and results of operations" contained elsewhere in this prospectus.

We derived the selected consolidated statements of operations data and consolidated balance sheet data for the fiscal years ended September 30, 2016 and 2017 from our audited consolidated financial statements included elsewhere in this prospectus. We have derived the unaudited condensed consolidated statements of operations data for the nine months ended June 30, 2017 and 2018, and the unaudited condensed consolidated balance sheet data as of June 30, 2018, from our unaudited condensed consolidated financial statements included elsewhere in this prospectus. We have prepared the unaudited financial information on a basis consistent with our audited consolidated financial statements and have included, in our opinion, all adjustments, consisting only of normal recurring adjustments, that we consider necessary for a fair statement of the financial information set forth in those statements. The summary financial data included in this section are not intended to replace the financial statements and related notes included elsewhere in this prospectus. Our historical results are not necessarily indicative of our future performance, and our interim results are not necessarily indicative of the results to be expected for the full fiscal year.

(in thousands, except share and per share data)	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Consolidated statements of operations data:				
Revenues	\$ 2,269	\$ 10,767	\$ 7,301	\$ 17,020
Operating expenses:				
Cost of revenues	9,421	24,020	17,191	23,096
Research and development	18,230	19,169	14,318	14,282
Selling, general and administrative	18,274	26,060	17,651	30,497
Total operating expenses	45,925	69,249	49,160	67,875
Loss from operations	(43,656)	(58,482)	(41,859)	(50,855)
Interest income	241	412	225	590
Interest expense	(746)	(905)	(657)	(927)
Other income (expense), net	73	(55)	151	(76)
Loss before income taxes	(44,088)	(59,030)	(42,140)	(51,268)
Provision for income taxes	—	(280)	(161)	(166)
Net loss attributable to common stockholders	(44,088)	(59,310)	(42,301)	(51,434)
Other comprehensive loss:				
Change in unrealized gain (loss) on investments	9	(9)	(25)	—
Foreign currency translation adjustment	—	33	6	35
Comprehensive loss	(44,079)	(59,286)	(42,320)	(51,399)
Net loss per share attributable to common stockholders— basic and diluted(1)	\$ (23.58)	\$ (24.49)	\$ (17.78)	\$ (18.92)
Weighted average shares used in computing net loss per share attributable to common stockholders—basic and diluted(1)	1,869,631	2,422,243	2,379,217	2,719,051
Pro forma net loss per share—basic and diluted(1)		\$ (3.84)		\$ (2.74)
Pro forma weighted-average shares used in computing pro forma net loss per share—basic and diluted(1)		15,392,026		18,780,785

(1) See Note 16 of the notes to our audited annual consolidated financial statements and Note 12 of the notes to our unaudited interim condensed consolidated financial statements included elsewhere in this prospectus for a description of the method used to compute basic and diluted net loss per share attributable to common stockholders and pro forma basic and diluted net loss per share.

(in thousands)	As of September 30,		As of June 30,
	2016	2017	2018
Consolidated balance sheet data:			
Cash, cash equivalents, and short-term investments	\$ 55,920	\$ 62,204	\$ 92,499
Working capital	50,361	58,392	85,688
Total assets	76,463	85,657	122,665
Total liabilities	19,037	19,382	26,919
Convertible preferred stock	134,037	199,633	278,505
Additional paid-in capital	3,689	6,228	8,226
Accumulated deficit	(80,309)	(139,619)	(191,053)
Total stockholders' deficit	(76,611)	(133,358)	(182,759)

Management's discussion and analysis of financial condition and results of operations

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes to those statements included elsewhere in this prospectus. In addition to historical financial information, the following discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions. Our actual results and timing of selected events may differ materially from those anticipated in these forward-looking statements as a result of many factors, including those discussed under "Risk factors" and elsewhere in this prospectus. The last day of our fiscal year is September 30, and we refer to our fiscal year ended September 30, 2016 as fiscal 2016 or 2016 and our fiscal year ended September 30, 2017 as fiscal 2017 or 2017.

Overview

We are a leading and rapidly growing synthetic biology company that has developed a disruptive DNA synthesis platform to industrialize the engineering of biology. The core of our platform is a proprietary technology that pioneers a new method of manufacturing synthetic DNA by "writing" DNA on a silicon chip. We have combined this technology with proprietary software, scalable commercial infrastructure and an e-commerce platform to create an integrated technology platform that enables us to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost than our competitors. We are leveraging our unique technology to manufacture a broad range of synthetic DNA-based products, including synthetic genes, tools for next generation sample preparation, and antibody libraries for drug discovery and development. Additionally, we believe our platform will enable new value-add opportunities, such as discovery partnerships for biologic drugs, and will enable new applications for synthetic DNA, such as digital data storage. We sell our synthetic DNA and synthetic DNA-based products to a customer base of over 600 customers across a broad range of industries.

We launched the first application of our platform, synthetic genes and oligo pools, in April 2016 to disrupt the gene synthesis market and make legacy DNA synthesis methods obsolete.

From inception to June 30, 2018, we have sold our products to more than 600 customers. In fiscal 2017, we served 286 customers including \$0.3 million in sales to seven of the top 20 pharmaceutical companies by revenue, \$4.3 million in sales to Ginkgo Bioworks, Inc., or Ginkgo Bioworks (which we believe is the largest global purchaser of synthetic DNA), \$0.3 million in sales to three of the largest agricultural biotechnology companies, \$2.7 million in sales to over 100 academic research institutions worldwide, and \$7.3 million in sales to innovative customers using synthetic DNA for new and emerging applications, such as Microsoft Corporation and the University of Washington for use of DNA as a digital data storage medium. We are also an original equipment manufacturer, or OEM, of synthetic DNA to four synthetic DNA manufacturers that also compete with us, which we believe is a strong demonstration of the superiority of our platform.

In the nine months ended June 30, 2018, we served 539 customers as follows: 56% to the industrial chemicals sector, 25% to the academic research sector, 2% to the agriculture sector and 17% to the healthcare sector. Sales to the industrial chemicals sector, the academic research sector, the agricultural sector and the healthcare sector accounted for 56%, 25%, 2% and 17% of the total \$17.0 million revenues for the nine months ended June 30, 2018. Sales to Ginkgo Bioworks amounted to \$5.5 million, or 32% and sales to customers other than Ginkgo Bioworks was \$11.5 million, or 68%, for the nine months ended June 30, 2018; an increase in revenue of 89% and 162%, respectively, as compared to the nine months ended June 30, 2017.

We have also leveraged the versatility of our platform to expand our product portfolio into other markets in which we believe we have a competitive advantage. In February 2018, we launched an innovative and

comprehensive preparation kit for next generation sequencing at the Advances in Genome Biology and Technology conference. Our kit leverages our platform to precisely synthesize oligo pools and uniformly amplify the desired target DNA segments, considerably improving the accuracy of the downstream sequencing analysis. We have also commercialized a custom DNA library solution which enables more effective biologic drug discovery and development for our customers. We believe we can further leverage our platform to develop other proprietary tools, such as our anti-GPCR library and antibody optimization solution, to provide an end-to-end solution in biologics drug discovery and early development, from target to Investigational New Drug (IND) application, adding value as a partner to biotech and pharmaceutical companies. We also aim to explore development of DNA as a digital data storage medium via internal research and industry partnerships.

We have built a scalable commercial platform that enables us to reach a diverse customer base that we believe includes over 100,000 synthetic DNA users today. In order to address this diverse customer base, we have employed a multi-channel strategy comprised of a direct sales force targeting synthetic DNA customers, a direct sales force focusing on the NGS market and an e-commerce platform. We launched our proprietary, innovative, and easy-to-use e-commerce platform in October 2017 to existing customers and expanded access to the general public in January 2018. Our platform allows customers to design, validate, and place on-demand orders of customized DNA online. This is a critical part of our strategy to address our large and diverse customer base, as well as drive commercial productivity, enhance the customer experience, and promote loyalty.

We generated revenues of \$7.3 million in the nine months ended June 30, 2017, and \$17.0 million in the nine months ended June 30, 2018, while incurring net losses of \$42.3 million and \$51.4 million in the nine months ended June 30, 2017 and 2018, respectively. We generated revenues of \$2.3 million in fiscal 2016, and \$10.8 million in fiscal 2017, while incurring net losses of \$44.1 million in fiscal 2016, and \$59.3 million in fiscal 2017.

Since our inception, we have incurred significant operating losses. Our ability to generate product revenue sufficient to achieve profitability will depend heavily on the success of our existing products and development and commercialization of additional products in the synthetic biology industry. Our net loss was \$42.3 million and \$51.4 million for the nine months ended June 30, 2017 and 2018, respectively. As of June 30, 2018, we had an accumulated deficit of \$191.1 million. We expect to continue to incur significant expenses for at least the next several years. Furthermore, upon the closing of this offering, we expect to continue to incur additional costs associated with operating as a public company including accounting, investor relations, legal and other expenses that we did not incur as a private company.

As a result, we will need substantial additional funding to support our continuing operations and pursue our growth strategy. Until such time as we can generate significant revenue from product sales, we expect to finance our operations from revenue from our commercial operations, the sale of equity, debt financings or other capital sources, including collaborations with other companies or other strategic transactions. We may be unable to grow our revenue, raise additional funds or enter into such other agreements or arrangements when needed on favorable terms, or at all. If we fail to raise capital or enter into such agreements as, and when, needed, we may have to significantly delay, scale back or discontinue the development and commercialization of one or more of our product opportunities or delay our pursuit of potential in-licenses or acquisitions.

As of June 30, 2018, we had \$92.5 million in cash, cash equivalents and short-term investments. In fiscal year 2017, we received net cash proceeds of \$65.6 million from the sale of shares of Series D convertible preferred stock, and as of August 31, 2018, we received additional net cash proceeds of \$90.8 million from the sale of additional shares of Series D convertible preferred stock.

After giving effect to the anticipated net proceeds from this offering, we expect that our existing cash, cash equivalents and short-term investments will be sufficient to fund our planned operating expenses, capital

expenditure requirements and debt service payments through at least the next 12 months. We have based these estimates on assumptions that may prove to be wrong, and we could exhaust our available capital resources sooner than we expect. See “Liquidity and capital resources.”

In the future, we expect we will need to raise additional capital to finance our operations which cannot be assured, on acceptable terms, or at all. If sufficient funds on acceptable terms are not available when needed, we will be required to significantly reduce our operating expenses. As a result, we have concluded that this circumstance raises substantial doubt about our ability to continue as a going concern. See Note 1 to our consolidated financial statements appearing in this prospectus for additional information.

Similarly, in its report on our financial statements for fiscal 2017, our independent registered public accounting firm included an explanatory paragraph stating that our recurring losses from operations since inception and required additional funding to finance our operations raise substantial doubt about our ability to continue as a going concern.

Key factors affecting our performance

We believe that our financial performance has been and in the foreseeable future will continue to be primarily driven by the following factors:

Adoption of our products and solutions by existing and new customers. A key factor to our future success is and will be our ability to increase orders from and sell new solutions to existing customers, and to acquire new customers. To do so, we must offer these customers synthetic DNA-based products with a superior combination of quality, cost, throughput, turnaround time, and scalability, and develop affordable tools for existing and prospective customers that expand the applications of our products and drive higher volume purchases. We must also convince potential customers who currently synthesize their own DNA that our products and solutions are superior and offer greater value to their organizations.

Expansion into new geographic markets. Our revenue is currently generated from customers primarily in the United States. As we begin to expand our global sales efforts, we must be successful in selling and marketing our products and solutions in geographies where we have limited experience. We are in the process of establishing a wholly owned foreign entity in China which will enable us to expand our manufacturing capacity in China and grow our sales organization in China. We are also expanding our Asia Pacific and European sales and marketing organizations, which will include hiring new personnel and recruiting distributors to serve local markets. Our revenue may be affected by seasonal trends in some geographies during the calendar year as we expand into new geographic markets.

Expansion into adjacent addressable markets. Our revenue growth and market potential depends on our ability to meet customer needs in adjacent markets, such as in pharmaceutical biologics discovery and development and data storage. By combining our affordable and high-quality synthetic DNA with our proprietary, innovative, and easy-to-use e-commerce platform that allows customers to design, validate, and place on-demand orders of customized DNA online, we believe we will continue to convert those who make DNA, or DNA Makers, into those who buy their own DNA, or DNA Buyers.

Leverage our manufacturing capacity and commercial infrastructure. We have invested, and will continue to invest, significantly in our manufacturing capabilities and commercial infrastructure. With our current operating model and infrastructure, we can increase our manufacturing production and commercialize additional products. By doing so, we expect to grow revenue and spread our costs over a larger volume of products, which we believe will further reduce our manufacturing costs on a per-unit basis and improve our operating margins. We are planning to consolidate our manufacturing operations in the United States into a

new facility in South San Francisco, and expand into new geographies including China. Our ability to achieve and enhance profitability is dependent upon growing our revenue and further increasing our manufacturing efficiency, successful knowledge transfer, and recruiting and retaining personnel, among other factors.

Key business metrics

We regularly review the following key business metrics to evaluate our business, measure our performance, identify trends affecting our business, formulate financial projections and make strategic decisions. We believe that the following metrics are representative of our current business; however, we anticipate these will change or may be substituted for additional or different metrics as our business grows.

Value of orders received

We believe that the value of orders we receive is a leading indicator of our ability to generate revenue. We define an order as a contract with a customer or purchase order from a customer, which outlines the promised goods at an agreed upon price. We regularly assess trends relating to the value of orders we receive, including with respect to our customer concentration. For example, we have experienced quarterly growth in the value of orders received from customers other than Ginkgo Bioworks, which has increased by approximately 15.5 times from the quarter ended June 30, 2016 to the quarter ended June 30, 2018.

Since commercially launching our product in April 2016, orders from customers have rapidly increased over the last nine quarters. Commencing with our Beta Access program, we believe we have successfully achieved industry-leading volumes of synthetic DNA orders. In 2018, we launched our e-commerce platform to enable customers to conveniently order our products online. These steps have contributed to outstanding order growth over the last nine quarters, which is illustrated in the table below.



(in thousands, except percentages)	Three months ended									
	June 30, 2016	September 30, 2016	December 31, 2016	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017	March 31, 2018	June 30, 2018	
Customers other than Ginkgo Bioworks	\$ 494	\$737	\$ 1,153	\$ 2,707	\$2,682	\$ 3,686	\$ 4,893	\$ 6,704	\$8,167	
Percentage change from prior quarter	—	49%	56%	135%	(1%)	37%	33%	37%	22%	

Table of Contents

Orders may never convert into actual revenue and the timing of delivery of our orders and recognition of revenue, if any, may vary based on the nature of the order, and there can be no assurance that orders will result in recognized revenue. The following table lists the value of orders received, including Ginkgo and non-Ginkgo orders, during the periods indicated:

(in thousands)	Three months ended								
	June 30, 2016	September 30, 2016	December 31, 2016	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017	March 31, 2018	June 30, 2018
Order value	\$ 753	\$ 2,307	\$ 2,732	\$ 4,207	\$ 4,432	\$ 6,186	\$ 7,393	\$ 8,517	\$ 10,673

Number of customers

We believe that the number of customers who have purchased from us since inception is representative of our ability to drive adoption of our products and convert DNA Makers to DNA Buyers. We define customers as separate legal entities or persons who have purchased and directly paid for our products. This means that if a parent company is a customer of ours, it is counted as one customer, and if its subsidiary also purchases our products from us, and the subsidiary makes a payment directly to us, we count the subsidiary as a separate customer. We apply this methodology of counting customers because it is not possible for our e-commerce platform and other data tracking software to distinguish accurately between affiliated purchasers.

Percentage of revenue from new vs. repeat customers

We believe that the percentage of revenue that we generate from both new and repeat customers is a leading indicator of our ability to drive adoption of our products amongst existing customers while also generating a robust pipeline of new customers. We define a new customer as a customer who, as a separate legal entity or person, has not previously purchased any products or services from us. We define a repeat customer as any customer who, as a separate legal entity or person, has previously purchased any products or services from us. Because our first commercial shipment was in April 2016, 100% of our revenue for fiscal 2016 was from new customers, therefore we had no revenue from repeat customers in fiscal 2016.

The table below represents sales to individual customers. We shipped products to 97 customers in fiscal 2016 and 286 customers in fiscal 2017. In the nine months ended June 30, 2017, we shipped product to 208 customers and in the nine months ended June 30, 2018, we shipped product to 539 customers. Between September 30, 2015 and June 30, 2018, we sold products to more than 600 customers.

	Years ended September 30,		Nine months ended June,	
	2016	2017	2017	2018
Percentage of revenue from repeat customers	—	63%	74%	91%
Percentage of revenue from new customers	100%	37%	26%	9%

Financial overview

The following table summarizes certain selected historical financial results:

(in thousands)	Years ended September 30,		Nine months ended June,	
	2016	2017	2017	2018
Revenues	\$ 2,269	\$ 10,767	\$ 7,301	\$ 17,020
Loss from operations	(43,656)	(58,482)	(41,859)	(50,855)
Net loss attributable to common stockholders	(44,088)	(59,310)	(42,301)	(51,434)

Revenues

We generate revenue from sales of synthetic genes, oligo pools, next generation sequencing tools and DNA libraries. We recognize revenue upon delivery to our customers and bill them directly for the shipments. Our ability to increase our revenues will depend on our ability to further penetrate the domestic and international markets, generate sales through our direct sales force, and over time from our e-commerce platform.

Revenues by geography

We have one reportable segment from the sale of synthetic DNA products. The following table shows our revenues by geography, based on our customers' shipping addresses. North America consists of Canada and Mexico; EMEA consists of Europe, Middle East, and Africa; and APAC consists of Japan, China, South Korea, Singapore, Malaysia and Australia.

(in thousands, except percentages)	Years ended September 30,				Nine months ended June 30,			
	2016	%	2017	%	2017	%	2018	%
United States	\$1,769	78%	\$ 8,252	77%	\$5,723	78%	\$12,011	71%
EMEA	459	20%	2,059	19%	1,342	18%	4,116	24%
APAC	41	2%	259	2%	105	2%	740	4%
North America	—	0%	197	2%	131	2%	153	1%
Total revenues	\$2,269	100%	\$10,767	100%	\$7,301	100%	\$17,020	100%

Revenues by products

The table below sets forth revenues by products:

(in thousands, except percentages)	Years ended September 30,				Nine months ended June 30,			
	2016	%	2017	%	2017	%	2018	%
Synthetic genes	\$1,087	48%	\$ 8,122	75%	\$5,379	74%	\$11,903	70%
Oligo pools	862	38%	2,056	19%	1,512	21%	2,146	13%
DNA libraries	320	14%	517	5%	410	5%	1,208	7%
NGS tools	—	—	72	1%	—	—	1,763	10%
Total revenues	\$2,269	100%	\$10,767	100%	\$7,301	100%	\$17,020	100%

Revenues by industry

Revenues by industry were as follows:

(in thousands, except percentages)	Years ended September 30,				Nine months ended June 30,			
	2016	%	2017	%	2017	%	2018	%
Industrial chemicals	\$ 960	42%	\$ 6,702	62%	\$4,550	62%	\$ 9,474	56%
Academic research	830	37%	2,709	25%	2,019	28%	4,223	25%
Healthcare	461	20%	1,226	12%	680	9%	2,901	17%
Agriculture	18	1%	130	1%	52	1%	422	2%
Total revenues	\$2,269	100%	\$10,767	100%	\$7,301	100%	\$17,020	100%

Revenues and accounts receivable concentration

Customer revenues equal to or greater than 10% of total revenues was as follows:

	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Customer A	30%	40%	26%	18%
Customer B	11%	*	16%	*

* Less than 10 percent

One customer accounted for greater than 10% of net accounts receivable as follows:

	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Customer A	41%	35%	40%	32%

Cost of revenues

Cost of revenues reflect the aggregate cost incurred in the production and delivery of our products and consists of: production materials, personnel costs (salaries, benefits, bonuses and stock-based compensation), cost of expensed equipment and consumables, laboratory supplies, depreciation of capitalized equipment, production overhead costs and allocations of IT and facility costs. We expect that our cost of revenues will increase as we increase our revenues with new product developments.

Other operating expenses

Our operating expenses are classified in the following categories: Research and development, and selling, general and administrative. For each category, the largest component is personnel costs, which includes salaries, employee benefit costs, bonuses, and stock-based compensation expenses.

Research and development

Research and development expenses consist primarily of costs incurred for the development of our products, which include personnel costs, laboratory supplies, consulting costs and allocated overhead, including IT and facility costs. We expense our research and development expenses in the period in which they are incurred. We expect to increase our research and development expenses as we continue to develop new products.

Selling, general and administrative

Selling expenses consist of personnel cost, customer service expenses, direct marketing expenses, educational and promotional expense, market research and analysis. General and administrative expenses include executive, finance and accounting, legal and human resources. These expenses consist of personnel costs, audit and legal expenses, consulting costs and allocated IT and facility costs. We expense all selling, general and administrative expenses as incurred. We expect our selling and marketing cost will continue to increase in absolute dollars, primarily driven by our efforts to expand our commercial capability, with an increased presence both within and outside the United States, and to expand our brand awareness and customer base through targeted marketing initiatives. We expect general and administrative expenses will increase as well as we scale our operations. In addition, we expect to incur additional accounting, legal and other expenses that we did not incur as a private company.

Interest expense

Interest expense is attributable to borrowing under our senior secured term loan and our equipment financing facility.

Interest income

Interest income consists primarily of interest earned on our cash, cash equivalents, and short-term investments.

Other income (expense), net

Other income (expense), net consists of realized gains and losses on sales of short-term investments and stock warrant expense.

Results of operations

(in thousands)	Years ended September 30,		Nine Months ended June 30,	
	2016	2017	2017	2018
Revenues	\$ 2,269	\$ 10,767	\$ 7,301	\$ 17,020
Operating expenses:				
Cost of revenues	9,421	24,020	17,191	23,096
Research and development	18,230	19,169	14,318	14,282
Selling, general and administrative	18,274	26,060	17,651	30,497
Total operating expenses	45,925	69,249	49,160	67,875
Loss from operations	(43,656)	(58,482)	(41,859)	(50,855)
Interest income	241	412	225	590
Interest expense	(746)	(905)	(657)	(927)
Other income (expense), net	73	(55)	151	(76)
Provision for income taxes	—	(280)	(161)	(166)
Net loss attributable to common stockholders	\$(44,088)	\$(59,310)	\$(42,301)	\$(51,434)

Comparison of Nine Months Ended June 30, 2017 and 2018

Revenues

(in thousands, except percentages)	Nine months ended June 30,		Change	
	2017	2018	\$	%
Revenues	\$7,301	\$17,020	\$9,719	133%

In the nine months ended June 30, 2017, we generated revenue of \$7.3 million from shipments of our synthetic DNA products, primarily oligonucleotides, clonal and non-clonal synthetic genes, and DNA libraries. Revenues from customers in the United States was 78%, and outside the United States was 22%.

Revenues increased \$9.7 million or 133% to \$17.0 million in the nine months ended June 30, 2018, driven by revenues from synthetic genes of \$11.9 million and NGS tools of \$1.8 million. The primary increase in synthetic genes revenue was attributed to volume increases of genes shipped to customers period-over-period, driven by increased investment in our sales force infrastructure and the launching of the e-commerce platform in fiscal

Table of Contents

2018. In the nine months ended June 30, 2018, we shipped 176,292 genes versus 87,439 genes in the nine months ended June 30, 2017, an increase of 102%. Gene pricing to our customers was relatively constant period-over-period. The primary reasons for NGS tools revenue growth period-over-period was attributed to the full commercial launching of the product in February 2018, increased investment in our sales force infrastructure and the volume of units shipped in fiscal 2018. We do not believe the pricing had a meaningful impact on the revenue changes for NGS tools period-over-period. Revenues from customers other than Ginkgo Bioworks increased \$7.1 million or 162% from \$4.4 million to \$11.5 million and revenue from Ginkgo Bioworks increased \$2.6 million, an increase of 89% from \$2.9 million to \$5.5 million versus the prior nine months ended June 30, 2017. Revenue from repeat customers increased \$10.0 million or 186% from \$5.4 million to \$15.4 million in the nine months ended June 30, 2017 and 2018, respectively.

Cost of revenues

(in thousands, except percentages)	Nine months ended June 30,		Change	
	2017	2018	\$	%
Cost of revenues	\$17,191	\$23,096	\$5,905	34%

Cost of revenues increased by \$5.9 million, or 34%, from \$17.2 million in the nine months ended June 30, 2017 to \$23.1 million in the nine months ended June 30, 2018, due to the increase in revenues. Cost of revenues was \$17.2 million in the nine months ended June 30, 2017, driven by additional ramp up of production capacity. Cost of revenues was primarily related to payroll expenses of \$5.9 million, consumption of reagents and production materials of \$5.5 million, information technology and facilities costs of \$2.8 million, depreciation expense of \$1.4 million, consulting and outside services of \$0.7 million, and other production related costs of \$0.9 million.

In the nine months ended June 30, 2018, total cost of revenues increased to \$23.1 million, primarily from \$8.5 million of payroll expenses driven by an increase in headcount, consumption of reagents and production materials of \$7.3 million, information technology and facilities costs of \$3.6 million, consulting and outside services of \$1.3 million, \$1.7 million of depreciation expense related to additional equipment for increased production capacity, and other production related costs of \$0.7 million.

Research and development expenses

(in thousands, except percentages)	Nine months ended June 30,		Change	
	2017	2018	\$	%
Research and development	\$14,318	\$14,282	\$(36)	0%

For the nine months ended June 30, 2017 and June 30, 2018, research and development expenses remained relatively flat and the total expense amounted to \$14.3 million for both periods. An increase in payroll expenses, IT and facilities cost and stock compensation expenses were offset by lower material and laboratory supplies costs. Research and development cost was \$14.3 million in the nine months ended June 30, 2017, primarily related to payroll expenses of \$6.5 million, production and laboratory supplies of \$2.6 million, information technology and facilities costs of \$2.2 million, and other research expenses of \$3.0 million. Research and development cost was \$14.3 million in the nine months ended June 30, 2018, primarily related to payroll expenses of \$6.9 million, production and laboratory supplies of \$1.7 million, information technology and facilities costs of \$2.3 million, and other research expenses of \$3.4 million.

Selling, general and administrative expenses

(in thousands, except percentages)	Nine months ended June 30,		Change	
	2017	2018	\$	%
Selling, general and administrative	\$17,651	\$30,497	\$12,846	73%

Selling, general and administrative expenses increased by \$12.8 million, or 73%, from \$17.7 million in the nine months ended June 30, 2017 to \$30.5 million in the nine months ended June 30, 2018, primarily due to increases in payroll expenses related to increased headcount, advertising and marketing expenses, professional and legal expenses, stock compensation expenses and information technology related charges.

Selling, general and administrative expenses was \$17.7 million as of June 30, 2017 primarily due to headcount costs of \$6.6 million, professional and legal fees of \$7.9 million, advertising and marketing expenses of \$0.7 million, online services expenses of \$0.9 million, stock compensation expense of \$0.7 million and other selling and administrative expenses of \$1.0 million. Selling, general and administrative expenses was \$30.5 million as of June 30, 2018 primarily due to headcount related costs of \$11.3 million, professional and legal fees of \$12.7 million, advertising and marketing expenses of \$1.9 million, online services expenses of \$1.2 million, stock compensation expense of \$1.1 million and other selling and administrative expenses of \$2.3 million.

Interest, and other income (expense), net

(in thousands, except percentages)	Nine months ended June 30,		Change	
	2017	2018	\$	%
Interest income	\$ 225	\$ 590	\$ 365	162%
Interest expense	(657)	(927)	(270)	(41)%
Other income (expense)	151	(76)	(227)	(150)%
Total interest, and other income (expense), net	\$(281)	\$(413)	\$(132)	(47)%

Interest income was \$0.2 million in the nine months ended June 30, 2017, and \$0.6 million in the nine months ended June 30, 2018, resulting from our short-term investments. Other income and expenses were primarily due to the disposal of property and equipment. Interest expense was \$0.7 million in the nine months ended June 30, 2017, and \$0.9 million in the nine months ended June 30, 2018, related to our outstanding debt. Stock warrant expense was \$0.2 million in the nine months ended June 30, 2017, and \$0.1 million in the nine months ended June 30, 2018.

Provision for income taxes

(in thousands, except percentages)	Nine months ended June 30,		Change	
	2017	2018	\$	%
Provision for income taxes	\$(161)	\$(166)	\$(5)	(3)%

We recorded a provision for income taxes of \$0.2 million in the nine months ended June 30, 2017 and \$0.2 million in the nine months ended June 30, 2018.

Comparison of Years Ended September 30, 2016 and 2017

Revenues

(in thousands, except percentages)	Years ended September 30,		Change	
	2016	2017	\$	%
Revenues	\$2,269	\$10,767	\$8,498	375%

We commenced selling our products in April 2016. In 2016, we generated revenue of \$2.3 million from shipments of our synthetic DNA products, primarily oligonucleotides, clonal and non-clonal synthetic genes, and DNA libraries. Revenue from customers in the United States was 78% and 22% outside the United States.

Revenue increased to \$10.8 million in 2017, as we continued to ramp up production capacity and sales of our synthetic DNA products, primarily oligonucleotides, clonal and non-clonal synthetic genes, DNA libraries and oligo pools. In 2017, revenues from customers in the United States accounted for 77% and 23% from customers outside the United States.

Since launching our products in April 2016, we have seen increased adoption by the market and our customer base has grown. In reviewing year-over-year results, our first commercial shipment was in April 2016 as compared to a full year of product shipments to customers in 2017. Revenue from synthetic genes, oligo pools, NGS tools and DNA libraries increased \$8.5 million from \$2.3 million in 2016 to \$10.8 million in 2017, primarily driven by increases in the volume of orders and new customers. Additionally, revenue for 2017 included approximately \$4.0 million from new customers, because our customer base increased from 97 customers in 2016 to 286 customers in 2017. In addition, the increase in 2017 revenue was also due to an increase from sales to Ginkgo Bioworks of \$3.6 million in revenue from \$0.7 million in 2016 to \$4.3 million in 2017.

Cost of revenues

(in thousands, except percentages)	Years ended September 30,		Change	
	2016	2017	\$	%
Cost of revenues	\$9,421	\$24,020	\$14,599	155%

Cost of revenues increased by \$14.6 million or 155% from \$9.4 million in 2016 to \$24.0 million in 2017 due to the increase in revenues. Cost of revenues was \$9.4 million in 2016, driven by our initial ramp up of production capacity. Cost of revenues was primarily related to payroll expenses of \$3.5 million, consumption of reagents and production materials of \$3.2 million, information technology and facilities costs of \$1.8 million, consulting and outside services of \$0.5 million, and maintenance costs of \$0.3 million.

In 2017, total cost of revenues increased to \$24.0 million, primarily from \$8.2 million of payroll expenses due to an increase in headcount, consumption of reagents and production material of \$7.4 million, information technology and facilities costs of \$3.8 million, consulting and outside services of \$1.1 million, \$1.9 million of depreciation expense related to additional equipment for increased production capacity, maintenance costs of \$0.7 million, and stock-based compensation expenses of \$0.2 million.

Research and development expenses

(in thousands, except percentages)	Years ended		Change	
	September 30,		\$	%
	2016	2017		
Research and development	\$ 18,230	\$ 19,169	\$939	5%

Research and development expenses increased by \$0.9 million or 5% from \$18.2 million in 2016 to \$19.2 million in 2017. This was primarily due to increased development activities for new product offerings, materials costs, and information technology and facilities costs. In 2017, information technology and facilities costs increased by \$0.9 million compared to 2016 primarily due to the signing of lease agreements for additional facilities located in San Francisco and South San Francisco. Additional research and development expenses of \$3.4 million were also incurred in 2017 in connection with the acquisition of Genome Compiler Corporation in the prior fiscal year. In 2016, we received \$2.4 million Defense Advanced Research Projects Agency, or DARPA, payments, whereas in 2017 there were no DARPA payments to offset expenses. In 2017, laboratory materials used in research and development increased \$0.5 million from \$2.7 million to \$3.2 million and allocations from facilities and information technology increased \$0.9 million.

Selling, general and administrative expenses

(in thousands, except percentages)	Years ended		Change	
	September 30,		\$	%
	2016	2017		
Selling, general and administrative	\$ 18,274	\$ 26,060	\$7,786	43%

Selling, general and administrative expenses increased by \$7.8 million, or 43%, from \$18.3 million in 2016 to \$26.1 million in 2017 primarily due to increases in payroll related to increased headcount, commercialization of products, professional and legal expenses, information technology and facilities. Salaries and related costs increased by \$1.9 million in 2017, as a result of increases in sales headcount. In addition, professional and legal expenses increased by \$5.2 million due to commercial expansion of our products.

Interest, and other income (expense), net

(in thousands, except percentages)	Years ended		Change	
	September 30,		\$	%
	2016	2017		
Interest income	\$ 241	\$ 412	\$ 171	71%
Interest expense	(746)	(905)	(159)	(21)%
Other income (expense)	73	(55)	(128)	(175)%
Total interest, and other income (expense), net	\$ (432)	\$ (548)	\$ (116)	(27)%

Interest income was \$0.2 million in 2016, and \$0.4 million in 2017, resulting from our short-term investments. Other income and expenses were primarily due to the disposal of property and equipment. Interest expense was \$0.7 million in 2016 and \$0.9 million in 2017 related to our outstanding debt. Stock warrant expense was \$(0.1) million in 2016 and \$0.3 million in 2017.

Provision for income taxes

(in thousands, except percentages)	Years ended September 30,		Change	
	2016	2017	\$	%
Provision for income taxes	\$ —	\$ (280)	\$ (280)	(100)%

We recorded an immaterial provision for income taxes in 2016 and \$0.3 million in 2017.

Quarterly Results of Operations

The following table shows unaudited quarterly consolidated statement of operations data for each of the last seven quarters. In the opinion of management, the information for each of these quarters has been prepared on the same basis as our audited financial statements and include all adjustments, consisting of normal recurring adjustments and accruals, necessary for the fair statement of financial information in accordance with generally accepted accounting principles. This information should be read in conjunction with the audited consolidated financial statements and related notes included elsewhere in this prospectus. Historical results are not necessarily indicative of results that may be achieved in future periods, and operating results for quarterly periods are not necessarily indicative of operating results for a full year. You should read this unaudited consolidated statement of operations data in conjunction with our consolidated financial statements and the related notes included elsewhere in this prospectus.

(in thousands)	Three months ended						
	December 31, 2016	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017	March 31, 2018	June 30, 2018
Revenues	\$ 1,692	\$ 2,433	\$ 3,176	\$ 3,466	\$ 4,313	\$ 6,166	\$ 6,541
Operating expenses:							
Cost of revenues	\$ 4,987	\$ 5,984	\$ 6,220	\$ 6,829	\$ 7,498	\$ 8,095	\$ 7,503
Research and development	4,332	4,709	5,277	4,851	4,303	4,711	5,268
Selling, general and administrative	5,740	5,992	5,919	8,409	9,263	9,978	11,256
Total operating expenses	\$ 15,059	\$ 16,685	\$ 17,416	\$ 20,089	\$ 21,064	\$ 22,784	\$ 24,027
Loss from operations	\$ (13,367)	\$ (14,252)	\$ (14,240)	\$ (16,623)	\$ (16,751)	\$ (16,618)	\$ (17,486)
Interest income	59	50	116	187	158	148	284
Interest expense	(192)	(199)	(266)	(248)	(273)	(317)	(337)
Other income (expense), net	(3)	11	143	(206)	(19)	(43)	(14)
Loss before income taxes	\$ (13,503)	\$ (14,390)	\$ (14,247)	\$ (16,890)	\$ (16,885)	\$ (16,830)	\$ (17,553)
Provision for income taxes	(33)	(58)	(70)	(119)	(52)	(43)	(71)
Net loss attributable to common stockholders	\$ (13,536)	\$ (14,448)	\$ (14,317)	\$ (17,009)	\$ (16,937)	\$ (16,873)	\$ (17,624)

[Table of Contents](#)

For the three months ended December 31, 2017, we shipped 44,784 genes via 964 shipments, a 18% growth in the number of genes shipped compared to the three months ended September 30, 2017. For the three months ended March 31, 2018, we shipped 71,246 genes via 1,251 shipments, a 59% growth in the number of genes shipped over the prior quarter. For the three months ended June 30, 2018, we shipped 60,252 genes via 1,694 shipments, a decrease of 15% in the number of genes shipped compared to the three months ended March 31, 2018.

Shipments and number of genes shipped in the three months ended September 30, 2017, December 31, 2017, March 31, 2018, and June 30, 2018 were as follows:

(in thousands, except shipments)	Three months ended			
	September 30, 2017	December 31, 2017	March 31, 2018	June 30, 2018
Number of genes shipped	38,023	44,784	71,246	60,252
Number of shipments	751	964	1,251	1,694

Liquidity and capital resources

Sources of liquidity

To date, we have financed our operations principally through private placements of our convertible preferred stock, borrowings from credit facilities and revenue from our commercial operations.

Since our inception on February 4, 2013 and through June 30, 2018, we have received an aggregate of \$278.5 million in gross proceeds from the issuance of equity securities and an aggregate of \$13.8 million from debt. As of June 30, 2018, we had a balance of \$90.9 million of cash and cash equivalents and \$1.6 million of short-term investments.

Preferred stock financings

As of June 30, 2018, we had raised \$278.5 million in net proceeds from the sale of our equity securities, including the sale of 6,034,089 shares of our Series D convertible preferred stock from January 2016 through September 2017 at a purchase price of \$21.24 per share for gross proceeds of \$128.2 million. On March 19, 2018 and May 29, 2018, we issued 2,353,544 and 941,417 shares of Series D convertible preferred stock for an aggregate purchase price of approximately \$50.0 million and \$20.0 million, respectively. On July 2, 2018 and July 3, 2018, we issued 517,778 and 47,070 shares of Series D convertible preferred stock for an aggregate purchase price of \$11.0 million and \$1.0 million, respectively.

Debt financings

We have entered into various credit facilities to obtain debt financing from time to time beginning in October 2013.

In December 2015, we entered into a Second Amended and Restated Loan and Security Agreement, or the Third Loan, for amounts aggregating up to \$15.0 million in a series of three advances. The Third A&R Loan contains an acceleration clause under which the loan can become due and payable to SVB in certain events of default, including in the event of a material adverse change in our business. The term of the loan was 41 months with an interest rate equal to the greater of (i) the prime rate or (ii) 3.25%, and there was a final payment fee of 6% of the amount loaned. In addition, we obtained a revolving facility from SVB of \$5.0 million for which the principal amount outstanding under the revolving line would accrue interest at a floating per annum rate equal to one percentage point (1.00%) above the Prime Rate, which interest shall be payable monthly.

[Table of Contents](#)

The first advance, totaling \$7.0 million, was drawn in December 2015 and comprised \$3.3 million to refinance our prior loan with SVB and a new advance of \$3.7 million. The debt provides interest only payments through December 31, 2016 at which time monthly principal payments become due. In connection with this advance, we issued warrants to purchase a total of 18,854 shares of Series C convertible preferred stock at an exercise price of \$14.85 per share. We accounted for this transaction as a debt modification and did not incur any gains or losses relating to the modification. The second advance, totaling \$4.0 million, was drawn in March 2016. In connection with this advance, we issued warrants to purchase a total of 7,531 shares of Series D convertible preferred stock at an exercise price of \$21.24 per share.

In September 2017, we entered into a Fourth Amended and Restated Loan and Security Agreement, or the Fourth Loan, with SVB, for amounts aggregating up to \$20.0 million in a series of three advances. The first advance provides a principal amount of \$10.0 million, the second advance provides a principal amount of \$5.0 million and the third advance provides a principal amount of \$5.0 million during their respective draw down periods; however, the draw periods for the second and third tranches under this agreement have expired. In connection with the first advance, we issued warrants to purchase 64,127 shares of common stock at an exercise price of \$6.24 per share. If we draw down the second and third advances, the warrants would become exercisable for an additional 64,126 shares of common stock at an exercise price of \$6.24 per share. The Fourth Loan contains a subjective acceleration clause under which the Fourth Loan could become due and payable to SVB in the event of a material adverse change in our business. The term of the loan was 51 months with an interest rate of prime plus 3.00% and a final payment fee of \$0.7 million. We had the ability to draw down the additional second and third advances of the loan and security agreement, subject to achieving various revenue milestones, through January 31, 2018 and June 30, 2018, respectively. In addition, we obtained a revolving facility from SVB in September 2017 as part of the Fourth Loan and the facility allows us to borrow up to \$10.0 million. The principal amount outstanding under the revolving line accrues interest at a floating per annum rate equal to one percentage point (1.00%) above the prime rate, which interest shall be payable monthly. The amounts available under the revolving line are limited by an advance rate which is a percentage of our account receivables balance.

Our credit facilities contain customary representations and warranties and customary affirmative and negative covenants applicable to us and our subsidiaries, including, among other things, restrictions on changes in business, management, ownership or business locations, indebtedness, encumbrances, investments, mergers or acquisitions, dispositions, maintenance of collateral accounts, prepayment of other indebtedness, distributions and transactions with affiliates. The credit facilities contain customary events of default subject in certain cases to grace periods and notice requirements, including (a) failure to pay principal, interest and other obligations when due, (b) material misrepresentations, (c) breach of covenants, conditions or agreements in the credit facilities, (d) default under material indebtedness, (e) certain bankruptcy events, (f) a material adverse change; (g) attachment, levy or restraint on business, (h) default with respect to subordinated debt, (i) cross default under our credit facilities, and (j) government approvals being revoked. As of June 30, 2018, as part of the Fourth Loan, all rights, title and interest to our personal property with the exception of our intellectual property, have been pledged as collateral, including cash and cash equivalents, short-term investments, accounts receivable, contractual rights to payment, license agreements, general intangibles, inventory and equipment. We were in compliance with all covenants under the loan and security agreement as of September 30, 2017 and June 30, 2018.

Future maturities of the loan as of June 30, 2018 are as follows:

(in thousands)	Principal	Interest	Total
Years ending September 30,			
2018	\$ —	\$ 204	\$ 204
2019	2,500	743	3,243
2020	3,333	485	3,818
2021	3,333	214	3,547
2022	834	11	845
	<u>10,000</u>	<u>1,657</u>	<u>11,657</u>
Less: Interest			(1,657)
Total amount of loan principal			10,000
Less unamortized debt discount			(629)
Add accretion of final payment fee			164
			<u>\$ 9,535</u>

Capital resources

After giving effect to the anticipated net proceeds from this offering, we expect that our existing cash, cash equivalents and short-term investments will be sufficient to fund our operating expenses, capital expenditure requirements and debt service payments through at least the next 12 months. In the future, we expect we will need to raise additional capital to finance our operations which cannot be assured. As of September 30, 2017, without giving effect to the anticipated net proceeds from this offering, we have concluded that this circumstance raises substantial doubt about our ability to continue as a going concern within one year after the issuance date of our consolidated financial statements for the year ended September 30, 2017. However, our operating plan may change as a result of factors currently unknown to us, and we may need to seek additional funds sooner than planned, through public or private equity or debt financings or other sources, such as strategic collaborations. Such financing may result in dilution to stockholders, imposition of debt covenants and repayment obligations, or other restrictions that may adversely affect our business. In addition, we may seek additional capital due to favorable market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. Our future capital requirements will depend on many factors. See "Risk factors—We will require additional financing to achieve our goals, and a failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product manufacturing and development and other operations."

Operating capital requirements

Our primary uses of capital are, and we expect will continue to be for the near future, compensation and related expenses, manufacturing costs, laboratory and related supplies, legal and other regulatory expenses and general overhead costs. As of September 30, 2017, we had \$1.3 million in commitments for capital expenditures. As of June 30, 2018, we had \$1.8 million in commitments for capital expenditures.

Cash flows

The following table summarizes our sources and uses of cash and cash equivalents:

(in thousands)	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Net cash used in operating activities	\$ (38,592)	\$ (51,301)	\$ (39,843)	\$ (49,468)
Net cash provided by (used in) investing activities	(33,345)	(9,870)	4,461	26,902
Net cash provided by financing activities	69,648	63,802	62,740	82,239
Net increase (decrease) in cash and cash equivalents	\$ (2,289)	\$ 2,631	\$ 27,358	\$ 59,673

Operating activities

Net cash used in operating activities was \$39.8 million in the period ended June 30, 2017, and consisted primarily of a net loss of \$42.3 million adjusted for non-cash items including depreciation and amortization expenses of \$3.8 million, stock-based compensation expense of \$1.0 million, change in operating assets and liabilities of approximately \$2.7 million, and other non-cash items of \$0.4 million.

Net cash used in operating activities was \$49.5 million in the period ended June 30, 2018, and consisted primarily of a net loss of \$51.4 million adjusted for non-cash items including depreciation and amortization expenses of \$4.4 million, stock-based compensation expense of \$1.9 million, a change in operating assets and liabilities of approximately \$4.8 million, and a net increase of non-cash items of \$0.4 million.

Net cash used in operating activities was \$38.6 million in 2016, and consisted primarily of a net loss of \$44.1 million adjusted for non-cash items including depreciation and amortization expenses of \$4.2 million, stock-based compensation expense of \$0.9 million, change in operating assets and liabilities of approximately \$0.2 million, and other non-cash items of \$0.2 million.

Net cash used in operating activities was \$51.3 million in 2017, and consisted primarily of a net loss of \$59.3 million adjusted for non-cash items including depreciation and amortization expenses of \$5.0 million, stock-based compensation expense of \$1.9 million, a change in operating assets and liabilities of approximately \$0.1 million, and a net increase of non-cash items of \$1.2 million.

Investing activities

In the nine months ended June 30, 2017, our investing activities provided net cash of \$4.5 million. Investing activities included the purchases and maturity of investments and purchases of laboratory property, equipment and computers.

In the nine months ended June 30, 2018, our investing activities provided net cash of approximately \$26.9 million. Investing activities included the purchases and maturity of investments and purchases of laboratory property, equipment and computers.

In 2016, our investing activities used net cash of \$33.3 million. The investing activity included the purchases of investments, laboratory property and equipment.

In 2017, our investing activities used net cash of approximately \$9.9 million. The use of net cash resulted primarily from the net impact of purchases and maturity of investments, and purchases of laboratory property, equipment and computers.

Financing activities

Net cash provided by financing activities was \$62.7 million in the nine months ended June 30, 2017, which consisted of \$65.2 million from the issuance of convertible preferred stock, partially offset by the repayment of \$2.4 million of debt.

Net cash provided by financing activities was \$82.2 million in the nine months ended June 30, 2018, which consisted of \$78.9 million from the issuance of convertible preferred stock, \$5.0 million advance receipt of proceeds for convertible preferred stock to be issued to Ever Alpha Fund L.P., \$2.0 million in payment of deferred offering costs, and \$0.3 million from the issuance of common stock and exercise of stock options.

Net cash provided by financing activities was \$69.6 million in 2016, which consisted of \$62.3 million from the issuance of convertible preferred stock, \$0.2 million from the issuance of common stock, and \$7.7 million from the issuance of debt, partially offset by the repayment of \$0.4 million of debt.

Net cash provided by financing activities was \$63.8 million in 2017, which consisted of \$65.6 million from the issuance of convertible preferred stock, \$0.2 million from the issuance of common stock, \$2.2 million from additional debt, off-set by the repayment of \$4.2 million of debt.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements other than our indemnification agreements as described in Note 5 of the condensed consolidated financial statements included elsewhere in this prospectus.

Contractual obligations and other commitments

Set forth below is information concerning our contractual commitments and obligations as of September 30, 2017:

(in thousands)	Total	Less than 1 Year	Years 1-3	Years 3-5	After 5 Years
Contractual obligations					
Future minimum operating lease payments	\$ 3,598	\$ 2,133	\$1,465	\$ —	\$ —
Long-term debt obligations	12,032	715	6,946	4,371	—
Total	\$15,630	\$ 2,848	\$8,411	\$4,371	\$ —

The following table summarizes our outstanding contractual obligations as of the payment due date by period as of June 30, 2018:

(in thousands)	Total	Less than 1 Year	Years 1-3	Years 3-5	After 5 Years
Contractual obligations					
Future minimum operating lease payments	\$28,643	\$ 540	\$ 6,431	\$ 7,368	\$14,304
Long-term debt obligations	11,657	203	7,062	4,392	—
Total	\$40,300	\$ 743	\$13,493	\$11,760	\$14,304

In September 2016, we entered into a collaboration agreement with Distributed Bio to offer therapeutic antibody design and optimization services, as well as an exclusive library targeting G-protein coupled receptors to our customers. Upon successful commercialization, our agreement with Distributed Bio requires us to pay \$0.3 million to Distributed Bio. In addition, we also agreed on a profit-sharing and license arrangement for an Antibody Optimization Software and GPCR-Targeting Antibody Library, which includes royalty payments for

discovered pharmaceutical products of up to 50% of net income or 20% of revenue on annual sales less than \$5.0 million. For annual sales in excess of \$5.0 million, we are obligated to make royalty payments ranging from 20% to 35% of net annual revenue on the antibody software and GPCR Antibody Library revenue under the collaboration agreement.

In March 2018, we entered into a stock purchase agreement related to the sale of additional shares of our Series D convertible preferred stock for the amount of \$70.0 million. Pursuant to a side letter to the stock purchase agreement, we have committed, subject to certain conditions, to using commercially reasonable efforts to invest up to \$5.0 million, \$10.0 million and \$10.0 million over a three year period in connection with the incorporation, business and/or operations of a wholly owned foreign enterprise in the PRC.

Qualitative and quantitative disclosures about market risk

We are exposed to market risks in the ordinary course of our business. These risks primarily include interest rate risk and foreign currency risk as follows:

Interest rate risk

We had cash and cash equivalents totaling \$55.9 million and \$90.9 million as of June 30, 2017 and 2018, respectively. We had short-term investments totaling \$20.1 million and \$1.6 million as of June 30, 2017 and 2018, respectively. Our cash and cash equivalents consist of cash in bank accounts and money market funds, and short-term investments consist of U.S. government agency bonds, corporate bonds, and commercial paper. The primary objectives of our investment activities are to preserve principal and provide liquidity without significantly increasing risk. We do not enter into investments for trading or speculative purposes. Due to the relatively short-term nature of our investment portfolio, a hypothetical 100 basis point change in interest rate would not have a material effect on the fair value of our portfolio for the years presented.

Foreign currency risk

Substantially all of our revenues and operating expenses are denominated in U.S. dollars. Therefore, we do not believe that our exposure to foreign currency exchange risk is material to our business, financial condition or results of operations. If a significant portion of our revenue or operating expenses were to become denominated in currencies other than U.S. dollars, we may not be able to effectively manage this risk, and our business, financial condition and results of operations could be adversely affected by translation to U.S. dollars and by transactional foreign currency conversions.

Critical accounting policies and estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which have been prepared in conformity with U.S. generally accepted accounting principles, or GAAP. The preparation of financial statements in accordance with GAAP requires management to make estimates and assumptions about future events that affect the amounts of assets and liabilities reported, disclosures about contingent assets and liabilities, and reported amounts of revenues and expenses. These estimates and assumptions are based on management's best estimates and judgment. Management regularly evaluates its estimates and assumptions using historical experience and other factors; however, actual results could differ materially from these estimates and could have an adverse effect on our financial statements. We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management's judgments and estimates.

While our significant accounting policies are described in more detail in Note 2 to our consolidated financial statements appearing in this prospectus, we believe that the following accounting policies are the most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue recognition

Effective October 1, 2017, we elected to early adopt the requirements of ASC 606 – Revenue from Contracts with Customers using the full retrospective method. We evaluated the impact on revenues, loss from operations, net loss attributable to common stockholders and basic and diluted earnings per share for all periods presented and concluded that there was no material impact on our consolidated financial statements for all periods presented.

Our revenue is generated through the sale of synthetic biology tools, such as synthetic genes, or clonal genes and fragments, oligonucleotide pools, or oligo pools, next generation sequencing, or NGS tools and DNA libraries. We account for a contract when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable.

Contracts with customers are generally in the written form of a purchase order or a quotation, which outline the promised goods and the agreed upon price. Such orders are often accompanied by a Master Supply or Distribution Agreement that establishes the terms and conditions, rights of the parties, delivery terms, and pricing. We assess collectability based on a number of factors, including past transaction history and creditworthiness of the customer.

For all of our contracts to date, the customer orders a specified quantity of a synthetic DNA sequence; therefore, the delivery of the ordered quantity per the purchase order is accounted for as one performance obligation. Some contracts may contain prospective discounts when certain order quantities are exceeded; however, these future discounts are either not significant, not deemed to be incremental to the pricing offered to other customers, or not enforceable options to acquire additional goods. As a result, these discounts do not constitute a material right and do not meet the definition of a separate performance obligation. We do not offer retrospective discounts or rebates.

The transaction price is determined based on the agreed upon rates in the purchase order or master supply agreements applied to the quantity of synthetic DNA that was manufactured and shipped to the customer. Our contracts include only one performance obligation—the delivery of the product to the customer. Accordingly, all of the transaction price, net of any discounts, is allocated to the one performance obligation. Therefore, upon delivery of the product, there are no remaining performance obligations. Our shipping and handling activities are performed before the customer obtains control of the goods and therefore are considered a fulfillment cost. We have elected to exclude all sales and value added taxes from the measurement of the transaction price. We have not adjusted the transaction price for significant financing since the time period between the transfer of goods and payment is less than one year.

We recognize revenue at a point in time when control of the products is transferred to the customer. Management applies judgment in evaluating when a customer obtains control of the promised good which is generally when the product is delivered to the customer. Our customer contracts generally include a standard assurance warranty to guarantee that our products comply with agreed specifications. We reduce revenue by the amount of expected returns which have been insignificant.

We have elected the practical expedient of not disclosing the consideration allocated to remaining performance obligations and an explanation of when those amounts are expected to be recognized as revenue since the duration of our contracts is less than one year.

We do not have any contract assets or contract liabilities as of September 30, 2017 and June 30, 2018. For all periods presented, we did not recognize revenue from amounts that were included in the contract liability balance at the beginning of each period. In addition, for all periods presented, there was no revenue recognized in a reporting period from performance obligations satisfied in previous periods.

Based on the nature of our contracts with customers which are recognized over a term of less than 12 months, we have elected to use the practical expedient whereby costs to obtain a contract are expensed as they are incurred.

Stock-based compensation

Total stock-based compensation expense recognized was as follows:

(in thousands)	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Cost of revenues	\$ 112	\$ 202	\$ 95	\$ 275
Research and development	261	575	272	521
Selling, general and administrative	484	1,114	660	1,079
Total stock-based compensation	\$ 857	\$ 1,891	\$1,027	\$1,875

During the nine months ended June 30, 2017, we granted stock options to employees and non-employees to purchase 63,125 shares of common stock with a weighted average grant date fair value of \$5.64. During the nine months ended June 30, 2018, we granted stock options to employees and non-employees to purchase 820,732 shares of common stock with a weighted average grant date fair value of \$7.13. We recognized stock-based compensation expense of \$1.0 million and \$1.9 million, for the nine months ended June 30, 2017 and 2018, respectively. As of June 30, 2018, there was \$10.2 million of total unrecognized compensation expense related to unvested stock options under the 2013 Plan that is expected to be recognized over a weighted-average period of 3.3 years. As of June 30, 2018, there was \$0.8 million of total unrecognized compensation expense related to restricted stock under the 2013 Plan that is expected to be recognized over a weighted-average period of 1.9 years.

During the year ended September 30, 2016, we granted stock options to employees and non-employees to purchase 246,536 shares of common stock with a weighted average grant date fair value of \$3.47. During the year ended September 30, 2017, we granted stock options to employees and non-employees to purchase 857,082 shares of common stock with a weighted average grant date fair value of \$6.63. We recognized stock-based compensation expense of \$0.9 million and \$1.9 million, for the years ended September 30, 2016 and 2017, respectively. As of September 30, 2017, there was \$6.7 million of total unrecognized compensation expense related to unvested stock options under the 2013 Plan that is expected to be recognized over a weighted-average period of 3.9 years. As of September 30, 2017, there was \$1.2 million of total unrecognized compensation expense related to restricted stock under the 2013 Plan that is expected to be recognized over a weighted-average period of 2.5 years.

We use the Black-Scholes option pricing model to calculate the grant date fair value of a stock option. The Black-Scholes model requires various assumptions, including expected volatility, expected term, risk-free interest rate, expected dividend yield and the fair value of our common stock.

The expected volatility of our stock options is estimated from the historical volatility of selected public companies with comparable characteristics to us, including similarity in size and lines of business. The expected term of stock options represents the period that the options are expected to be outstanding before being

Table of Contents

exercised. The risk-free interest rate is based on the implied yield currently available on U.S. treasury notes with terms approximately equal to the expected life of the option. The expected dividend yield is zero as we currently have no history or expectation of declaring cash dividends on our common stock. The fair value of our common stock is described below under "Determination of the fair value of common stock on grant dates".

The grant date fair value of options granted during the years ended September 30, 2016 and 2017 and nine months ended June 30, 2017 and 2018 were calculated using the weighted average assumptions set forth below:

	Years ended September 30,		Nine months ended June 30,	
	2016	2017	2017	2018
Expected term (years)	6.25	6.25	6.25	6.25
Expected volatility	64.4%	65.5%	65.5%	66.4%
Risk-free interest rate	1.44%	2.02%	2.02%	2.81%
Dividend yield	0%	0%	0%	0%

We expect the effect of our stock-based compensation expense to grow in future periods due to the potential increases in the fair value of our common stock and increased number of stock options granted due to anticipated increases in our overall headcount.

As of June 30, 2018, options (vested and unvested) to purchase 2,424,024 shares of our common stock were outstanding. The aggregate intrinsic value of these options was \$9,360,237, assuming an initial public offering price of \$15.00 per share, the midpoint of the estimated price range set forth on the cover page of this prospectus, which was calculated based on the following:

	Shares available	Options outstanding	Weighted average exercise price per share	Weighted average remaining contractual term
Outstanding as of September 30, 2015	644,152	879,860	\$ 4.64	8.88
Outstanding as of September 30, 2016	470,623	1,033,612	\$ 4.93	8.81
Outstanding as of September 30, 2017	687,339	1,819,724	\$ 6.63	9.14
Outstanding as of June 30, 2018	944,109	2,424,024	\$ 8.04	8.61
Vested or expected to vest and become exercisable as of June 30, 2018		2,424,024	\$ 8.04	8.61

Determination of the fair value of common stock on grant dates

As there has been no public market for our equity instruments to date, the estimated fair value of our shares of common stock has been determined by our board of directors and/or our compensation committee as of the grant date, with input from management, considering our most recently available independent third-party valuation of our common stock and our board of directors' and/or compensation committee's assessment of additional objective and subjective factors that it believed were relevant and which may have changed between the effective date of the most recent valuation and the date of the grant. Following the consummation of this offering, the fair market value of our common stock will be determined based on the quoted market price of our common stock. The independent third-party valuations have generally been performed quarterly in accordance with the guidance outlined in the AICPA Practice Aid, Valuation of Privately-Held Company Equity Securities Issued as Compensation, or AICPA's Practice Aid. In conducting the valuations, the independent third-party valuation specialist considered all objective and subjective factors that it believed to be relevant for each valuation conducted in accordance with AICPA's Practice Aid, including management's best estimate of our

[Table of Contents](#)

business condition, prospects and operating performance at each valuation date. Other significant factors included:

- the rights, preferences and privileges of our preferred stock as compared to those of our common stock, including the liquidation preferences of our preferred stock;
- our results of operations, financial position and the status of research and development efforts;
- arms-length transactions involving recent rounds of preferred stock financings;
- the composition of, and changes to, our management team and board of directors;
- the lack of liquidity of our common stock;
- our stage of development and business strategy and the material risks related to our business and industry;
- the valuation of publicly traded companies in the life sciences and biotechnology sectors, as well as recently completed mergers and acquisitions of peer companies;
- any external market conditions affecting the life sciences and biotechnology industry sectors;
- the likelihood of achieving a liquidity event for the holders of our common stock and stock options, such as an initial public offering, or IPO, or a sale of our company, given prevailing market conditions; and
- the state of the IPO market for similarly situated privately held biotechnology companies.

The independent third-party valuations utilized market-based valuation approaches, including the option pricing method, or OPM, the Probability-Weighted Expected Return Method, or PWERM, and a hybrid methodology utilizing both OPM and PWERM.

The OPM treats the rights of the holders of preferred and common stock as equivalent to that of call options on any value of the enterprise above certain break points of value based upon the liquidation preferences of the holders of preferred stock, as well as their rights to participation and conversion. Under OPM, the value of a company's common stock is determined by estimating the value of its portion of each of these call option rights.

Under the PWERM, the value of a company's common stock is estimated based upon an analysis of values for the company assuming various possible future events: IPO, strategic merger or sale, dissolution/no value to common and private company. The per share value of the company's common stock is based upon the probability-weighted present value of expected future equity values, under each of the possible future event scenarios, as well as the rights and preferences of each share class.

Under the hybrid method, the per share values calculated under the OPM and PWERM are weighted appropriately to arrive at a final per share fair value of the company's common stock before the discount for lack of marketability is applied.

The independent third-party valuations covering fiscal year 2016 through March 31, 2017 were prepared utilizing the OPM as the primary valuation method. The material assumptions used in the OPM include recent rounds of preferred stock financing, estimated future revenues, and the valuation of peer companies.

Subsequent to March 31, 2017, the independent third-party valuations were prepared utilizing a hybrid allocation methodology (with both OPM and PWERM used) as the primary allocation method, with the same steps discussed above being applied. The material assumptions used in the hybrid method consist of the weighting of values determined under the OPM and PWERM. The weighting of the value determined under the PWERM in the hybrid method has increased as the likelihood of an IPO has increased. The material assumptions used in the PWERM include the estimated value, timing and weighting of potential liquidity events.

All of our independent third-party valuations also included appropriate discounts to the value of our common stock for lack of marketability.

Recently issued accounting pronouncements

We have reviewed all recently issued standards and have determined that, other than as disclosed in Note 2 to our unaudited interim condensed consolidated financial statements appearing elsewhere in this prospectus, such standards will not have a material impact on our financial statements or do not otherwise apply to our operations.

Business

Overview

We are a leading and rapidly growing synthetic biology company that has developed a disruptive DNA synthesis platform to industrialize the engineering of biology. The core of our platform is a proprietary technology that pioneers a new method of manufacturing synthetic DNA by “writing” DNA on a silicon chip. We have combined this technology with proprietary software, scalable commercial infrastructure and an e-commerce platform to create an integrated technology platform that enables us to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost than our competitors. We are leveraging our unique technology to manufacture a broad range of synthetic DNA-based products, including synthetic genes, tools for next generation sample preparation, and antibody libraries for drug discovery and development. Additionally, we believe our platform will enable new value-add opportunities, such as discovery partnerships for biologic drugs, and will enable new applications for synthetic DNA, such as digital data storage, which will drive growth in the market for our products. We sell our synthetic DNA and synthetic DNA-based products to a customer base of over 600 customers across a broad range of industries.

DNA is the fundamental building block of biology. The ability to design DNA and engineer biology, a field known as synthetic biology, is growing rapidly and we believe this field represents one of the most exciting areas of growth and technological innovation in the 21st century. The ability to modify DNA to serve different purposes is leading to a broad range of applications for synthetic DNA and synthetic DNA-based products across multiple industries, including:

- healthcare for the discovery and production of new therapeutics and molecular diagnostics;
- industrial chemicals for cost-effective and sustainable production of new and existing specialty chemicals and materials, such as spider silk, nylon, rubber, fragrances, food flavors and food additives;
- agriculture for more effective and sustainable crop production;
- academic research for a broad range of applications; and
- technology for potential use as an alternative long-term data storage medium.

Our mission is to be the leading provider of synthetic genes, which are comprised of strands of synthetic DNA, and to leverage the versatility of our platform to expand our portfolio to include other synthetic DNA-based products and address additional market opportunities. As a leading synthetic DNA provider, we produce an array of different synthetic DNA-based products targeting multiple market opportunities. The following chart represents our target market opportunities:

MARKET OPPORTUNITIES	EXPLORATION	PROOF OF CONCEPT	BETA	COMMERCIAL	NEXT STEPS
Synthetic Genes, DNA Libraries and Oligo Pools ¹					Continue to drive growth and expand market adoption of synthetic DNA
Next Generation Sequencing Sample Preparation ²					Drive adoption of our NGS products and launch our NGS e-commerce platform
Biological Drug Discovery and Development ³					Validate GPCR library and antibody optimization solution Establish partnerships with biotechnology and pharmaceutical companies
Digital Data Storage in DNA					Continue to develop partnerships to explore digital data storage in DNA

- 1 Products addressing this market include clonal, non-clonal genes (gene fragments), oligo pools and DNA libraries
- 2 Products addressing this market include NGS exome capture and NGS custom capture
- 3 Products addressing this market include custom DNA libraries, our proprietary GPCR-targeting antibody library and our antibody optimization solution

Synthetic genes, DNA libraries and oligo pools

In April 2016, we launched the first applications of our platform, synthetic genes and oligo pools, to disrupt the gene synthesis market and make legacy DNA synthesis methods obsolete. Soon thereafter, we added DNA libraries for drug discovery and development. We estimate the market for synthetic DNA was approximately \$1.3 billion in calendar year 2016. We believe that the traditional DNA synthesis methods used by our competitors are inherently limited in scalability and are not optimized to satisfy the rapidly growing demand for high-quality, low-cost synthetic DNA. Our silicon-based chip technology is able to increase DNA production by a factor of 9,600 on a footprint similar to that of traditional DNA synthesis methods. Also, it significantly lowers the volume of required reagents, specifically the most expensive reagent by a factor of 1,000,000 and improves the precision of the synthesis process relative to legacy methods. This enables us to produce high-quality synthetic DNA on a much larger scale and at a lower cost than competitors. In fiscal 2016, our revenue from synthetic genes was \$1.0 million, or approximately 48% of our total revenue, and our revenue from oligo pools was \$0.9 million, or approximately 38% of our total revenue.

In fiscal 2017, we served 286 customers including \$0.3 million in sales to seven of the top 20 pharmaceutical companies by revenue, \$4.3 million in sales to Ginkgo Bioworks which we believe is the largest global purchaser of synthetic DNA, \$0.3 million in sales to three of the largest agricultural biotechnology companies, \$2.7 million in sales to over 100 academic research institutions worldwide, and \$7.3 million in sales to innovative customers using synthetic DNA for new and emerging applications, such as Microsoft Corporation and the University of Washington for use of DNA as a digital data storage medium. To date, we have served over 600 customers across a broad range of industries. In fiscal 2017, our revenue from synthetic genes was \$8.1 million, or approximately 75% of our total revenue, and our revenue from oligo pools was \$2.0 million, or approximately 19% of our total revenue. In the nine months ended June 30, 2018, our revenue from synthetic genes was \$11.9 million, or approximately 70% of our total revenue, and our revenue from oligo pools was \$2.1 million, or approximately 13% of our total revenue.

We are also an OEM supplier of synthetic DNA to four synthetic DNA manufacturers that also compete with us, which we believe is a strong demonstration of the superiority of our platform. We entered into a new agreement with Ginkgo Bioworks in March 2018 (the 2018 Agreement), after the agreement entered into by the parties in 2017 expired pursuant to its terms, and we are obligated to deliver to Ginkgo Bioworks synthesized DNA sequences that meet certain agreed upon sequence guidelines pursuant to purchase orders placed by Ginkgo Bioworks during the term of the 2018 Agreement. Under the 2018 Agreement, should Ginkgo Bioworks place an order, they shall provide us with genetic sequences to be synthesized. The 2018 Agreement can only be terminated (i) upon mutual agreement of both parties, (ii) by Ginkgo Bioworks upon a specified change of control, (iii) upon a material breach of the contract by either party, or (iv) unilaterally by us in the event that Ginkgo Bioworks fails to place more than a certain percentage of their required quarterly minimums under the agreement for two consecutive quarters. The purchase minimums in the 2018 Agreement are considered to create an enforceable obligation only in conjunction with each purchase order.

Next Generation Sequencing sample preparation

Synthetic DNA is a key product used for target enrichment during sample preparation in NGS applications. We launched an innovative and comprehensive sample preparation kit for NGS at the Advances in Genome Biology and Technology conference in February 2018. Our kit leverages our platform to precisely synthesize oligo pools and uniformly amplify the desired target DNA segments, considerably improving the accuracy of the

downstream sequencing analysis. Our proprietary technology also allows us to quickly and cost-effectively customize our NGS kits and simplify the sequencing workflow. This enables our customers to analyze more samples per sequencing run, without sacrificing accuracy, saving them time and money. We estimate this market opportunity to be approximately \$500 million in calendar year 2016.

Biological drug discovery and development

We believe we can leverage our DNA synthesis platform together with our custom libraries and other proprietary tools, such as our anti-GPCR library and antibody optimization solution, to provide an end-to-end solution in biologics drug discovery and early development, from target to IND application, adding value as a partner to biotechnology and pharmaceutical companies.

Custom DNA libraries

We are developing custom DNA libraries, collections of DNA fragments, which are primarily used by pharmaceutical companies during biological drug discovery and development. Our platform allows customers to customize every antibody variation and construct a library systematically to target the entire region of therapeutic interest, which we believe represents a significant advantage over current methodologies and can accelerate drug development and generate new antibody therapeutics.

GPCR drug discovery and early development

Together with Distributed Bio using in silico design, we have developed a proprietary GPCR-targeting antibody library. GPCRs are cell surface receptors that traditionally have been difficult to target with antibodies or other biological drugs. We believe our proprietary library improves antibody drug discovery against this difficult class of targets. We plan to partner with biotechnology and pharmaceutical companies to discover antibodies against GPCRs or out-license the proprietary library to them.

Antibody optimization solution

Coupling our unique DNA synthesis platform with proprietary software developed by one of our partners, we are now creating and validating a comprehensive antibody optimization solution that may allow us to form value add partnerships with academic institutions as well as biotechnology and pharmaceutical companies to improve their antibody drug candidates. In addition, this solution may allow us to discover "bio-better" antibody drugs, which are antibody therapeutics that are similar to an existing antibody with improved tolerability, clinical and/or commercial properties.

With our custom DNA libraries, proprietary GPCR-targeting antibody library and antibody optimization solutions, we are targeting the biologic drug development market which we believe to be a large market opportunity.

DNA as a data storage media

Due to the explosion of data across many industries, finding efficient long-term storage solutions has become more important. Through the Semiconductor Research Corporation, many leading semiconductor companies, including Microsoft Corporation, IBM Corporation, Micron Technology, Inc., Autodesk Inc., Mentor Graphics Corporation and GlobalFoundries Inc., are exploring DNA as a long-term, compact form of data storage with very low energy maintenance requirements and universal read technology that will last hundreds of years. We have strategic relationships with Microsoft Corporation and the University of Washington through which we have demonstrated the feasibility of storing data on DNA and the unique benefits of longevity, density, and universality of this format. We believe that over time our technology will develop to allow data storage in DNA to become cost competitive with traditional data storage media, which is necessary to enable us to target several large markets opportunities. The market for digital data storage is more than \$35 billion and we believe DNA can address several segments of this market.

[Table of Contents](#)

We believe the growth of the synthetic DNA market is analogous to the trends seen in the next generation sequencing (NGS) market, where rapid innovation is resulting in the declining costs of sequencing, increased adoption, development of new applications and market expansion. Similarly, tools that combine advanced production technology with modern digital technology and software capabilities, such as our DNA synthesis platform, are driving growth and market creation for synthetic DNA and synthetic DNA-based products. Therefore, we believe that market estimates understate the potential for our products as they reflect a market that has historically been limited by the costly, time-consuming, and cumbersome nature of legacy DNA synthesis methods. We are experiencing rapid growth for synthetic DNA and synthetic DNA-based products as we improve access to affordable tools that encourage adoption of, and foster new applications and markets for, our products.

We have built a scalable commercial platform that enables us to reach a diverse customer base that we estimate consists of over 100,000 synthetic DNA users, and many additional potential customers of our NGS library preparation products today. In order to address this diverse customer base, we have employed a multi-channel strategy comprised of a direct sales force targeting synthetic DNA customers, a direct sales force focusing on the NGS market and an e-commerce platform. Our sales force is focused on customer acquisition, support, and management across industries, and is highly trained on both the technical aspects of our platform and how synthetic DNA can be used in a wide range of industries. We launched our proprietary, innovative, and easy-to-use e-commerce platform in October 2017 to existing customers and expanded access to the general public in January 2018. Our platform allows customers to design, validate, and place on-demand orders of customized DNA online, and enable them to receive real-time customized quotes for their products and track their order status through the manufacturing and delivery process. This is a critical part of our strategy to address our large market and diverse customer base, as well as drive commercial productivity, enhance the customer experience, and promote loyalty.

Since our formation in 2013, we have grown rapidly and achieved several key milestones that we believe position us for continued growth and success:

- In 2015, we demonstrated the benefits and validated the commercial utility of our proprietary silicon-based platform for DNA synthesis through a proof-of-concept program called the Alpha Access program, which provided initial access to our platform to select customers.
- In 2016, we (i) secured a long-term contract with Ginkgo Bioworks to provide up to 100 million base pairs of DNA, which we believe was the largest agreement for synthetic DNA at that time, (ii) launched our early commercial access program in April called the Beta Access program to select customers and expanded our existing relationship with Ginkgo Bioworks, (iii) acquired Genome Compiler Corporation to add software design capabilities for our e-commerce ordering system, (iv) laid the groundwork to pursue an opportunity in biologics drug discovery through a relationship with Distributed Bio, Inc., and (v) supplied DNA to Microsoft Corporation for its work with the University of Washington to develop DNA as a data storage medium.
- In 2017, we continued to increase penetration with existing customers and expand our customer base, by (i) serving 286 customers (up from 97 customers in 2016), (ii) extending the scope of our relationship with Microsoft Corporation and the University of Washington, (iii) entering into an agreement to supply thousands of genes for public benefit through the BioBricks Foundation, (iv) successfully achieving industry-leading volumes of synthetic DNA shipped every month, (v) becoming an OEM supplier of synthetic DNA to four synthetic DNA manufacturers that also compete with us, (vi) launching our e-commerce platform to existing customers in October 2017 and (vii) shipping over 38,000 genes in the fourth quarter of fiscal 2017 compared to approximately 7,600 for the fourth quarter of fiscal 2016, which represents 400% year-over-year growth.
- In 2018, we continued to experience revenue growth greater than the estimated rate of growth of the synthetic biology market, expanded into new market opportunities for next-generation sequencing and

antibody biologics discovery, and enhanced our global distribution capabilities by (i) launching our e-commerce platform to the general public, (ii) launching our NGS target enrichment solutions at a major medical conference, (iii) completing a private financing with funds reserved for building Chinese operations, (iv) signing international distributors in Asia Pacific, (v) expanding our management team to support our entry into the biologics drug discovery and early development, (vi) signing a new agreement with Ginkgo Bioworks to deliver up to approximately 1.3 billion base pairs over a period of four years, and (vii) shipping 19,794 genes in the third quarter of fiscal 2018 compared to 8,297 for the third quarter of fiscal 2017, which represents 139% year-over-year growth, and compared to shipping 2,650 genes in the third quarter of fiscal 2016.

We generated revenue of \$2.3 million in fiscal 2016 and \$10.8 million in fiscal 2017, representing 375% year-over-year growth, while incurring net losses of \$44.1 million in fiscal 2016 and \$59.3 million in fiscal 2017. In addition, we generated revenue of \$7.3 million and \$17.0 million in the nine months ended June 30, 2017 and 2018, representing 133% period-over-period growth, while incurring net losses of \$42.3 million and \$51.4 million in the nine months ended June 30, 2017 and 2018.

Our headquarters and manufacturing facilities are located in San Francisco, California. As of June 30, 2018, we had 221 full-time employees worldwide, including three locations in the San Francisco Bay Area and an international location in Tel Aviv, Israel. We also utilize a team of 14 dedicated commercial consultants across the European Union and the United Kingdom and five dedicated commercial consultants across Asia. We also recently received private funding to establish production facilities and commercial operations in Asia. We plan to begin operations in Asia in 2019. As of August 31, 2018, we have raised a total of \$291.5 million in gross proceeds from the sale of equity securities.

Industry overview

Engineering of Biology Enables Multiple Market Opportunities

We operate in the field of synthetic biology, which is undergoing an era of rapid innovation and transformation. Synthetic biology is the engineering of biology to build new biological systems or re-design existing biological systems and this emerging field is enabling advances across a broad range of end markets and consumers. For example, in healthcare, synthetic biology is being used to develop and enable new drugs, via tools such as CRISPR, as well as to improve targeted molecular diagnostics for personalized medicine. In industrial chemical applications, synthetic biology is enabling the production of renewable, cost-effective chemicals such as nylon, rubber, fragrances, and food flavors or new materials, such as spider silk. In agricultural biotechnology, synthetic biology is being used to improve nutritional content of agricultural goods, eliminate the need for oil-based fertilizers, and maximize crop yields. The applications of synthetic biology are constantly growing and new end markets are emerging, driven by continued innovation, our growing understanding of biology, and access to tools allowing us to modify and build biological systems.

The understanding of, and the ability to use, synthetic biology continues to vastly improve, accelerated by the adoption of modern research tools, technological advancements in bioinformatics, genomics, computation and automation, coupled with a decrease in DNA sequencing and DNA synthesis costs. Furthermore the availability and application of artificial intelligence and big data analysis to enhance biological experiments has led to an acceleration of valuable biological insights in a streamlined, automated, and industrialized manner. This digitization of biology has led to an explosion of new and accessible technologies and has made it possible for small and large organizations alike to conduct synthetic biology research.

According to BCC Research, the overall market for synthetic biology products was approximately \$4.4 billion in calendar year 2017 and is expected to grow to over \$13.9 billion by calendar year 2022. This industry

momentum creates a significant opportunity for us to grow within our existing markets as well as expand our product offering.

The value chain within the synthetic biology market consists of three areas: enabled products, core technologies and products, and enabling technologies.

- **Enabled products** are the true end products resulting from the use of synthetic biology, which include products such as pharmaceuticals, agricultural crops, industrial chemicals and materials, and molecular diagnostics. Companies that operate in this segment include pharmaceutical and biotechnology companies, large industrial chemical companies, and agriculture companies.
- **Core technologies and products** include the biological components, integrated systems, and ingredients that form the building blocks for the enabled products, including synthetic genes and cells, delivery plasmids, and biobrick parts, among others. Companies that operate in this segment include Ginkgo Bioworks and other companies that help engineer biological components to create the enabled products.
- **Enabling technologies** are the tools needed to produce both the core technologies and enabled products. These include technologies such as DNA synthesis, DNA sequencing, gene editing, workflow automation technologies, bioinformatics, and digital data storage.

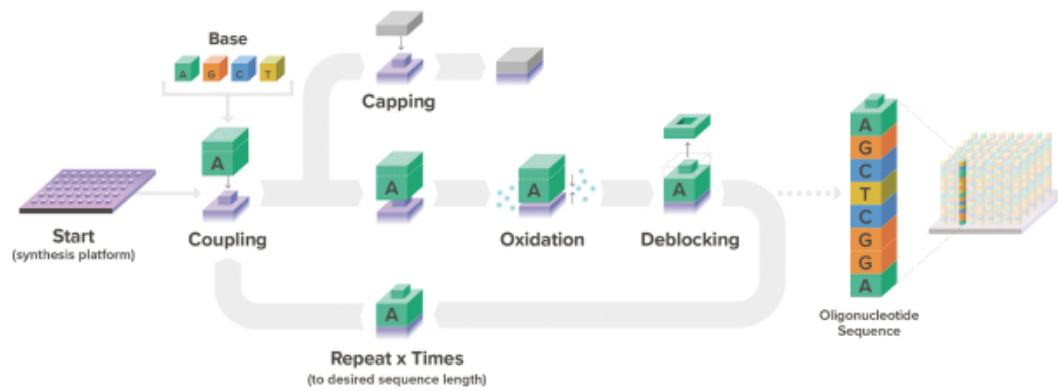
Our platform provides flexibility to pursue opportunities across all of these segments. For example, our synthetic gene offering is considered an enabling technology, but our NGS products are considered an enabled product.

Synthetic DNA is the fundamental building block of synthetic biology. Users of synthetic biology can design synthetic DNA to regulate the production of these proteins and molecules to achieve a specific functional purpose. While humans have been slowly altering the genetic coding of DNA in plants and animals for millennia through selective breeding, synthetic biology is the process of rapidly coding man-made DNA to build new biological systems or modify the design of existing biological systems. This is implemented by using powerful computational models and advanced engineering to redesign existing biological systems for new purposes. As the ability to modify DNA has become increasingly accessible, the applications, products, and customer base for synthetic DNA have continued to grow.

Traditional DNA synthesis methods

While synthetic DNA (also referred to as recombinant DNA) has been produced for more than 40 years, the complexities of biology and the production constraints inherent in legacy processes have historically limited the applications and market opportunities for DNA synthesis. DNA synthesis is the process of linking together naturally occurring nucleotides and their phosphodiester analogs to create DNA strands that are chemically identical to naturally occurring DNA. This process is commonly referred to as phosphoramidite chemistry and was first published in 1982. Traditional methods of DNA synthesis consist of a two-step process that initially involves the synthesis of oligos, which are short strands of DNA of up to approximately 200 base pairs (bp) in length. These oligos are then combined to create longer strands of DNA. The length of DNA required for specific research typically depends on the desired end use and can vary from 50bps to more than 100,000bps.

Oligonucleotide Synthesis



Currently, there are two primary methodologies used by others to create synthetic DNA, the 96-well plate method and the microarray method. Each of these methods has production limitations that we believe make these technologies sub-optimal to satisfy the rapidly growing demand for synthetic DNA. In addition, because the synthesis of oligos can introduce errors in the sequence order, all DNA synthesis methods require a process called cloning to produce many identical copies of a strand of DNA, such as a clonal gene. Today, all of our competitors use one of these two primary methods of DNA synthesis and require cloning for clonal genes.

96-well plate method of DNA synthesis

Introduced as early as the 1950s, a 96-well plate is a flat plastic plate, roughly the size of two smartphones, with 8 rows of 12 wells that are used as small test tubes. This plate has become a standard tool used by researchers in multiple industries to conduct tests and also to manufacture synthetic DNA in the form of oligos. Instead of creating one sequence of DNA at a time in a single test tube, the 96-well plate allows researchers to create 96 oligos in parallel, one in each well. While this process successfully achieves DNA synthesis, it requires high volumes of phosphoramidites, an expensive raw material, as well as other ancillary reagents. It also produces excessive amounts of the final product, significantly more than is required for most subsequent processes, resulting in material that is discarded and an unnecessary expense. Additionally, this process is not scalable to produce high volumes, as approximately 100 oligos are needed to assemble one gene and therefore only one gene can be made from each 96-well plate.

Microarray method of DNA synthesis

Unlike a 96-well plate, a microarray is a flat surface made of plastic or glass, on which DNA is synthesized directly in an array of discrete locations. Microarrays were initially developed as an analysis tool, to detect the identity and quantity of DNA in a sample. Beginning in the early 2000s, researchers began using microarrays to synthesize oligos. Microarrays allow large numbers of oligos to be synthesized in parallel, increasing production by up to four orders of magnitude when compared to the 96-well plate. However, DNA synthesis on microarrays presents other production limitations. In order to assemble the microarray-derived oligos into a gene, the oligos are distributed onto a plastic or glass plate, much like printing, and given unique barcodes for identification. Once printed, the oligos are cleaved off of the array chip into a single large pool of oligos, which are then amplified using polymerase chain reaction (PCR). Amplification is necessary because only small amounts of oligos can be produced on a microarray, not enough to be assembled into genes. Oligos are amplified using corresponding primers for their bar codes for separation into smaller pools of approximately 100 oligos. Separation into smaller pools and bar code removal is an expensive and time-consuming process.

The oligos are then stored in the separate wells of a 96-well plate and are then assembled into a gene. While this method can make 100 genes in parallel, it remains difficult to scale, requires many steps and results in significant waste of materials.

Cloning

Cloning is a tedious process to filter out errors and produce many identical copies of a strand of DNA, such as a gene. While the cloning process results in a precise sequence, it is incredibly slow and labor intensive and generally takes around 10 business days to complete. As a result, it is time consuming, expensive, and, in many cases, not an efficient use of a researcher's time. In general, more accurate DNA synthesis technology results in fewer errors in the sequence order and reduces the time and costs required or allocated to the cloning process.

Example—Cloning Workflow (4 - 10 business days of a researcher's time) compared to Purchase Workflow (10 business day turnaround at Twist Bioscience)

11-Step, Labor-Intensive Cloning Workflow

Steps	Action	Timeline (hours)
1	Design DNA Sequence Select desired sequence, modify as needed for specific application	<1
2	Generate DNA Sequence Source physical DNA. Synthesis, PCR or restriction digest	2-100
3	Prepare Vector Linearize vector with restriction enzymes or prepare for specific cloning technique	1
4	Cloning Clone gene into vector. Restriction/Ligation, seamless cloning, recombination or other method	1-16
5	Transform Plasmid Transform plasmid into E. coli via heat shock or electroporation	1
6	Plate E. coli on Selective Media E. coli plated on selective agar and grown at 37 C overnight. Only E. coli containing the plasmid with the selective marker will grow	16
7	Pick Clones, Grow Culture Pick colonies from overnight incubation and grow in selective media	24
8	Isolate Plasmid DNA Isolate DNA using mini prep kit or direct lysis	1
9	Sequence Cloned Gene Sequence plasmid using Sanger or Next Generation Sequencing	24-72
10	Analyze Sequence Analyze sequence for correct clone	1
11	Grow Plasmid for Intended Downstream Application Grow larger scale culture and isolate DNA using large scale preparation Midi, Maxi or Giga prep	24
Total Time		4-10+ Days

Our solution: The Twist Bioscience DNA synthesis platform

We developed the Twist Bioscience DNA synthesis platform to address the limitations of throughput, scalability, and cost inherent in legacy DNA synthesis methods. Our platform stems from extensive analyses of, and improvements to, the existing gene synthesis and assembly workflows. Our core technologies combine expertise in silicon, software, fluidics, chemistry, and motion and vision control to miniaturize thousands of parallel chemical reactions on silicon and write thousands of strands of DNA in parallel. With a footprint that is similar to the size of a 96-well plate that produces one gene, we are able to produce 9,600 genes in parallel. Based on current production needs, we have intentionally designed our latest chip to make 6,144 genes in parallel but we have the current capacity to increase this to 9,600 genes, as needed. We have combined our DNA synthesis technology with propriety software and a scalable commercial infrastructure to create our

vertically integrated DNA synthesis platform capable of delivering very large volumes of high-quality synthetic DNA at low cost.

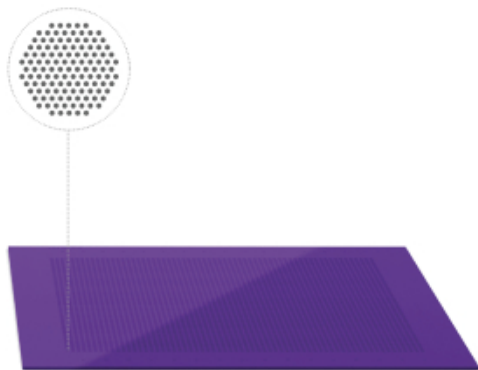
DNA writing on silicon

Silicon is an excellent medium for DNA synthesis because the properties of silicon allow us to miniaturize the chemical reactions of DNA synthesis and precisely control the position of fluid on the silicon surface. Silicon is flat and can be aligned, patterned and imaged. Fluids also flow uniformly over the surface. Silicon is a very hard material and other materials can be added or removed without changing the surface. It conducts heat very well, so the temperature can be controlled quickly, accurately and consistently across the surface.

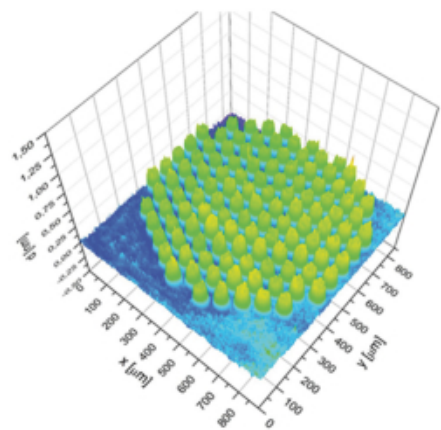
As discovered and capitalized on by the semiconductor industry, it is possible to grow a thin layer of silicon oxide on the surface of silicon by reacting the silicon surface with oxygen at a very high temperature. The resulting oxide layer can be etched to produce micro- or nano-structures and the surface energy of the silicon oxide can be modified to be hydrophobic or hydrophilic. These modifications can also be patterned. We use these oxide-based properties to create an array of discrete devices that are similar in function to the wells on a 96-well plate to control the position of drops of fluid on the surface, replacing legacy plastic. Our process, which miniaturizes the devices relative to the wells on the 96-well plate, enables us to significantly reduce the volumes of reagents required in the oligo synthesis reaction, specifically the most expensive reagent (phosphoramidites) by a factor of 1,000,000. In addition, our silicon chip technology allows us to increase DNA production by a factor of 9,600 on a similar footprint to that of traditional DNA synthesis methods.

Currently, we manufacture DNA on a silicon chip with 6,144 distinct spaces on the chip which we call clusters, each comprised of 121 devices and we have the current capability to increase this to 9,600 genes, as needed. Each device supports the synthesis of a unique oligonucleotide sequence. In parallel, within each cluster, we construct 121 short oligos of 50 to 250 base pairs in length. Each cluster is individually customized to create and assemble the oligos into a single gene and clone them into final form using small volumes and automated processes. Because we synthesize each oligonucleotide individually, almost all DNA sequences can be customized to our customer's specifications, both in terms of volume and amount. This improves production efficiency by enabling the manufacturing of different products in parallel without the need for retooling.

Diagram showing each cluster on the chip containing 121 devices



Optical image showing surface structure of a single cluster



We believe that we are only beginning to realize the benefits of our semiconductor-based production process and expect that, similar to the semiconductor industry, we will be able to continuously improve our production

process over time and further our technology leadership position. By developing a semiconductor-based platform to harness the power of biology, we believe that we are promoting the digitization of biology and creating a modern production platform able to satisfy the demands of a rapidly growing industry.

Synthesis and Assembly Comparison

	96-well Plate	Microarray	TWIST BIOSCIENCE
Amount of DNA	Waste (Nano-mol)	Amplification (< Femto-mol)	No Amp, no waste (Pico-mol)
DNA processing	Pooling stoichiometrically	De-pooling	No pooling No de-pooling
Genes per 96-well	1	96	9,600*

*Full scale capacity chip shown; current chip in production has the capacity to make 6,144 genes

In addition to traditional DNA synthesis methods, some researchers are investigating possible enzymatic DNA synthesis methods that involve using an enzyme in the synthesis process to manufacture the desired DNA sequence. These methods are in early stages of research and have the potential to significantly improve the DNA synthesis process in many respects. Based on the published research on these enzymatic synthesis methods, we believe our semiconductor-based DNA synthesis platform could also be applied to these synthesis methods to address limitations on throughput, scalability and cost.

Key advantages of our proprietary DNA synthesis platform

We designed our DNA synthesis platform to address the diverse needs of our large potential customer base. Given the limitations of traditional DNA synthesis methods, buyers have historically faced trade-offs and compromises when purchasing from legacy DNA providers. We believe that DNA Buyers are looking for a product and purchasing experience that delivers on a number of key factors. We believe that our platform is uniquely designed to meet these customer needs and overcome the limitations of legacy DNA synthesis methods to support the growing demand for synthetic DNA:

	Customer desires	Twist Bioscience advantages
Quality and accuracy	<ul style="list-style-type: none"> Quality and accuracy is a basic requirement for all customers. Deviations from customer specifications can render customers' downstream uses less productive or ineffective. 	<ul style="list-style-type: none"> Synthetic DNA providers are able to supply perfect clonal DNA to the customer. However, existing DNA synthesis technologies require significant cloning and error filtration to produce perfect clonal DNA. We are able to

	Customer desires	Twist Bioscience advantages
		<p>consistently produce high quality oligos with what we believe is an industry-leading error rate of 1/1000 base pairs. This enables us to reduce the cloning and error filtration necessary to achieve perfect clonal DNA. The benefits, quality and accuracy of our platform also apply to customers who purchase other synthetic DNA based products, such as antibody libraries and oligo pools. In each of our market opportunities, we believe the precision of our technology provides the advantage of cost and production throughput.</p>
Cost	<ul style="list-style-type: none">• Cost is a critical consideration for both large and small-scale customers. Large-scale commercial DNA purchasers that outsource their DNA supply are becoming increasingly price sensitive due to their growing demand for DNA. On the other hand, smaller-scale users, particularly academic users, have always been price sensitive and typically have made their own DNA because of limited budgets relative to the prices charged by legacy DNA suppliers.	<ul style="list-style-type: none">• Because we miniaturize the chemical reaction on a silicon chip, require lower volumes of reagents and automate the production process, we are able to dramatically lower the production cost per base pair of DNA and offer our synthetic DNA at a lower price than competitors. As of September 2018, the publicly available pricing of our competitors for clonal DNA ranged from \$0.15—\$2.00 per base pair (assuming an order size of 150 base pairs). Our standard pricing for comparable DNA is \$0.09 per base pair for genes between 300 and 1,800 base pairs in length. One of the best demonstrations of our cost advantage is that we supply synthetic DNA to four other competing synthetic DNA providers.

	Customer desires	Twist Bioscience advantages
<i>Throughput / scale</i>	<ul style="list-style-type: none">As the applications for synthetic biology have expanded, customers are increasingly seeking to purchase large quantities of DNA in relatively short periods of time, which often cannot be supplied by a single synthetic DNA provider due to production capacity constraints. Ordering from multiple suppliers to fulfill large orders can be costly and administratively cumbersome for customers.	<ul style="list-style-type: none">Our silicon chip technology is able to increase DNA production by a factor of 9,600 on a footprint similar to traditional DNA synthesis methods. We currently have the capability to manufacture 20 million oligonucleotides per month that can be combined into high-precision oligo pools of various sizes. These oligonucleotides can be used to create multiple products including genes. We currently have the capacity to produce more than 45,000 genes per month, which we believe is the highest in the industry. We have agreed to supply up to approximately 1.3 billion base pairs to Ginkgo Bioworks over a period of four years, which we believe is the largest volume supply commitment in the industry to date.
<i>Turnaround time</i>	<ul style="list-style-type: none">The time between placement of the order and delivery is a key consideration for customers. For example, pharmaceutical companies are focused on shortening internal R&D timelines and ready availability of high- quality, synthetic DNA to meet their internal timelines is an important factor.	<ul style="list-style-type: none">Because our platform enables the large-scale production of DNA, our turnaround time is largely independent of order size. We have enhanced our manufacturing capabilities and expect to reduce turnaround time on large commercial quantities of genes (i.e., orders of over 15,000 genes per month) to 10 business days.
<i>Product offering / complexity</i>	<ul style="list-style-type: none">Customers require a broad range of products including different gene lengths, complicated sequences and a wide range of additional configurations to fulfill a diverse set of applications and uses.	<ul style="list-style-type: none">Because we synthesize each oligonucleotide individually, we can customize orders to almost any customer's specifications. We currently offer genes of up to 3,200 base pairs in length, which we believe satisfies a substantial portion of the market for

	Customer desires	Twist Bioscience advantages
		synthetic DNA today. For Ginkgo Bioworks, our largest customer, we offer up to 5,000 base pairs in length. We expect to offer genes of up to 10,000 base pairs in the future. Unlike traditional DNA synthesis technologies, we can also manufacture a broad range of additional products on our same DNA synthesis platform, including antibody libraries and oligo pools, among others.
<i>Reliability</i>	<ul style="list-style-type: none"> Customers value the reliability of a supplier to deliver on promises of quality and turnaround time to allow them to plan their downstream workflow and hit internal deadlines. 	<ul style="list-style-type: none"> Due to our throughput capability and proprietary integrated production and ordering process we have been able to consistently meet the specifications and turnaround time that we promise customers.
<i>E-commerce capability</i>	<ul style="list-style-type: none"> Customers, particularly smaller-scale customers, value an intuitive, seamless e-commerce experience that tracks orders from placement to delivery to simplify and automate the purchasing process. Some customers also value an application protocol interface, or an API, for electronic integration into their own procurement systems. 	<ul style="list-style-type: none"> While some synthetic DNA providers have an e-commerce platform for ordering DNA, we believe we offer the most comprehensive e-commerce platform consisting of customized quotes, automated feedback on the feasibility of the sequence and the ability to track orders from placement to delivery. An API is also a core component of our e-commerce system.

Our growth strategy

Our objective is to be the leading provider of synthetic DNA worldwide and to leverage the versatility of our platform to build a leadership position in other synthetic DNA-based product markets in which we have a competitive advantage. We intend to accomplish this objective by executing on the following:

- **Maintain and expand our position as the provider of choice for high-quality, affordable synthetic genes and DNA to customers across multiple industries:**
 - Offer an unprecedented combination of quality, cost, throughput and scalability to deliver synthetic DNA to our existing customers and win new customers
- *Increase our penetration within existing buyers of synthetic DNA, including pharmaceutical and biotechnology companies, industrial chemical companies, agricultural biotechnology companies and academic institutions*
- **Further expand our addressable market by converting current DNA Makers into DNA Buyers** by offering a compelling value proposition that saves time and money for DNA users that are currently making their own DNA
- **Broaden our reach to the more than 100,000 estimated synthetic DNA users** by scaling our multi-channel commercial strategy
- **Augment our product offering within the gene franchise to include, for example, longer genes, catalog vectors, maxiprep and products for CRISPR screens**
- *Become a leading supplier of NGS sample preparation products:*
 - Drive adoption of our NGS products by addressing the demand for better sample preparation products that improve the sequencing workflow, increase sequencing accuracy and lower sequencing costs versus other technologies; and
 - Continue to expand our software capabilities to allow customers to fully customize our NGS products to drive adoption by the broader diagnostic community.
- *Conduct antibody therapeutic discovery and optimization for our current customers and future partners:*
 - Leverage our ability to generate customized DNA libraries to reduce the time and cost necessary for lead identification and lead optimization of potential biological therapeutics for biotechnology and pharmaceutical partners;
 - Validate and partner a comprehensive antibody optimization solution with academic institutions and biotechnology and pharmaceutical companies to improve their antibody drug candidates, and discover “bio-better” antibody drugs;
 - Discover new anti-GPCR antibody candidates for target discovery, antibody candidate selection and antibody candidate optimization through adding value by partnering with biotechnology and pharmaceutical companies; and
 - We will look to initiate adding value by partnering with biotechnology and pharmaceutical companies, leveraging our proprietary DNA libraries, antibody optimization solution and anti-GPCR antibody library, which may include upfront, milestone and royalty payments to us.
- *Continue to explore development of DNA as a digital data storage medium via internal research and government and industry partnerships:*
 - Leverage existing strategic relationships and seek to develop additional relationships with leading technology companies for product development and as a potential source of non-dilutive financing for development of DNA as a data storage media; and

- Continue to develop and explore market opportunities for DNA as a very long-term storage media for market segments, including the WORN (Write Once, Read Never) and WORSE (Write Once, Read Seldom if Ever) markets.
- **Expand our global presence:**
 - Expand our operations into other large global markets in which we believe we can be competitive, including for example, Asia. We have received private funding to establish a production facility in China to manufacture DNA in China for the Asian market, with operations expected to begin in 2019.

Beyond these opportunities, we are working with industry partners to create new markets for our products by leveraging the versatility of our platform.

Our products

We have developed multiple products derived from synthetic DNA and our versatile DNA synthesis technology. Our current offering consists of four primary products that address different needs of our customers across a variety of applications: synthetic genes, oligo pools, next generation sequencing tools and DNA libraries.

Synthetic genes

Synthetic genes are manufactured strands of DNA. Customers order our synthetic genes to conduct a wide range of research, including product development for the healthcare, agricultural, and industrial chemical industries as well as a multitude of applications within academic research. Virtually all research and development requires trial and error, and our customers require many variations of genes to find the DNA sequence that achieves their objectives.

We offer two primary categories of synthetic genes: genes of perfect quality, clonal genes, in a vehicle to carry the DNA, also called a vector, and genes of near-perfect quality, non-clonal genes or fragments, that customers can place in their own vector. Within these two categories, customers can order different lengths of DNA depending on their required final gene construct. Customers can order longer genes or shorter genes and can stitch genes together to create longer or shorter constructs if desired.

Clonal genes in a Twist Bioscience or customer vector

Our premier gene synthesis offering delivers clonally perfect genes. For our clonally perfect genes, we perform the cloning on behalf of our customers and deliver DNA in either a customer-supplied vector or a Twist Bioscience vector. Customer-supplied vectors greatly simplify downstream work for our customers, allowing them to take our genes and pass them directly into their workflows. We have also developed a catalog of our own specific vectors. Currently, we manufacture genes of up to 3,200 base pairs in length, yielding a clonally perfect piece of DNA that our customers can immediately use for their research. We offer turnaround times of approximately 15 – 20 business days for clonal genes. As of the date of this prospectus, our standard pricing for clonal DNA is \$0.09 per base pair for genes between 300 and 1,800 bps in length. We intend to further expand the length of genes offered to more than 10,000 base pairs and, in parallel, expand our catalog of available vectors to increase flexibility and reduce turnaround times. We also intend to offer express service options for customers that require genes on an expedited basis.

Non-clonal genes

Non-clonal genes serve customers who prefer to conduct their own cloning protocols or that do not need, or want, to pay for perfect quality genes. We offer non-clonal genes of up to 1,800 base pairs in length, which we

believe addresses the vast majority of demand for non-clonal genes. From August 2017 through October 2017, we offered average monthly turnaround times of approximately six to 11 business days for non-clonal genes. As of the date of this prospectus, our standard pricing for non-clonal genes is \$0.07 per base pair.

Oligonucleotide (Oligo) pools

Oligo pools, or high diversity collections of oligonucleotides, are utilized in many applications, including targeted next generation sequencing, or NGS, CRISPR gene editing, mutagenesis experiments, DNA origami (the nanoscale folding of DNA to create two- and three-dimensional shapes at the nanoscale), DNA computing and data storage in DNA, among others. Our oligo pools are also used for high-throughput reporter assays that are used to study cell signaling pathways, gene regulation, and the structure of cell regulatory elements. For these applications, we provide customers with accurate and uniform synthetic oligos to precisely match their required designs.

We sell a diverse, customizable set of oligo pools, ranging from a few hundred oligos to over one million and offer oligonucleotides of up to 200 nucleotides in length and, from October 2017 through December 2017, average monthly turnaround times of five to six business days. As of the date of this prospectus, our standard pricing for oligo pools is between \$0.10 to \$1.00 per oligo depending primarily on order size. Because the ability to design oligo pools and customize their experiments is very important to our customers, we have established a co-marketing agreement with a company that specializes in developing algorithms which enable customers to design optimized and high-quality oligo pools. Integration of this design capability with our oligo pool synthesis production competency enables our customers to design and receive a high-quality oligo pool customized to meet their needs.

In the future, we expect to offer longer oligonucleotides, cloned pools, and a sub-pooling capability which will allow our customers to purchase lower complexity pools and arrayed pools.

Oligo pools for CRISPR gene editing

CRISPR is a recently discovered gene editing tool that has become an area of significant research focus, especially in drug development, and is a rapidly growing application that is contributing to growing demand for our oligo pools. In the CRISPR editing process, a short sequence of RNA called guide-RNA (gRNA) binds to its target DNA sequence in a host cell, indicating to an enzyme where to cut and edit the DNA. In order to conduct gene editing research, many single guide-RNA must be created. Researchers can use oligo pools for CRISPR gene editing to silence, through editing, DNA locations. This process creates an error at a particular location in the DNA of the cell, rendering that location unusable, in other words silenced. By studying the relationship between silenced regions and change in phenotype (did the disease get worse or better), researchers can find the genomic regions important to the disease and identify targets for therapeutics. Similar to our standard oligo pools, we offer oligo pools for CRISPR screening with a diverse and customizable set of specifications, including pool sizes ranging from a few hundred oligos to over one million. From oligo produced on a single silicon chip, researchers can edit up to 1,000,000 DNA locations. We currently offer oligo pools for CRISPR screening of up to 200 nucleotides in length, which we believe addresses the vast majority of the market for CRISPR guide library generation.

Next generation sequencing (NGS) tools

We recently expanded the application of our DNA synthesis technology to develop products targeted at the large next generation sequencing market, or NGS. In particular, we are focused on addressing the demand for better sample preparation products that improve sequencing workflow, increase sequencing accuracy, and lower sequencing costs. In the target enrichment process, the DNA probes “enrich” a DNA sample by binding to

specified segments of DNA in order to isolate and physically extract the targeted segment of DNA from the sample, prior to downstream sequencing. The targeted segment of DNA can then be copied uniformly prior to NGS analysis by our customers, yielding a larger volume of targeted segments in the sample used for sequencing. Because we are able to precisely target, extract, and uniformly amplify the target DNA segments, our solution considerably improves the accuracy of the downstream sequencing analysis. This enables our customers to perform fewer sequencing runs per sample, without sacrificing accuracy, saving them time and money.

We believe we are the only company to offer double-stranded DNA (dsDNA) probes within a comprehensive target enrichment kit used for exome and targeted sequencing. Using dsDNA as opposed to single-stranded DNA, or RNA, during next generation sequencing preparation avoids the problem of deamination (removal of an amino group). Deamination interferes with the detection of infrequent gene mutations, and may hinder genetic results and clinical diagnosis, particularly in cancer.

Our NGS products are primarily used for diagnostic testing, research for population genetics and biomarker discovery, translational research, microbiology and applied markets. Our customers are primarily diagnostic companies and hospitals, research institutions, agricultural biotechnology companies, and consumer genetics companies conducting diagnostic tests for a wide range of applications.

In addition to our DNA probes, we have created a comprehensive sample preparation kit that combines these probes for NGS target enrichment with all the reagents and consumables necessary to process a sample into sequencing-ready material. This improves the NGS library preparation workflow and is a cost-effective solution that reduces sequencing costs, improves time to results, enhances sequencing coverage, and provides quality control on every DNA probe.

We have launched a kit for sequencing of the exome, or NGS exome capture, the entire known coding region of the genome, and expect to launch a software tool to allow customers to customize their own kit, or NGS custom capture. We expect the development of this software tool, combined with our e-commerce platform, will simplify the design process for our customers and provide broader market access to our products. We currently deliver this exome kit within two to three weeks for our customers. Our NGS tools pricing is based on the numbers of reactions and pools requested by a customer.

DNA libraries

DNA libraries are collections of DNA fragments that are primarily used by pharmaceutical companies during antibody discovery and development. During the drug discovery phase, a pharmaceutical company typically has a biological target or function of interest. In order to find antibodies that best bind to that target in a specific region of a gene and deliver a therapeutic effect, it may be necessary to test many variants of an antibody. Synthetic DNA libraries become useful in this process, as they produce customized, controllable groups of antibodies from specific DNA sequences to run through assays that assess function, toxicity and binding affinity.

Traditionally, pharmaceutical companies have generated antibody libraries through a process called “random mutagenesis.” This uses a technique called polymerase chain reaction (PCR) mutagenesis, where PCR is used to introduce many sequence errors, or variations, within the copies of the antibody. While this generates many different antibody variants, the changes are entirely random and are unknown until the antibody DNA is sequenced. In addition, because of the random approach, there is no guarantee that the resulting antibodies will target the desired region of interest.

Our platform allows customers to customize every antibody variation and construct a precise library systematically to target the entire region of interest. We can create single site libraries in which we change one

single amino acid (a group of three DNA bases) within the sequence or single site saturation libraries in which we change every amino acid within the sequence for a more comprehensive approach. We can also generate combinatorial libraries in which we introduce changes to multiple sites within the same gene in specific ratios and combinations. These libraries can be used for antibody engineering, affinity maturation, and humanization, which simplifies downstream screening and identifies more lead molecules. Our libraries are explicitly developed for a specific area of the genome or tailored to a specific disease, with antibody compounds evenly represented across all areas of the genome desired. In the future, we expect to add digital library design tools to our e-commerce platform that will facilitate rapid library design.

To support our efforts to add further value for our customers and potential partners, we are in the process of creating a comprehensive antibody optimization solution to enable simultaneous optimization of multiple characteristics of a given antibody. Working with Distributed Bio, we developed custom software for the optimization of antibody hits, antibody compounds that meet pre-specified criteria for therapeutic development. We are now working to add our high throughput and hyper-variant antibody library capabilities to create a comprehensive antibody optimization solution for potential partners. We plan to use this solution to design, build and test hyper-variant, tightly controlled antibody libraries that follow the rules of the human repertoire and mitigate the pitfalls associated with traditional optimization methods. By following the rules of the human repertoire, which means including only DNA sequences known to occur in humans, these libraries will be natural in composition and are expected to generate better drug development candidates. The libraries also have a large degree of synthetic variation, enabling simultaneous optimization of several antibody characteristics and the discovery of antibodies with high affinity and specificity to drug targets.

In parallel with the development of our antibody optimization solution, we are conducting a proof-of-concept project to validate whether we are able to identify a "bio-better" (or improved) antibody of icrucumab, an anti-VEGFR1 antibody that has failed in clinical studies to show improvement in clinical outcomes. If we succeed in identifying an improved antibody of a previously unsuccessful antibody candidate as proof-of-concept, we would seek to license our design and build library capabilities to provide improved therapeutic antibodies for pharmaceutical and biotechnology partners.

Additionally, we plan to leverage our ability to rapidly generate custom libraries to discover novel therapeutic antibodies against biological targets that have traditionally been difficult for biological drug development. Specifically, through a collaboration with Distributed Bio we have developed a proprietary antibody library targeting a major class of proteins known as GPCRs. GPCRs are important receptors that control and drive the biology of nearly all disease classes, including inflammation, cancer, metabolism, respiratory, and pain. According to a recent publication in Molecular Pharmacology, approximately 700 approved therapeutics target GPCRs, representing approximately 35% of all approved drugs. However, they remain a difficult class of targets for antibody development due to the lack of exposed protein surfaces to bind. We are now validating this GPCR library of highly designed antibodies and screening it against three GPCR targets and we may partner with other technology providers to advance development of our anti-GPCR antibody discovery efforts. If we are successful in validating the utility of our DNA library synthesis capabilities to address this traditionally difficult class of antibody targets, we may also develop libraries for screening and selection of other biological therapeutic targets such as ion channels and membrane based transporters.

We believe we have several avenues available to monetize our antibody discovery program. For example, we anticipate that successful discovery of a novel therapeutic antibody against any single GPCR target would attract significant partnership interest from academic institutions as well as biotechnology and pharmaceutical companies given the difficult nature of this class of antibody targets. These partnerships may include upfront, milestone and royalty payments to us for access to our GPCR library.

End markets for Twist Bioscience products

Our current product set addresses customers across a range of major applications.

	Product offered	Healthcare	Industrial chemicals	Agriculture	Academic research
Genes	Clonal genes	X	X	X	X
	Non-clonal genes (Gene fragments)	X	X	X	X
Oligo pools	Oligonucleotide pools	X	X	X	X
	Oligo pools for CRISPR gene editing	X	X	X	X
NGS tools	NGS exome capture	X			X
	NGS custom capture	X		X	X
Libraries	Antibody and protein	X	X	X	X
	Variant libraries				

Our target markets

Our currently marketed product offering addresses a market opportunity that was approximately \$1.8 billion in calendar year 2016. We believe that current market estimates underestimate the potential for synthetic DNA because they reflect the costly, time-consuming and cumbersome nature of legacy DNA synthesis technologies. We believe our solution has the potential to materially expand our initial market by providing end users access to high-quality and lower cost tools, encouraging adoption and facilitating new applications for our products.

DNA synthesis—DNA Buyers and DNA Makers

Our core DNA synthesis market includes our synthetic DNA, oligo pools and DNA libraries. We believe that our current market opportunity for synthetic DNA was approximately \$1.3 billion in calendar year 2016. The market consists of those who buy DNA, or DNA Buyers, and those who make their own DNA, or DNA Makers. Driven by access to more affordable and high-quality synthetic DNA, we believe that there is a strong trend of DNA Makers converting to DNA Buyers.

DNA Buyers

DNA Buyers are generally commercial users in the healthcare, industrial, agricultural and academic fields who require large amounts of DNA. These customers value speed, throughput, and reliability and are increasingly price sensitive given the volume of DNA that they purchase. According to BCC Research, the size of the buyer market in 2016 was approximately \$300 million and is growing at a rate of approximately 20% annually as existing DNA Buyers develop new uses for synthetic DNA and existing DNA Makers convert to DNA Buyers.

DNA Makers

DNA Makers purchase supplies in order to make their own DNA. They typically require only a few genes at a time and are very price sensitive. While the consumables required to make DNA are relatively inexpensive, it is a time-consuming and labor-intensive task. The steps include copying and pasting each DNA sequence from one vector to another using restriction enzymes, and mutagenizing the sequence of interest to obtain the desired variant and cloning DNA. Our customers in this market segment are predominantly small-scale synthetic DNA users, which typically include emerging biopharmaceutical companies, academic institutions and research organizations. We estimate our market opportunity in the DNA Maker market to be approximately \$950 million

with estimated annual growth of approximately 10%. Our market estimate is based on the market sizes for products used in manual DNA synthesis, including the cloning and restriction digestion enzyme market in 2016, according to a report on Molecular Biology by Markets and Markets.

Cloning one gene is a cumbersome process which typically involves 11 discrete steps and generally takes around 4 - 10 business days to complete. However, most small scale researchers have historically made their own DNA due to the prohibitively high cost of purchasing synthetic DNA in small batches. Given the inefficiency of making DNA, we are increasingly seeing DNA Makers transition to DNA Buyers as we provide broader access to affordable DNA. In addition, as we increase the size of the DNA that we offer, we expect to convert certain researchers who are both DNA Buyers and DNA Makers that buy multiple genes and stitch them together for longer constructs. We also expect the implementation of our intuitive e-commerce platform to provide enhanced access to the relatively untapped market of DNA Makers.

We believe that the DNA synthesis market is in the early stages of a growth acceleration that is similar to the growth experienced by the DNA sequencing industry over the last two decades, where initial demand was severely limited by the high cost and time required to sequence genes. The Human Genome Project, which resulted in the sequencing of the full human genome in 2003, cost \$2.7 billion in government funding. At that time, the cost to sequence an entire genome was \$50 million. An enormous reduction in cost was required before human genome sequencing could realistically be used as a medical research tool. With innovation in sequencing technology, the first \$1,000 genome was achieved in 2014, and costs are significantly lower today.

As the cost of sequencing has decreased, both the size of the market and the number of applications have expanded exponentially. Over the last five years, the market size has more than doubled. DeciBio LLC estimates that by 2016 the total market for sequencing technology had grown to approximately \$2.4 billion and expects the market to continue to grow at 17% annually to approximately \$4.5 billion by 2019. We believe the synthetic DNA market is undergoing a comparable transformation.

Products for next generation sequencing applications (exome and custom capture tools)

Our NGS products target a market opportunity for NGS sample preparation that was approximately \$500 million in calendar year 2016 and growing at approximately 20% annually, according to market research provided by Kalorama Information, a division of marketresearch.com. As the cost of sequencing genes has decreased significantly, the applications of sequencing and the utilization of sequencing technology has increased rapidly. Today, sequencing is used in many fields, including the study of population genetics to discover disease specific markers and the diagnosis of patient-specific mutations. However, in many cases, the sequencing of an entire genome is undesirable and custom targeted sequencing, which focuses on specific regions of the genome, is preferable, as it results in a lower cost per sample and deeper coverage. For example, cancer samples are notoriously heterogeneous, and sequencing them multiple times to achieve the desired result, otherwise known as deep sequencing, would be too costly using whole genome sequencing. Similarly, a growing clinical application for cancer treatment called minimal residual disease analysis requires following the evolution of a few genetic locations to instruct physicians when they have successfully managed the disease and can stop therapy. In this application, and many others, it is significantly more cost-effective to use exome sequencing and custom targeted sequencing rather than whole genome sequencing.

We are focused on addressing the demand for better sample preparation products that improve the sequencing workflow, increase sequencing accuracy and lower sequencing costs. We offer kits consisting of double-stranded DNA probes and a comprehensive set of reagents that are used for exome sequencing and custom targeted sequencing.

Pharmaceutical biologics drug discovery

In the field of pharmaceutical biologics drug discovery, we believe our platform can significantly accelerate the time it takes researchers to go from target identification to an IND application. We believe the integral role of synthetic DNA in the drug discovery and development process along with our DNA synthesis platform uniquely positions us to capture a larger portion of this value chain.

In the initial stages of drug development, our oligo pools can be used to increase the probability of identifying a specific drug target. Our genes and gene fragments can be used to validate the specific function of this drug target. Our DNA libraries can be used in the drug discovery process to identify high value biological therapeutic drug leads. As a biological lead moves towards clinical development, our genes, gene fragments, and antibody libraries can again aid in the lead optimization process. In the clinic, our NGS target enrichment offering may also play a role in patient selection and stratification.

Through our partnership with Distributed Bio, we are beginning to generate proprietary content in biologics with an initial focus on G-protein-coupled receptors, or GPCRs. We also are seeking to establish partnerships to develop content related to additional target areas with other pharmaceutical companies.

Current antibody discovery and development methods rely on the creation of very large number of antibody variations (approximately $>10^{10}$) in a format that can be screened, or tested, rapidly. These libraries consist of DNA sequences expressed into proteins (antibodies) and screened for desired functions which usually requires multiple iterations of designing, constructing and testing antibodies.

Today, many of our pharmaceutical and biotechnology customers use random mutagenesis to generate diversity in their antibody libraries. Random mutagenesis has the following disadvantages:

- The random mutations created through this process may not be found in the human body and therefore may be unlikely to behave well in a clinical setting, may be immunogenic, may aggregate or not express well
- Libraries created from random mutagenesis lack synthetic control in their fabrication and therefore are incapable of enabling researchers to systematically explore changing to individual DNA bases across the DNA sequence and the impact on the antibody

In contrast to the traditional library synthesis methods described above, we are leveraging our DNA synthesis platform to precisely control the design and synthesis of the library, changing each base individually, rather than each codon (group of three bases), creating controlled, predictable library diversity. We believe this will allow researchers to explore the desired sequence variations and combinations desired to facilitate their discovery efforts more effectively.

DNA data storage R&D

Due to the explosion of data across many industries, finding efficient means of storage has become more important. Through the Semiconductor Research Corporation, many leading semiconductor companies, including Microsoft Corporation, IBM Corporation, Micron Technology, Inc., Autodesk Inc., Mentor Graphics Corporation and GlobalFoundries Inc., are exploring DNA as a data storage medium. The market for digital data storage, including solid-state disk, magnetic disk, magnetic tape and optical disc storage, is currently estimated at over \$35 billion.

While DNA is currently too expensive for routine storage, we believe that our modern, silicon-based process to synthesize DNA has the potential to make DNA cost-competitive with additional research and development efforts. If the cost of writing and reading data in DNA becomes equivalent to or lower than magnetic tape, we believe DNA will have the advantage in serving several data storage markets, including the storage of deeply cold data, in particular the WORN (Write Once, Read Never) and WORSE (Write Once, Read Seldom if Ever)

markets, and the market for digital preservation where latency and the cost of reading the data are minor considerations. Typical end-markets for these storage applications include the media and entertainment industries, healthcare/pharmaceutical record storage, cultural/heritage organizations, scientific data records storage, intelligence/defense information, and libraries/museum collections.

Through our relationship with Microsoft Corporation and the University of Washington, we have demonstrated the feasibility of storing data on DNA and the unique benefits of longevity, density, and universality of this format. We believe that over time our technology will develop to allow data storage in DNA to become cost competitive with traditional data storage media, which is necessary to enable us to target several large markets within data storage.

In order to reduce the cost of synthesizing DNA, we are focused on innovating our proprietary platform to synthesize DNA at an even higher throughput, moving from a platform capable of storing megabytes of data to a platform capable of storing terabytes of data. Taking into account trends and internal projections for the cost of synthesizing oligo pools, sequencing price, hard drive price and tape price, we believe new DNA technologies and cost efficiencies could surpass mature information technology hardware solutions in three to five years. We are employing advanced techniques from the semiconductor industry to further miniaturize the chemistry and fluid movement to pursue this opportunity.

Complementing the reduction in cost for making DNA, we are also developing a system to manage the data flow; that is, from binary data to DNA and back to binary data. The equivalent of a computer operating system, it will be responsible for accessing a digital data file of 0s and 1s, applying an encoding scheme to convert the digital data into DNA sequences for synthesis and storage, and, after the stored DNA is sequenced, applying a decoding scheme to retrieve the original digital data file.

Commercial strategy, sales and distribution

We have built a scalable commercial platform with a multi-channel strategy designed to address a diverse customer base consisting of an estimated more than 100,000 synthetic DNA users today. This platform is comprised of a direct sales force and an e-commerce platform.

Our sales force is focused on customer acquisition, support, and management and is highly trained on both the technical aspects of our platform and how synthetic DNA is used in a wide range of industries. Their goal is to articulate our value proposition, drive pilot programs and increase the adoption of our product offerings while maintaining close working relationships with customers.

In January 2018, we launched our multi-channel commercial strategy through our proprietary, innovative, and easy-to-use e-commerce platform to current customers. Based on initial usage data, we believe that this e-commerce platform will enhance the productivity of our sales force and expand our customer reach by allowing customers to design, validate, and place on-demand orders of customized DNA online. We have built our e-commerce platform to allow our customers to receive real-time customized quotes for their sequence as well as track their order status through the manufacturing and delivery process, providing them improved flexibility to plan their budgets and internal timelines. This platform is a critical part of our strategy to address our potential large and diverse customer base, as well as drive commercial productivity, enhance the customer experience and promote loyalty.

We target customers of our NGS products through a direct sales team focused on the NGS tools market and which is separate from our synthetic DNA sales force. We launched early commercial access for our NGS sample preparation tools to select customers in August 2017. Our direct NGS sales representatives are focused on supporting our early adopters and providing a high level of service in order to familiarize customers with our

[Table of Contents](#)

product offering. In the first half of fiscal year 2019, we plan to initiate a full commercial launch for NGS customers including a specific application of our e-commerce platform for customized NGS sample preparation kits in order to drive adoption by the broader diagnostic community.

For our antibody discovery efforts, under the guidance of two experienced executives, we are building a team of scientists to conduct library screening and optimization services. We intend to leverage our DNA synthesis platform to create antibody libraries for these purposes, and initiate partnering activities initially for enabling technology. Subsequently, we intend to establish partnerships with biotechnology and pharmaceutical companies to identify and/or optimize novel antibody candidates.

We believe that the market for storing digital data on DNA will be one that evolves based on the unique features (durability, small size, readability and low energy maintenance requirements) of DNA, similar to the way flash memory created its own market segment. Initially, we intend to pursue items of significance including cultural heritage projects (i.e. Montreux Jazz Festival archives) as well as government needs. We intend to pursue very long-term storage opportunities for both of these market segments initially - the WORN and WORSE data - and then expand into shorter term projects as the technology and market demands.

Our customers

Our products serve the needs of customers across multiple growing end markets. We categorize our customers as follows:

- **Healthcare** companies include pharmaceutical, biotechnology and diagnostics companies that utilize synthetic biology in target discovery, target validation, drug discovery, drug development, manufacturing, clinical trial stratification, DNA sequencing and diagnostics.
- **Industrial Chemical** companies that apply synthetic biology to increase the use of cost-effective and sustainable, specialty chemicals and raw materials, as well as new protein-based and protein-inspired chemicals and materials that are inaccessible through traditional industrial organic chemistry.
- **Agriculture** customers include companies that apply synthetic biology to improve crop traits, increase resistance to existing and emerging diseases, increase resistance to extremes of weather and replace oil and natural gas-derived fertilizer with synergistic bacteria, leading to better food security and nutrition.
- **Academic Research** customers include institutions that perform research across a wide range of applications, both basic and applied. For purposes of financial reports, we consider the customers we are working with to develop long-term data storage applications using DNA as part of this category.

For the year ended September 30, 2017, the composition of our revenue by customer type was as follows: healthcare revenue of \$1.2 million, industrial chemicals revenue of \$6.7 million, agriculture revenue of \$0.1 million and academic research revenue of \$2.7 million.

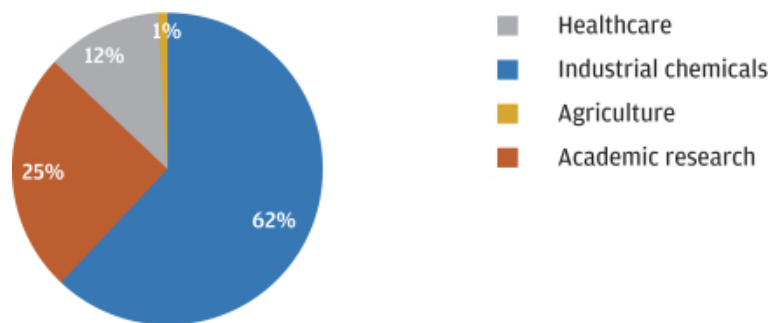
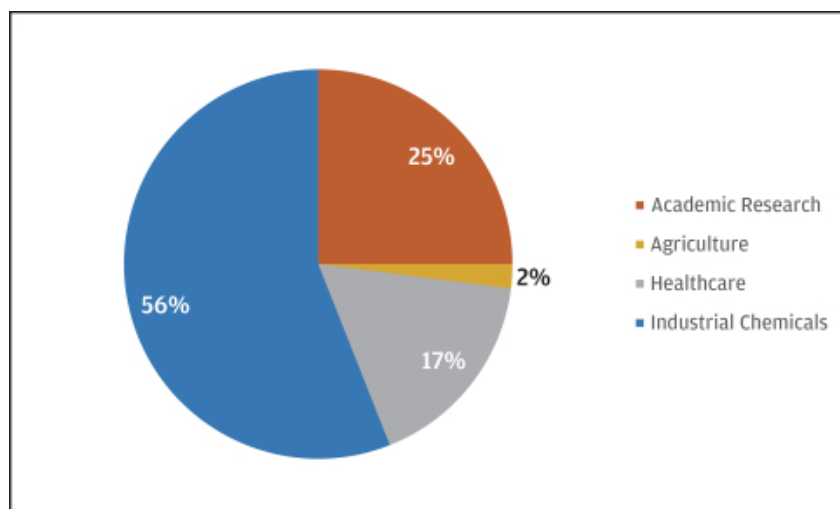


Table of Contents

In addition, for the nine months ended June 30, 2018, the composition of our revenue by customer type was as follows: healthcare revenue of \$2.9 million, industrial chemicals revenue of \$9.5 million, agriculture revenue of \$0.4 million and academic research revenue of \$4.2 million.



The benefits and versatility of our platform are exemplified by our expanding relationships with various partners across a variety of customers and end markets, for example:

Ginkgo Bioworks

We believe Ginkgo Bioworks is the largest purchaser of synthetic DNA globally. Ginkgo Bioworks, the organism company, is bringing biotechnology to consumer goods markets, enabling fragrance, cosmetic, nutrition, food, agriculture and pharmaceuticals to make better products. Ginkgo Bioworks also recently partnered with Bayer to form a new company focused on sustainable agriculture. We began working with Ginkgo Bioworks as one of our initial commercial customers in 2015. In March 2016, we signed an agreement with Ginkgo Bioworks to supply up to 100 million base pairs of DNA, which we believe accounted for approximately 10% of the total synthetic DNA market at the time. In March 2018, we signed a new agreement with Ginkgo Bioworks to supply to Ginkgo Bioworks up to approximately 1.3 billion base pairs over a period of four years, which we believe is the largest volume supply commitment in the industry. This new agreement can only be terminated unilaterally by Ginkgo Bioworks if we undergo a change of control with certain specified parties or commit a material breach of the new agreement. This new agreement may be terminated unilaterally by us if Ginkgo Bioworks fails to place orders for more than a certain percentage of specified quarterly minimums for two consecutive quarters or commits a material breach.

Top 3 pharmaceutical company

For the last two years we have been working closely with one of the top three pharmaceutical companies by revenue, generating bespoke synthetic antibody libraries with ratio controlled amino acid representation at defined positions. Workflow optimization has enabled us to bring the turn-around time for library delivery down to four weeks with no compromise on quality. Outsourcing to us has freed up valuable researcher time for the pharmaceutical company's collaborators, enabling downstream assay development to occur in parallel to library synthesis. In addition, our platform has allowed this company to avoid library enrichment with carry over parental template during the selection process, which can present an issue with more traditional methods of primer-based amplification and assembly.

Syngenta AG

In 2016, Syngenta AG, or Syngenta, a leading agricultural technology company, placed an order to purchase both genes and libraries for research into pesticide resistance. We have been able to offer these genes and libraries at very competitive prices while maintaining high-quality standards that allow Syngenta to improve their research and development process. Syngenta has continued to increase the volume and diversity of products they order from us, consistent with our increase in capabilities.

Case studies demonstrating conversion of makers to buyers

Centre for the Commercialization of Antibodies and Biologics

Since August 2016, we have been working with the Centre for the Commercialization of Antibodies and Biologics (CCAB), which is taking promising therapeutic compounds and providing initial validation and scale-up services for these molecules prior to licensing them to biotechnology companies. CCAB was attracted to us because of our low price for their genes of interest and our ability to supply these genes in CCAB's own vector systems. Importantly, CCAB decided not to hire additional staff for cloning, given their satisfaction with our products, which allowed them to focus staffing resources on other aspects of development within their lab. Given their positive experience, CCAB has continued to expand their business with us and has referred other Toronto academic laboratories to us.

Antibody drug development company

We are working with an antibody drug development company that develops fully human antibody drugs, who uses our synthetic genes for some of its antibody discovery and development. They find that they are able to make better therapeutics using a targeted synthetic approach and have switched to buying synthetic DNA from us. They continue to order larger quantities of our DNA over time.

Competition

Our markets are characterized by significant technological changes, frequent new product introductions and enhancements, and evolving customer demands. We face competition from a broad range of providers of core synthetic biology products such as GenScript Biotech Corporation, GENEWIZ, Inc., Integrated DNA Technologies, Inc., DNA 2.0 Inc. d/b/a ATUM, GeneArt (owned by Thermo Fisher Scientific Inc.), Eurofins Genomics LLC, Sigma-Aldrich Corporation (an indirect wholly owned subsidiary of Merck & Company, Inc.), Promega Corporation, OriGene Technologies, Inc., Blue Heron Biotech, LLC and others. Additionally, we compete with both large and emerging providers in the life sciences tools and diagnostics industries focused on sample preparation for next generation sequencing such as Thermo Fisher Scientific Inc., Illumina, Inc., Integrated DNA Technologies, Inc., Agilent and Roche NimbleGen, Inc. In the antibody discovery market, we compete with clinical research organizations, such as LakePharma, Inc. (mouse hybridoma, llama immune libraries, XOMA phage display library) and Aldevron, LLC (genetic mouse immunization coupled with hybridoma), and antibody discovery biotechnology companies, such as Lontas Ltd (human phage display libraries, human phage display library focused on ion channels), Adimab, LLC (human synthetic yeast display libraries), and Distributed Bio (human synthetic phage display library, lead optimization libraries). In the field of DNA digital data storage, we compete with Catalog Technologies, Inc., ETH Zurich, Helixworks Technologies Limited, Iridia, Inc., North Shore Bio and Roswell Biotechnologies. Many of our competitors have greater financial, technical, research and/or other resources than we do. They may also have larger and more established manufacturing capabilities and marketing, sales, and support functions. The competition is intense within this market and we believe that the principal defining factors driving competition in our market will continue to be quality, cost, throughput and scalability, turnaround time, product offering and complexity, reliability, e-commerce capabilities, customer satisfaction and convenience.

[Table of Contents](#)

We believe that we compete favorably against our competitors based on our proprietary, integrated DNA synthesis platform, which enables us to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost as compared to our competitors.

In order for us to successfully compete against others in our industry, we will need to continue to demonstrate that our products deliver superior performance and value as a result of these key differentiators, and continue to expand the breadth and depth of current and future products and applications.

We also believe that as a large-scale participant in the industry, we have gained experience and brand recognition across the sectors in which we operate, and have achieved a competitive advantage over existing market participants and new entrants. These advantages include:

- *Substantial capital investment*—As of August 31, 2018, we had raised a total of \$291.5 million in gross proceeds from the sale of equity securities and we have in turn made substantial capital investments in our disruptive DNA synthesis platform. We believe we are the first and only company to harness the highly scalable production and processing infrastructure of the semiconductor industry to industrialize the production of a wide range of synthetic DNA-based products, we believe we are significantly ahead of current and future competitors.
- *Economies of scale*—Customers are usually price sensitive and economies of scale allow providers to reduce production costs which result in lower pricing for customers. When more genes are produced on a larger scale yet with fewer input costs, as we are able to do with our DNA synthesis technology, economies of scale are achieved.
- *Accumulated technical know-how and operational expertise*—The synthetic biology industry is characterized by rapid and significant changes in technologies and requires precision, years of accumulated technical know-how and operational expertise. Our senior executive team has an average of over 25 years of experience across the synthetic biology, semiconductor, software and pharmaceutical industries.
- *Biotechnology expertise and research and development talent*—Because the synthetic biology industry requires continuous innovation to keep up with emerging new technologies, the productivity and success of providers' research and development is highly dependent on the quality and quantity of the employees and consultants recruited and the ability of executive management.
- *Strong brand and market recognition*—Customers generally select well-recognized providers with proven technology for large-scale and technically-demanding projects.
- *Customer experience*—Customers value an intuitive, seamless e-commerce experience to simplify and automate the purchase process as well as electronic integration to their own procurement systems. Customers also value quality customer service which we believe we satisfy with our multi-channel commercial approach and direct sales force.
- *Patents*—We have developed a comprehensive portfolio of issued patents and patent applications that cover our commercial products and technologies in development. Our patent strategy includes each aspect of our technology, from hardware to e-commerce to DNA storage, in order to create robust intellectual property barriers to entry for competitors.

Suppliers

We procure the raw materials we utilize in our production process from a number of different suppliers. Although most of the raw materials required for our business are typically readily available, we rely on one single source supplier for a critical component of our production process.

Pursuant to a supply agreement, FUJIFILM Dimatix, Inc., or FUJIFILM, is our single source supplier, for specialized print heads and related jetting assemblies which we use as part of our DNA synthesis platform. The FUJIFILM supply agreement has an effective date of November 5, 2015 for a term of 10 years, which term will thereafter be automatically extended by one year on each anniversary of the effective date unless either party notifies the other party 90 days prior to the anniversary that the agreement will terminate on the last day of the then current renewal period. The materials obtained pursuant to the agreement are obtained on a purchase order basis, and the agreement has no minimum requirements on either side, although we provide FUJIFILM six-month rolling forecasts detailing our expected product requirements. As of May 31, 2018, we had a reserve of FUJIFILM products which we estimate should last us approximately two years at our current usage rate. We estimate that it would take us approximately nine months to locate and validate an alternative supplier of the products we currently purchase from FUJIFILM.

We do not have long-term supply agreements with most of our suppliers but secure our raw materials on a purchase order basis. Because most of the raw materials used in our business are readily available in the market from many suppliers, we believe that we can within a reasonable period of time make satisfactory alternative arrangements in the event of an interruption of supply from any vendor.

We procure various raw materials such as reagents, plastic lab ware, and spare parts for use in our DNA synthesis process and we use reagents, plastic lab ware, and packaging in our gene production service.

For fiscal 2016 and fiscal 2017, our cost of raw materials accounted for approximately 27% and 30%, respectively, of the total cost of sales. For the nine months ended June 30, 2018, the costs of our raw materials accounted for approximately 30% of the total costs of sales.

Our procurement department manages our raw materials inventory levels by monitoring our sales orders, production and manufacturing output, purchase orders and e-commerce requests. We typically advise our suppliers of our needs one to three months in advance and we procure raw materials on a monthly basis while maintaining one to two months' worth of inventory. We procure raw materials for our customized services and products on an as-needed basis.

We select our suppliers based on the following: technology, quality, delivery, cost, and service. Performance of raw materials from suppliers is monitored at least every six months using data from incoming inspection, non-conformance reports, service reports, on-time delivery reports and customer complaints. Any quality or performance issues are addressed via a quality management conference call or an on-site supplier audit.

We pay for our purchases in cash or on credit and in some cases, we prepay for our purchases. Credit terms with our suppliers range between 30 and 90 days.

Manufacturing

Our manufacturing facilities are located at our headquarters in San Francisco and in South San Francisco, California. We currently manufacture all of our products and multiple sub-assemblies at these facilities. As of June 30, 2018, we had 88 full-time employees dedicated to manufacturing our synthetic genes, oligo pools, NGS tools, and DNA libraries.

All of our products originate from synthetic DNA obtained from nanostructured clusters fabricated on our proprietary silicon technology platform. As of July 31, 2018, we have the capacity to synthesize oligos on more than 184,000 nanostructured clusters per month, which corresponds to approximately 230,000 96-well plates on the legacy equipment used by our competitors. Our DNA synthesis process has been meticulously fine-tuned to yield high-quality DNA. In July 2018, we had an average error rate, of one error per 1,000 DNA bps, which we believe is a significantly lower rate than our competitors.

We have also built a large-scale parallel process that transforms nanostructured clusters into synthetic genes (clonal and non-clonal) using a mix of proprietary and over-the counter-laboratory equipment. Synthetic genes are an on-demand product for which customers increasingly demand fast turnaround time. We have enhanced our manufacturing capabilities and we expect to reduce turnaround time on large commercial quantities of genes (i.e., orders of over 15,000 per month) to 10 business days.

Due to its on-demand nature, the gene synthesis business requires manufacturing operations to be in operation 24 hours a day, seven days a week, 365 days per year. For synthetic genes, we have built a highly scalable gene production process with what we believe is industry-leading capacity of more than 45,000 genes per month to address the growing demand of scalable, high-quality, affordable synthetic genes. In July 2018, we only utilized approximately a third of this production capacity for synthetic genes and oligos.

In addition to synthetic genes, we are combining nanostructured clusters into oligo pools. If our production was dedicated entirely to the oligos, we currently have the capacity to produce more than 20 million high-quality oligos per month that can be combined into high-precision oligo pools of various sizes. The pooling process has been fully automated through a mixture of custom proprietary and over-the-counter liquid handling equipment. We are currently only utilizing approximately a third of this production capacity for synthetic genes and oligos. We intend to increase our shipments to leverage our production capacity through our e-commerce platform, which we believe will expand both our market opportunity and our customer base.

The manufacturing process for our NGS tools is highly flexible and scalable and requires minimal fixed costs and direct labor given the efficiency of our production capability. We have automated the entire workflow using proprietary and over-the-counter laboratory equipment. We have built dedicated production capabilities for our NGS products, which began operation in October 2017. We plan to have the full NGS workflow International Organization for Standardization 13,485 certified in 2018 to comply with diagnostic industry regulatory requirements.

Over time, to further improve our production process, we intend to outsource various sub-assemblies to third-party manufacturers.

Research and development

As of June 30, 2018, we had 56 full-time employees dedicated to research and development. Of these employees, 26 hold advanced degrees in engineering and biology or other sciences, including either a Ph.D. or master's degree. We incurred expenses of \$19.2 million expenses for the year ended September 30, 2017 on research and development activities. Our primary research and development operations are located in leased laboratory facilities in San Francisco and South San Francisco, California.

Intellectual property

Our core technology originated as a collaboration between two of our co-founders, Bill Banyai, Ph.D., and Bill Peck, Ph.D., based on the idea that the synthetic DNA market could be revolutionized through a new oligonucleotide synthesis and gene assembly technology. Applying their engineering expertise, Drs. Banyai and Peck conceived—and later refined through collaboration with several of our other accomplished researchers and engineers—innovative silicon-structure based technologies and other innovations for synthesizing nucleic acids that allowed for the manufacture of DNA at greater yields than existing technology allowed.

Our patent strategy is to seek broad patent protection on new developments in nucleic acid synthesis technology and then later file patent applications covering new implementations of the technology and downstream applications utilizing the technology. As part of our strategy, we include each aspect of our technology, from hardware to e-commerce to DNA storage, in order to create robust intellectual property barriers to entry for competitors. As these technologies are implemented, we file new patent applications

covering scientific methodology enabled by our technology. Additionally, where appropriate, we file new patent applications covering instrumentation and software that are used in conjunction with our systems for oligo synthesis and gene assembly.

We have developed our own comprehensive portfolio of issued patents and patent applications that cover each step of our commercial products and technologies in development. For example, in part because of our pioneering development efforts in the field of nucleic acid libraries, we have six issued patents and many patent applications pending relating to different aspects of our technology including our devices, our low error rate for oligo synthesis, our large, accurate nucleic acid libraries and their synthesis. We have additional patent filings directed to nucleic acid design and ordering, devices for low error rate nucleic acid synthesis, nucleic acid based data storage, and diversified biologics encoding libraries.

As of June 30, 2018, we own nine issued U.S. patents and two issued international patents in China. We have 81 pending patent applications, including 39 in the United States, 31 international applications and 11 applications filed under the Patent Cooperation Treaty. The U.S. issued patents expire between 2034 and 2036. The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the date of filing the non-provisional application or PCT application. In the United States, a patent's term may be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the USPTO in granting a patent, or may be shortened if a patent is terminally disclaimed over an earlier-expiring patent.

The patent positions of companies like ours are generally uncertain and involve complex legal and factual questions. Our patents may not enable us to obtain or keep any competitive advantage. Our pending U.S. and foreign patent applications may not issue as patents or may not issue in a form that will be advantageous to us. Any patents we have obtained or do obtain may be challenged by re-examination, opposition or other administrative proceeding, or may be challenged in litigation, and such challenges could result in a determination that the patent is invalid. In addition, competitors may be able to design alternative methods or devices that avoid infringement of our patents. To the extent our intellectual property protection offers inadequate protection, or is found to be invalid, we are exposed to a greater risk of direct competition. If our intellectual property does not provide adequate protection against our competitors' products, our competitive position could be adversely affected, as could our business. Both the patent application process and the process of managing patent disputes can be time consuming and expensive. Furthermore, the laws of some foreign countries may not protect our intellectual property rights to the same extent as do the laws of the United States.

In addition to pursuing patents on our technology, we have taken steps to protect our intellectual property and proprietary technology by entering into confidentiality agreements and intellectual property assignment agreements with our employees, consultants, corporate partners and, when needed, our advisors. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure. Monitoring unauthorized disclosure is difficult, and we do not know whether the steps we have taken to prevent such disclosure are, or will be, adequate.

Legal proceedings

On February 3, 2016 Agilent filed a lawsuit against us and our Chief Executive Officer, Ms. Emily Leproust, in the Superior Court of California, Santa Clara County, or the Court. The complaint also names Does 1 through 20, which are fictitious placeholder defendants. As discussed below in more detail, Agilent has filed a motion for leave to amend its complaint, including to add two individuals as defendants, and Agilent may seek to amend its complaint to name additional defendants in the future.

Agilent's complaint alleges three claims: (1) alleged breach of contract, related to the use of confidential information and alleged breach of non-solicitation obligations against Ms. Leproust; (2) alleged breach of a duty of loyalty against Ms. Leproust; and (3) alleged misappropriation of trade secrets under the California Uniform Trade Secrets Act, or CUTSA, against all defendants.

Agilent's specific allegations against Twist and Ms. Leproust are set forth in its first amended complaint, which was filed on October 31, 2016. With regard to the misappropriation claim, Agilent alleges, among other things, that Twist and Ms. Leproust misappropriated trade secrets relating to Agilent's oligonucleotide synthesis technology and used those secrets to develop Twist's technology and identify personnel to hire from Agilent. With regard to the breach of loyalty claim, Agilent alleges, among other things, that Ms. Leproust improperly withheld strategic business and technological plans from Agilent and diverted those plans to Twist instead. With regard to the breach of contract claim, Agilent alleges, among other things, that Ms. Leproust violated her contractual obligations under her employment agreement with Agilent, including by failing to disclose the aforementioned plans and by soliciting one or more Agilent employees to terminate their employment within two years of her resignation.

Agilent's requested relief in its amended complaint includes: compensatory damages; injunctive relief; punitive and/or statutory exemplary damages; a constructive trust upon allegedly misappropriated assets and gains derived from alleged breaches of agreements; and its attorneys' fees and costs. Defendants have responded to Agilent's allegations and asserted numerous affirmative defenses in their answer, filed January 30, 2017, and furthermore deny Agilent's claims have merit or entitle it to any relief. On August 22, 2018, Agilent filed a motion for leave to amend its complaint, including to add two individuals as defendants. On September 12, 2018, Agilent filed a supplemental declaration in support of its motion to amend, which attached a new, proposed Second Amended Complaint that revised certain allegations in paragraph 2 of the document. The motion for leave will be heard by the Court on December 7, 2018 and until then the First Amended Complaint remains operative.

We and Ms. Leproust currently believe that we have substantial and meritorious defenses to Agilent's claims and intend to vigorously defend our position, including through the trial and appellate stages if necessary. The outcome of any litigation, however, is inherently uncertain and there can be no assurance that the outcome of the case or the costs of litigation, regardless of outcome, will not have a material adverse effect on our business.

We may also be subject to various other legal proceedings and claims arising in the ordinary course of business. Although occasional adverse decisions or settlements may occur, management believes that the final disposition of such matters will not have a material adverse effect on our business, financial position, results of operations or cash flows.

Government regulation

The synthetic biology industry and our current product portfolio is largely unregulated by governmental bodies such as the FDA. Our products are also not intended to be components or incorporated into our customers' products. Rather, our synthetic DNA products enable our customers to develop a wide spectrum of commercial products, some of which may require governmental approval. If a customer's product requires governmental approval, as would be the case with the development of medical diagnostics and therapeutic drugs, it is the customer who seeks and obtains the required governmental approval to commercialize those products. However, in the future we may be subject to a variety of specialized regulatory requirements, including potential regulation by the FDA, any of which could have a material effect on the business.

"Research Use Only" is a term limited to our target enrichment products for the next-generation sequencing market, and is specifically applied only to kits sold to this market segment, and is intended to restrict use of the kits to non-in vitro diagnostic purposes. The RUO label is not affixed to any other products. Our NGS target

enrichment and library preparation products are used in a more comprehensive workflow for next generation sequencing. It is this larger workflow that can become an in vitro diagnostic, after undergoing the appropriate regulatory processes. As noted above, our NGS products target a market opportunity for NGS sample preparation that was approximately \$500 million in calendar year 2016 and growing at approximately 20% annually, according to market research provided by Kalorama Information, a division of marketresearch.com. This market estimate represents the NGS target enrichment products which are limited solely to the RUO component of target enrichment and library preparation and does not include the full in vitro diagnostic workflow.

While most of the current laws and regulations concerning synthetic biology relate to the end products produced using synthetic biology, this may change. For example, in December 2010, the Presidential Commission for the Study of Bioethical Issues recommended that the federal government oversee, but not regulate, synthetic biology research. The Presidential Commission also recommended that the federal government lead an ongoing review of developments in the synthetic biology field and that the federal government conduct a reasonable risk assessment before the field release of synthetic organisms.

While we and our subsidiaries maintain regulatory compliance practices, we rely on our customers' compliance with laws and regulations applicable to the products they produce. We do not independently monitor whether our customers comply with applicable laws and regulations.

FDA. Pursuant to its authority under the Federal Food, Drug, and Cosmetic Act, or the FDC Act, the FDA has jurisdiction over medical devices. The FDA regulates, among other things, the research, testing, manufacturing, safety, labeling, storage, recordkeeping, premarket clearance or approval, marketing and promotion and sales and distribution of medical devices in the United States to ensure that medical products distributed domestically are safe and effective for their intended uses. In addition, the FDA regulates the import and export of medical devices.

The FDC Act classifies medical devices into one of three categories based on the risks associated with the device and the level of control necessary to provide reasonable assurance of safety and effectiveness. Devices deemed by the FDA to pose the greatest risk, such as life-sustaining, life-supporting or implantable devices, or devices deemed not substantially equivalent to a previously 510(k) cleared device are categorized as Class III. These devices typically require submission and approval of a Premarket Approval Application, or PMA. Devices deemed to pose lower risk are categorized as either Class I or II. Class II classification usually requires the manufacturer to submit to the FDA a premarket notification submission requesting clearance of the device for commercial distribution in the United States pursuant to Section 510(k) of the FDC Act, referred to as 510(k) clearance. Most Class I devices are exempt from this requirement, as are some lower risk Class II devices. When a 510(k) is required, the manufacturer must submit to the FDA a premarket notification submission demonstrating that the device is "substantially equivalent" to: (i) a device that was legally marketed prior to May 28, 1976, for which PMA approval is not required, (ii) a legally marketed device that has been reclassified from Class III to Class II or Class I, or (iii) another legally marketed, similar device that has been cleared through the 510(k) process.

In vitro diagnostics, or IVDs, are a category of medical devices that include reagents, instruments, and systems intended for use in diagnosis of disease or other conditions, including a determination of the state of health, in order to cure, mitigate, treat, or prevent disease or its sequelae. IVDs are intended for use in the collection, preparation, and examination of specimens taken from the human body. A research use only, or RUO, IVD product is an IVD product that is in the laboratory research phase of development. As such, an RUO IVD is not intended for use in clinical investigations or in clinical practice. Such RUO products do not require premarket clearance or approval from the FDA, provided that they be labeled "For Research Use Only. Not for use in diagnostic procedures" pursuant to FDA regulations.

As presently contemplated, none of our IVD products are intended for clinical or diagnostic use, and we market them to academic institutions, life sciences and clinical research laboratories that conduct research, and

[Table of Contents](#)

biopharmaceutical and biotechnology companies for non-diagnostic and non-clinical purposes. Our current IVD products are marketed and labeled as RUO, and are provided to our customers solely for their internal research use. Accordingly, we believe that our current IVD products are subject only to limited regulation with respect to labeling by the FDA, and we have not sought clearance or approval from the FDA to market our products.

In November 2013, the FDA issued final guidance indicating that merely including the RUO labeling statement will not necessarily render the device exempt from FDA premarket clearance, approval, or other regulatory requirements if the totality of circumstances surrounding the distribution of the product indicate that the manufacturer intended its IVDs for diagnostic use. Such circumstances may include, but are not limited to, the product's advertising, labeling, or promotion, or the manufacturer's assistance of a clinical laboratory in validating or verifying a test that incorporates products labeled RUO. We do not believe any of these circumstances apply to our current product portfolio.

While we believe that none of our current IVD products require FDA approval or clearance, we may in the future develop and commercialize a subset of our products or related applications that could become subject to additional regulation by the FDA. If we market our products for use in performing clinical diagnostics, thus subjecting them to additional regulation by the FDA, including premarket and post market control as medical devices, we would be required to obtain either prior 510(k) clearance or prior pre-market approval from the FDA before commercializing the product, unless an exemption applies.

International sales of medical devices are subject to foreign government regulations, which vary substantially from country to country. Outside of the European Union, or EU, regulatory approval needs to be sought on a country-by-country basis in order to market medical devices.

FSAP. The federal Centers for Disease Control and Prevention and the Animal and Plant Health Inspection Service administer requirements of the Federal Select Agent Program, or FSAP. FSAP requirements govern possession, use, and transfer of biological select agents and toxins that have the potential to pose a severe threat to public, animal or plant health or to animal or plant products. It is our policy generally not to produce or otherwise work with material that is subject to FSAP requirements.

Export controls. International shipments of DNA sequences that we produce are potentially licensable under export controls, although in our experience so far exports of DNA sequences that we have produced have not required licenses.

Given the evolving nature of our industry, legislative bodies or regulatory authorities may adopt additional regulation or expand existing regulation to include our service. Changes to the current regulatory framework, including the imposition of additional or new regulations, could arise at any time, and we may be unable to obtain or maintain comparable regulatory approval or clearance of our service, if required. These regulations and restrictions may materially and adversely affect our business, financial condition, and results of operations.

Facilities

Our principal executive offices are located in San Francisco, California, where we lease approximately 13,000 square feet under a lease that expires in September 30, 2019. We believe that our facilities are sufficient to meet our current needs and that suitable additional space will be available as and when needed.

Our team

As of June 30, 2018, we had 221 full-time employees and a team of 14 dedicated commercial consultants across the European Union and United Kingdom and five dedicated commercial consultants across Asia. Of these full-time employees, 56 full-time employees are engaged in research and development activities. None of our employees is represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

Management

Executive officers and directors

The names and ages of our executive officers and directors as of October 16, 2018, are as follows:

Name	Age	Position(s)
Executive officers:		
Emily M. Leproust	45	President and Chief Executive Officer and Director
William Banyai	63	Chief Operating Officer and Director
James M. Thorburn	62	Chief Financial Officer
Mark Daniels	56	General Counsel, Secretary and Chief Ethics and Compliance Officer
Paula Green	51	Vice President of Human Resources
Patrick Finn	47	Vice President of Sales and Marketing
Patrick Weiss	48	Vice President of Operations
Bill Peck	58	Chief Technology Officer
Non-Employee directors:		
Robert Chess	61	Director
Paul A. Conley	50	Director
Keith Crandell	58	Director
Fredrick Craves	73	Director
Jan Johannessen	62	Director
Xiaoying Mai	30	Director
Robert Ragusa	59	Director

(1) Member of audit committee

(2) Member of compensation committee

(3) Member of nominating and corporate governance committee

Executive officers

Emily M. Leproust, Ph.D. has served as our President and Chief Executive Officer and as a member of our board of directors since April 2013, and she was appointed as Chair of our board of directors effective as of the effective time of this registration statement. Prior to co-founding Twist Bioscience, Ms. Leproust served in various positions at Agilent most recently as its Director, Applications and Chemistry R&D from February 2009 to April 2013. Ms. Leproust holds a M.Sc. in Industrial Chemistry from the Lyon School of Industrial Chemistry and a Ph.D. in Organic Chemistry from the University of Houston. Our board of directors believes that Ms. Leproust is qualified to serve as a director because of her operational and historical expertise gained from serving as our President and Chief Executive Officer, and her extensive professional and educational experience in the biotechnology industry.

William Banyai, Ph.D. has served as our Chief Operating Officer and as a member of our board of directors since February 2013. Prior to co-founding Twist Bioscience, from April 2006 to March 2013, Mr. Banyai was the Vice

[Table of Contents](#)

President of Hardware Engineering at Complete Genomics Inc., a life sciences company that developed and commercialized a platform for sequencing and analyzing human genomes. Mr. Banyai was also previously a director at Glimmerglass Networks, a supplier of SDN enabled Intelligent Optical Switching and Optical Network Management solutions. Mr. Banyai holds a B.S. in Physics and an M.S. in Electrical Science from the University of Michigan, an Engineer of Electrical Engineering degree from the University of Southern California and a Ph.D. in Optical Science from the University of Arizona. Our board of directors believes that Mr. Banyai's experience as our Chief Operating Officer and extensive executive and professional experience in the biotechnology industry, as well as his previous director experience and expertise in corporate governance, qualify him to serve as a director.

Mark Daniels has served as our General Counsel since August 2016, as our Chief Ethics and Compliance Officer since May 1, 2017 and as our Secretary since September 2018. Prior to joining us, from January 2013 to May 2016, Mr. Daniels was at Broadcom Corporation, a semiconductor manufacturer and producer of wireless and broadband products, where his most recent position was Vice President, Law and Deputy Chief Corporate Compliance Officer. Before that, he spent 20 years in positions of increasing responsibility in the legal department at Amgen, Inc., a producer of biopharmaceuticals, where his last role was Vice President and Associate General Counsel. Mr. Daniels received his B.S. with honors in Industrial and Labor Relations from Cornell University and a J.D., cum laude, from Harvard Law School.

Patrick Finn, Ph.D. has served as our Vice President of Sales and Marketing since March 2015. Prior to joining us, Mr. Finn was Vice President of Sales at Enzymatics Inc., a developer, manufacturer, and marketer of enzymes for molecular biology applications, sold predominantly to manufacturers in research and diagnostic markets from January 2012 to March 2015. Mr. Finn holds a B.Sc. in Chemistry from Heriot-Watt University and a Ph.D. in Chemistry from the University of Southampton.

Paula Green has served as our Vice President of Human Resources since March 2016. Prior to joining us, Ms. Green was Vice President of Human Resources at Qiagen, N.V., a provider of sample and assay technologies for molecular diagnostics, applied testing, academic and pharmaceutical research from March 2001 to September 2015. Ms. Green holds a B.S. Organizational Behavior from the University of San Francisco.

Bill Peck, Ph.D. has been our Chief Technology Officer since February 2013. Prior to co-founding Twist Bioscience, Mr. Peck was the Director of Fluidic Systems at Complete Genomics Inc. from April 2008 to February 2013. Mr. Peck holds a B.Sc., M.Sc., and Ph.D. in Mechanical Engineering from the University of Alberta.

James M. Thorburn has served as our Chief Financial Officer since April 2018. Prior to joining us, Mr. Thorburn served as a member of the board of directors of IXYS Corporation, a publicly traded semiconductor company from March 2007 to January 2018. Mr. Thorburn was also Chief Sales Officer and Co-Head of International at Televerde, a demand generation and sales acceleration enterprise, from August 2014 to February 2018. Prior to Televerde, he served as interim CFO of several public and private companies including Enercore, Next Autoworks, Fisker Automotive and Numonyx. Mr. Thorburn served as Chief Executive Officer of Zilog from March 2001 until August 2006. Prior to serving as Chief Executive Officer of Zilog, Mr. Thorburn held various executive positions including Chief Operating Officer of ON Semiconductor, operating consultant with Texas Pacific Group, Chief Financial Officer at Zilog and various management positions at National Semiconductor Corporation. Mr. Thorburn holds a B.Sc. (Hons.) degree from University of Glasgow and passed the Chartered Institute of Management Accountant exams in the United Kingdom.

Patrick Weiss has served as our Vice President of Operations since January 2014. Prior to joining us, between April 2010 and December 2013, Mr. Weiss served as an outside consultant to various technology companies. Mr. Weiss also served as Chief Executive Officer of Operon Biotechnologies, Inc. from June 2004 to March 2010. Mr. Weiss holds an M.Sc. in Chemistry from E.T.H. Zurich.

Non-employee directors

Robert Chess has served on our board of directors since July 2014, and he was appointed as lead independent director effective as of the effective time of the registration statement of which this prospectus forms a part. Mr. Chess is Chairman of the board of directors of Nektar Therapeutics, a publicly traded therapeutics company. He has served on the board of Nektar Therapeutics as either CEO and/or Chairman since 1992 and has held the Chairman position since 1999. Mr. Chess has also served on the board of directors of Pharsight Corp., a publicly traded company that provides software and scientific consulting services to pharmaceutical and biotechnology companies, and CoTherix, Inc., a publicly traded biopharmaceutical company. Mr. Chess currently serves as a lecturer at the Stanford Graduate School of Business, a position he has held since 2004. Mr. Chess holds a B.S. in Engineering with Honors from the California Institute of Technology and an M.B.A. from Harvard University. Our board of directors believes that Mr. Chess brings extensive board and executive experience managing the operations of biotechnology companies, and his service on a number of public company boards provides important industry and corporate governance experience, which qualifies him to serve as one of our directors.

Keith Crandell has served on our board of directors since October 2013. Mr. Crandell is the Managing Director of Arch Venture Corporation, a venture capital firm focused on early-stage technology companies, since 1994. Mr. Crandell is a director of several private companies and he also serves on the board of directors of Adesto Technologies Corp., a provider of low power, smart non-volatile memory products which is a publicly traded company and Quanterix, a publicly traded life science instrument company. Mr. Crandell holds a B.S. in Chemistry and Mathematics from St. Lawrence University, an M.S. in Chemistry from the University of Texas, Arlington, and an M.B.A. from the University of Chicago. Our board of directors believes that Mr. Crandell brings extensive experience in the technology industry and that his service on a number of boards provides an important perspective on operations, finance and corporate governance matters, which qualifies him to serve as one of our directors.

Frederick Craves, Ph.D. has served on our board of directors since May 2014. Mr. Craves is the Founder of Bay City Capital, one of the world's premier life science investment firms, and has been Managing Director since its founding in September 1996. Over the course of his career, Mr. Craves has worked in executive management of a multinational pharmaceutical company and founded and managed several biotech companies. He previously served on the boards of several private and public companies, including Reliant Pharmaceuticals, Medarex Pharmaceuticals and Incyte Pharmaceuticals. His current board memberships include two publicly traded companies, Madrigal Pharmaceuticals, Inc., a clinical stage biopharmaceutical company, where he is lead director and Dermira, Inc. a dermatological biotechnology company. Mr. Craves holds a B.S. in Biology from Georgetown University, an M.S. in Biochemical Pharmacology from Wayne State University, and a Ph.D. in Pharmacology and Toxicology from the University of California, San Francisco. Our board of directors believes that in addition to his educational background, Mr. Craves brings extensive experience in the biotechnology industry and his service on a number of boards of public and private companies provides an important perspective on operations and corporate governance matters, which qualifies him to serve as one of our directors.

Paul A. Conley, Ph.D. has served on our board of directors since July 2013. Mr. Conley is a Partner and Managing Director at Paladin Capital Group, a prominent venture capital investment firm, a position he has held since November 2007. Mr. Conley also serves on the board of directors of many companies, several in the biotechnology and related fields, including 10x Genomics, Inc., TOMA Bioscience, Inc., and General Automation Laboratory Technologies, Inc. Mr. Conley holds a B.S. in Mechanical Engineering and an M.S. in Mechanical & Aerospace from the University of Virginia, an M.S. in Bioengineering and a Ph.D. in Applied Physics from the University of California, San Diego. Our board of directors believes that Mr. Conley brings extensive experience in the biotechnology industry and his service on a number of boards provides an important perspective on operations and corporate governance matters, as well as his education in biotechnology, which qualifies him to serve as one of our directors.

Jan Johannessen has served on our board of directors since October 2018. Mr. Johannessen currently serves as an advisor to iGlobe Partners, a venture capital company. Mr. Johannessen served as Chief Operating Officer and Secretary at Conexant Systems, LLC, a semiconductor company, from May 2013 to August 2017 and also served as its Chief Financial Officer from May 2013 to May 2016 and as its Chief Executive Officer from May 2016 to August 2017. Mr. Johannessen served as Chief Financial Officer and Secretary at REC Silicon ASA, a company listed on the Oslo stock exchange from August 2008 to May 2013. He served as Interim Chief Executive Officer and President at Lattice Semiconductor Corporation, a publicly traded company, from May 2008 to August 2008 and as Chief Financial Officer and Secretary Lattice Semiconductor Corporation from December 2003 to May 2008. Mr. Johannessen holds a B.S. in Business from the University of Houston, and a MBA in International Business from Arizona State University. Our board of directors believes that Mr. Johannessen brings extensive executive experience in the technology industry and financial and accounting expertise, which qualifies him to serve as one of our directors.

Xiaoying Mai has served on our board of directors since July 2018. Ms. Mai is an Investment Director of GF Xinde Investment Management Co. Ltd, a venture capital investment firm based in China that specializes in investing in biotechnology companies, a position she has held since June 2015. Ms. Mai previously served as a financial manager for Guangfa Securities Co., Ltd, a publicly listed company in Hong Kong from December 2012 to June 2015, where she specialized in preparing financial information for public disclosure and tax management. Ms. Mai has also served as a member of the IPSAS program-international public sector accounting standard and worked with the United Nations in 2011. Ms. Mai holds a B.A. in Business Management from the Guangdong University of Foreign Studies and a M.A. in accountancy from George Washington University. Our board of directors believes that Ms. Mai brings extensive experience in the biotechnology industry and her experience with the Asian markets will help us to expand into such markets, which qualifies her to serve as one of our directors.

Robert Ragusa has served on our board of directors since February 2017. Mr. Ragusa is currently the Senior Vice President, Global Quality and Operations, at Illumina, Inc., a strategic commercial partner of Twist Bioscience Corporation and a publicly traded corporation, where he has worked since December 2013. Prior to joining Illumina, Inc., from April 2010 to November 2013, Mr. Ragusa was Executive Vice President, Global Operations and Service at Accuray Incorporated, a radiation oncology company that develops, manufactures, sells and supports cancer treatment solutions. Mr. Ragusa holds a B.S. in Biomedical and Electrical Engineering and an M.B.A. from the University of Connecticut, and an M.S. in Biomedical and Electrical Engineering from Carnegie-Mellon University. Our board of directors believes that Mr. Ragusa brings extensive experience in important ecosystem partners and managing operations of large public companies, and this, in addition to his education in biotechnology, finance and management, qualifies him to serve as one of our directors.

There are no family relationships among any of our directors or executive officers.

Code of business conduct and ethics

We have adopted a code of business conduct and ethics that will apply to all of our employees, officers and directors beginning on the effective date of the registration statement of which this prospectus forms a part. Immediately prior to the effectiveness of this offering, the full text of our code of business conduct and ethics will be posted on the investor relations section of our website at www.twistbioscience.com. We expect that any amendment to the code, or any waivers of its requirements, will be disclosed on our website to the extent required by the applicable rules and exchange requirements. The inclusion of our website in this prospectus does not include or incorporate by reference the information on our website into this prospectus.

Board of directors

Our board of directors is currently comprised of nine members. Subject to the rights of holders of any series of preferred stock, our amended and restated bylaws permit our board of directors to establish by resolution the authorized number of directors, and nine directors are currently authorized. Upon completion of this offering our board of directors will continue to consist of nine members, seven of whom will qualify as “independent” under the listing standards of the Nasdaq Global Market. Our board of directors has designated Ms. Leproust to serve as Chair of our board of directors and Mr. Chess to serve as our lead independent director.

Voting arrangements

The election of the members of our board of directors is currently governed by the amended and restated stockholders agreement that we entered into with certain holders of our common stock and certain holders of our convertible preferred stock in January 2016, and the related provisions of our amended and restated certificate of incorporation. Pursuant to the stockholders agreement, as amended prior to the effectiveness of the registration statement of which this prospectus forms a part, and these provisions, Messrs. Banyai, Chess, Conley, Crandell, Craves, Johannessen and Ragusa and Mesdames Leproust and Mai have been designated to serve on our board of directors.

- Mr. Crandell was designated by ARCH Ventures Fund VII, LP and elected by the holders of our Series A convertible preferred stock;
- Mr. Craves was designated by Tao Invest LLC, and elected by the holders of our Series B convertible preferred stock;
- Mr. Ragusa was designated by Illumina, Inc., and elected by the holders of our Series C convertible preferred stock;
- Mr. Conley was designated and elected by the holders of a majority of our Series D convertible preferred stock at the time of his designation, and his designation was approved by the holders of a majority of our common stock;
- Ms. Mai was designated by the holders of a majority of our Series D convertible preferred stock held collectively by Ever Alpha Fund L.P. and Bay City Capital GF Xinde International Life Sciences USD Fund, L.P. at the time of her designation, and elected by the holders of a majority of our Series D convertible preferred stock at the time of her designation;
- Mr. Banyai was elected to the board of directors by the holders of our common stock;
- Mr. Chess was elected to the board of directors by a majority the holders of our common stock and convertible preferred stock, each voting as a single class;
- Mr. Johannessen was elected to the board of directors by a majority the holders of our common stock and convertible preferred stock, each voting as a single class; and
- Ms. Leproust was elected to the board of directors as our chief executive officer.

The holders of shares of our common stock and convertible preferred stock who are parties to our stockholders agreement are obligated to vote for such designees indicated above. The provisions of this stockholders agreement will terminate upon the closing of this offering and our certificate of incorporation will be amended and restated, after which there will be no further contractual obligations or charter provisions regarding the election of our directors.

Our directors hold office until their successors have been elected and qualified or appointed, or the earlier of their death, resignation or removal.

Classified board

In connection with the closing of this offering, we will file our amended and restated certificate of incorporation which will provide that our board of directors will be divided into three classes, with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes of directors continuing for the remainder of their respective three-year terms. Upon the expiration of the term of a class of directors, a director in that class will be eligible to be elected for a new three-year term at the annual meeting of stockholders in the year in which their term expires.

Our directors will be divided among the three classes as follows:

- the Class I directors will be Messrs. Chess and Conley and Ms. Mai, and their terms will expire at the annual meeting of stockholders to be held in 2019;
- the Class II directors will be Messrs. Crandell, Craves and Johannessen, and their terms will expire at the annual meeting of stockholders to be held in 2020; and
- the Class III directors will be Ms. Leproust and Messrs. Banyai and Ragusa, and their terms will expire at the annual meeting of stockholders to be held in 2021.

In addition, our amended and restated bylaws and amended and restated certificate of incorporation will provide that, subject to the rights of holders of any series of preferred stock, (i) only the board of directors may fill vacancies on the board of directors until the next annual meeting of stockholders and (ii) the number of our directors shall be fixed from time to time by a resolution of the majority of our board of directors. Any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the total number of directors.

This classification of the board of directors and the provisions described above may have the effect of delaying or preventing changes in our control or management. See "Description of capital stock—Anti-takeover effects of Delaware law and our amended and restated certificate of incorporation and amended and restated bylaws."

Role of the board in risk oversight

One of the key functions of our board of directors is informed oversight of our risk management process. Our board of directors does not have a standing risk management committee, but rather administers this oversight function directly through the board of directors as a whole, as well as through its standing committees that address risks inherent in their respective areas of oversight. In particular, our board of directors is responsible for monitoring and assessing strategic risk exposure. Our audit committee is responsible for reviewing and discussing our major financial risk exposures and the steps our management has taken to monitor and control these exposures, including guidelines and policies with respect to risk assessment and risk management. Our audit committee also monitors compliance with legal and regulatory requirements, in addition to oversight of the performance of our external audit function. Our nominating and corporate governance committee monitors the effectiveness of our governance guidelines. Our compensation committee reviews and discusses the risks arising from our compensation philosophy and practices applicable to all employees that are reasonably likely to have a materially adverse effect on us.

Director independence

In connection with this offering, we have applied to list our common stock on the Nasdaq Global Market. Under the rules of the Nasdaq Global Market, independent directors must comprise a majority of a listed company's board of directors within a specified period of time after completion of such company's initial public offering. In

addition, the rules of require that, subject to specified exceptions, each member of a listed company's audit, compensation, and nominating committees be independent. Under the rules of Nasdaq Global Market, a director will only qualify as an "independent" director if, in the determination of that company's board of directors, that director does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director with the listed company.

Audit committee members must also satisfy the independence criteria set forth in Rule 10A-3 under the Exchange Act. In order to be considered independent for purposes of Rule 10A-3, each member of the audit committee of a listed company may not, other than in his or her capacity as a member of such committee, the board of directors, or any other board committee: (i) accept, directly or indirectly, any consulting, advisory, or other compensatory fees from the listed company or any of its subsidiaries; or (ii) be an affiliated person of the listed company or any of its subsidiaries.

Our board of directors has undertaken a review of its composition, the composition of its committees, and the independence of each director and considered whether any director has a material relationship with us that could compromise his or her ability to exercise independent judgment in carrying out his or her responsibilities. Based on information provided by each director concerning his or her background, employment, and affiliations, including family relationships, our board of directors has determined that each of Messrs. Chess, Crandell, Craves, Conley, Ragusa and Johannessen and Ms. Mai do not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director and that each of these directors is "independent" as that term is defined under the applicable rules and regulations of the Securities and Exchange Commission, and the listing standards of the Nasdaq Global Market. In making these determinations, our board of directors considered the current and prior relationships that each non-employee director has with our company and all other facts and circumstances our board of directors deemed relevant in determining their independence, including the beneficial ownership of our capital stock by each non-employee director, and the transactions involving them described in the section titled "Certain relationships and related party transactions."

Committees of the board of directors

Our board of directors has established an audit committee, a compensation committee and a nominating and corporate governance committee. The composition and responsibilities of each committee are described below. Upon completion of this offering, copies of the charters for each committee will be available on the investor relations portion of our website at www.twistbioscience.com. Members serve on these committees until their resignations, removal or until his or her successor had been duly appointed by our board of directors. The inclusion of our website in this prospectus does not include or incorporate by reference the information on our website into this prospectus.

Audit committee

Our audit committee is comprised of Messrs. Chess, Conley and Craves, and, effective upon the completion of this offering, our audit committee will consist of Messrs. Chess, Conley and Johannessen, with Mr. Johannessen serving as audit committee chairperson. Our board of directors has determined that each of the members of our audit committee satisfies the requirements for independence and financial literacy under the current listing standards of the Nasdaq Global Market and Securities and Exchange Commission rules and regulations, including Rule 10A-3. Our board of directors has also determined that Mr. Johannessen is an audit committee financial expert within the meaning of Item 407(d) of Regulation S-K of the Securities Act.

[Table of Contents](#)

Our audit committee will be responsible for, among other things:

- selecting a qualified firm to serve as independent registered public accounting firm to audit our financial statements;
- helping to ensure the independence and performance of the independent registered public accounting firm;
- discussing the scope and results of the audit with the independent registered public accounting firm, and reviewing, with management and the independent accountants, our interim and year-end operating results;
- developing procedures for employees to submit concerns anonymously about questionable accounting or audit matters;
- reviewing related party transactions;
- reviewing our policies on risk assessment and risk management;
- approving all audit and all permissible non-audit services, to be performed by the independent registered public accounting firm; and
- reviewing the audit committee report required by Securities and Exchange Commission rules to be included in our annual proxy statement.

Our audit committee will operate under a written charter, to be effective on the date of this offering, which satisfies the applicable rules of the Securities and Exchange Commission and the listing standards of the Nasdaq Global Market, and which will be available on our website upon completion of this offering. All audit services to be provided to us and all permissible non-audit services, other than *de minimis* non-audit services, to be provided to us by our independent registered public accounting firm will be approved in advance by our audit committee.

Compensation Committee

Our compensation committee is comprised of Messrs. Chess, Crandell and Craves, and, effective upon the completion of this offering, our compensation committee will consist of Messrs. Chess, Craves and Ragusa with Mr. Craves serving as compensation committee chairperson. Our board of directors has determined that each member of the compensation committee is a non-employee director, as defined pursuant to Rule 16b-3 promulgated under the Exchange Act. Our board has determined that Messrs. Chess, Craves and Ragusa meet the requirements for independence under the listing standards of the Nasdaq Global Market and Securities and Exchange Commission rules and regulations. Our compensation committee will be responsible for, among other things:

- reviewing and approving the compensation of our chief executive officer and other executive officers;
- reviewing the compensation paid to our directors and making recommendations to our board of directors;
- reviewing, adopting, amending, and administering our equity incentive plans and granting awards to eligible persons and determining the terms of such awards;
- reviewing, approving, amending, and terminating any change in control, severance or termination agreement, plan or arrangement for our executive officers;
- reviewing in conjunction with the nominating and corporate governance committee, succession planning for our chief executive officer and other executive officers and evaluating potential successors; and
- assessing whether our compensation policies and practices create risks that are reasonably likely to have a material adverse effect on us.

Our compensation committee will operate under a written charter, to be effective on the date of this offering, which satisfies the applicable rules of the Securities and Exchange Commission and the listing standards of the Nasdaq Global Market.

Nominating and corporate governance committee

Effective upon the completion of this offering, our nominating and corporate governance committee will consist of Messrs. Chess, Crandell and Johannessen, each of whom is a non-employee member of our board of directors, with Mr. Chess serving as the nominating and corporate governance committee chairperson. Our board of directors has determined that Messrs. Chess, Crandell and Johannessen meet the requirements for independence under the listing standards of the Nasdaq Global Market and Securities and Exchange Commission rules and regulations.

Our nominating and corporate governance committee will be responsible for, among other things:

- identifying, evaluating and making recommendations to our board of directors regarding, nominees for election to our board of directors, and individuals to fill any vacancies on our board of directors, between meetings of our stockholders at which directors are to be elected;
- identifying, evaluating and making recommendations to our board of directors regarding the chairmanship and membership of each of its committees;
- considering and making recommendations to our board of directors regarding the composition of our board of directors and its committees;
- assessing the effectiveness of any diversity policy our board of directors may determine to implement;
- reviewing in conjunction with the compensation committee, succession planning for our chief executive officer and other executive officers and evaluating potential successors; and
- reviewing and assessing the adequacy of our corporate governance guidelines and recommending any proposed changes to our board of directors.

The nominating and corporate governance committee will operate under a written charter, to be effective on the date of this offering, which satisfies the applicable listing requirements and rules of the Nasdaq Global Market.

Our board of directors may from time to time establish other committees.

Compensation committee interlocks and insider participation

During fiscal 2017, our compensation committee consisted of Messrs. Chess, Crandell and Craves. None of the members of our compensation committee has at any time been one of our officers or employees. None of our executive officers currently serves, or during fiscal 2017 has served, as a member of our board of directors or the compensation committee (or other board committee performing equivalent functions) of any entity that has one or more of its executive officers who served on our board of directors or our compensation committee during fiscal 2017. Certain members of our compensation committee are affiliated with entities that purchased our preferred stock. Please see "Equity financings" for more information.

Director compensation

Historically, we have neither had a formal compensation policy for our non-employee directors, nor have we had a formal policy of reimbursing expenses incurred by our non-employee directors in connection with their

Table of Contents

board service. However, we have reimbursed our non-employee directors for reasonable expenses incurred in connection with their attendance at board of directors or committee meetings and occasionally granted stock options. Other than as described below, we did not provide our non-employee directors, in their capacities as such, with any cash, equity or other compensation in fiscal 2018. Neither Emily Leproust, our President and Chief Executive Officer, nor William Banyai, our Chief Operating Officer, received separate compensation for services as a director. Ms. Leproust's compensation is discussed in the section titled "Executive compensation."

The following table sets forth certain information regarding the compensation of our non-employee directors for fiscal 2018:

Name	Option awards \$(1)(2)	Total (\$)
Robert Chess	\$208,515(3)	\$208,515
Paul A. Conley	—	—
Keith Crandell	—	—
Frederick Craves	—	—
Xiaoying Mai	—	—
Robert Ragusa	—	—

(1) The amount reported in this column represents the aggregate grant date fair value for financial statement reporting purposes of stock options granted in fiscal 2018 under our 2013 Plan, as determined in accordance with FASB ASC Topic 718. This amount reflects our accounting expense for these stock options and does not represent the actual economic value that may be realized by each non-employee director. There can be no assurance that this amount will ever be realized. For information on the assumptions used in valuing this award, refer to Note 15 to the consolidated financial statements included elsewhere in this prospectus.

(2) The number of shares underlying outstanding stock options held by each non-employee director as of September 30, 2018, was as follows: Mr. Chess (35,521); Mr. Conley (0); Mr. Crandell (0); Mr. Craves (0); Ms. Mai (0) and Mr. Ragusa (0).

(3) This represents the grant date fair value of an option to purchase 28,417 shares of common stock granted on September 13, 2018 with an exercise price of \$11.89 per share. The option grant is subject to a 4-year vesting schedule, with 10% of the shares vesting on September 13, 2018, 15% of the shares vesting on March 24, 2019 and 1/48th of the shares vesting monthly thereafter, subject to continuous service through each applicable vesting date. The option has a term of ten years.

In September 2018, our board of directors approved a non-employee director compensation policy that will become effective upon the closing of this offering. Under this policy, we will pay our non-employee directors a cash retainer for service on the board of directors and an additional cash retainer for service on each committee on which the director is a member, which will be paid quarterly in arrears. The chairman of each committee will receive higher retainers for such service. The fees paid to non-employee directors for service on the board of directors and for service on each committee of the board of directors on which the director is a member are as follows:

	Member Annual Retainer	Chairman or Lead Director Annual Retainer
Board of Directors	\$ 40,000	\$ 60,000
Audit Committee	7,000	16,000
Compensation Committee	5,000	13,000
Nominating and Corporate Governance Committee	5,000	10,000

In addition, each non-employee director elected to our board of directors following the completion of this offering will, upon the date of his or her initial election or appointment to be a non-employee director, be granted an option to purchase a number of shares of common stock having a grant date fair value of \$340,000. One-third of the shares subject to such initial option grant will vest on each anniversary of the date of grant,

subject to the director providing service through each vesting date. Further, at the close of business on the date of each annual stockholder meeting following the initial public offering, each person who is currently and has been a non-employee director for at least three (3) months will be granted an option to purchase a number of shares of common stock having a grant date fair value of \$170,000. 100% of the shares subject to such annual option grant will vest in full on the earlier of the one year anniversary of the grant date and the next annual stockholder meeting, subject to the director providing service through the vesting date. All stock option awards to non-employee directors following the completion of this offering are expected to be made pursuant to the 2018 Plan. For additional information, see “Executive compensation — 2018 equity incentive plan.”

We will also continue to reimburse our non-employee directors for reasonable travel and out-of-pocket expenses incurred in connection with attending our board of director and committee meetings.

The non-employee director compensation program is intended to provide a total compensation package that enables us to attract and retain qualified and experienced individuals to serve as directors and to align our directors’ interests with those of our stockholders.

Board diversity

Upon consummation of this offering, our nominating and corporate governance committee will be responsible for reviewing with the board of directors, on an annual basis, the appropriate characteristics, skills and experience required for the board of directors as a whole and its individual members. In evaluating the suitability of individual candidates (both new candidates and current members), the nominating and corporate governance committee, in recommending candidates for election, and the board of directors, in approving (and, in the case of vacancies, appointing) such candidates, may take into account many factors, including, but not limited to, diversity of personal and professional background, perspective and experience; personal and professional integrity, ethics and values; experience in corporate management, operations or finance; experience relevant to our industry and with relevant social policy concerns; experience as a board member or executive officer of another publicly held company; relevant academic expertise or other proficiency in an area of our operations; practical and mature business judgment; and any other relevant qualifications, attributes or skills.

Currently, our board of directors evaluates, and following the consummation of this offering will evaluate, each individual in the context of the board of directors as a whole, with the objective of assembling a group that can best maximize the success of the business and represent stockholder interests through the exercise of sound judgment using its diversity of experience in these various areas.

Limitation of liability and indemnification of directors and officers

Our amended and restated certificate of incorporation, which will become effective upon the closing of this offering, will contain provisions that limit the liability of our directors for monetary damages to the fullest extent permitted by Delaware law. Consequently, our directors will not be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duties as directors, except liability for the following:

- any breach of their duty of loyalty to our company or our stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- unlawful payments of dividends or unlawful stock repurchases or redemptions as provided in Section 174 of the DGCL; or
- any transaction from which they derived an improper personal benefit.

[Table of Contents](#)

Our amended and restated bylaws, which will become effective upon the closing of this offering, will provide that we shall indemnify, to the fullest extent permitted by law, any person who is or was a party or is threatened to be made a party to any action, suit or proceeding, by reason of the fact that he or she is or was one of our directors or officers or is or was serving at our request as a director or officer of another corporation, partnership, joint venture, trust or other enterprise. Our amended and restated bylaws will provide that we may indemnify to the fullest extent permitted by law any person who is or was a party or is threatened to be made a party to any action, suit or proceeding, by reason of the fact that he or she is or was one of our employees or agents or is or was serving at our request as an employee or agent of another corporation, partnership, joint venture, trust or other enterprise. Our amended and restated bylaws will also provide that we must advance expenses incurred by or on behalf of a director or officer in advance of the final disposition of any action or proceeding, subject to very limited exceptions.

Prior to the closing of this offering, we intend to obtain insurance policies under which, subject to the limitations of the policies, coverage is provided to our directors and officers against loss arising from claims made by reason of breach of fiduciary duty or other wrongful acts as a director or officer, including claims relating to public securities matters, and to us with respect to payments that may be made by us to these officers and directors pursuant to our indemnification obligations or otherwise as a matter of law.

Prior to the closing of this offering, we intend to enter into indemnification agreements with each of our directors and executive officers that may be broader than the specific indemnification provisions contained in the DGCL. These indemnification agreements may require us, among other things, to indemnify our directors and executive officers against liabilities that may arise by reason of their status or service. These indemnification agreements may also require us to advance all expenses incurred by the directors and executive officers in investigating or defending any such action, suit or proceeding. We believe that these agreements are necessary to attract and retain qualified individuals to serve as directors and executive officers.

The underwriting agreement provides for indemnification by the underwriters of us and our officers, directors and employees for certain liabilities arising under the Securities Act, or otherwise.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers or persons controlling our company pursuant to the foregoing provisions, we have been informed that, in the opinion of the Securities and Exchange Commission, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Executive compensation

Overview

As an emerging growth company, we have opted to comply with the executive compensation disclosure rules applicable to “smaller reporting companies,” as such term is defined in the rules promulgated under the Securities Act.

Our named executive officers for fiscal 2018 were:

- Emily M. Leproust, our President and Chief Executive Officer;
- James M. Thorburn, Chief Financial Officer; and
- Mark Daniels, General Counsel, Secretary and Chief Ethics and Compliance Officer.

Summary compensation table

The following table sets forth certain information regarding the compensation of our named executive officers for fiscal 2017 and fiscal 2018:

Name and principal position	Year	Salary (\$)(1)	Bonus (\$)	Option awards (\$)(2)	Non-equity incentive plan compensation (\$)(3)	All other compensation (\$)	Total (\$)
Emily M. Leproust <i>President and Chief Executive Officer</i>	2018	362,250	—	—	43,107	—	405,357
	2017	340,001	—	2,445,057	87,150	—	2,872,208
James M. Thorburn <i>Chief Financial Officer (4)</i>	2018	134,015	—	1,286,756	—	—	1,420,771
Mark Daniels <i>General Counsel, Secretary and Chief Ethics and Compliance Officer (4)</i>	2018	325,000	—	214,968	44,687	—	584,655

(1) The amounts reported in this column represent salary earned by each of our named executive officers in fiscal 2017 and fiscal 2018.

(2) The amounts reported in this column reflect the aggregate grant date fair value for financial statement reporting purposes of stock options granted in fiscal 2017 and fiscal 2018 as determined in accordance with FASB ASC Topic 718. These amounts reflect our accounting expense for these stock options and do not represent the actual economic value that may be realized by each named executive officer. There can be no assurance that these amounts will ever be realized. For information on the assumptions used in valuing these awards, refer to Note 15 to the consolidated financial statements included elsewhere in this prospectus.

(3) Represents annual bonuses earned by each named executive officer under our annual cash incentive plan for executive officers for fiscal 2017 and fiscal 2018; provided that for 2018, the amount reflected here represents the bonus payable for the first half of fiscal 2018 and the second half bonus has not been approved yet. The amounts reported represent performance-based cash incentives earned by each named executive officer based on the achievement of certain revenue goals and strategic objectives and the named executive officer’s target incentive compensation amount.

(4) Fiscal 2018 is the first year as a named executive officer.

Outstanding equity awards as of September 30, 2018

The following table provides information regarding the unexercised stock options and restricted stock awards held by each of our named executive officers as of September 30, 2018:

Name	Grant date	Option awards(1)				Stock awards(1)	
		Number of securities underlying unexercised options (#) exercisable (2)	Number of securities underlying unexercised options (#) unexercisable (3)	Option exercise price or per share purchase price (\$)(4)	Option expiration date	Number of shares or units of stock that have not vested (#)(5)	Market value of shares or units of stock that have not vested (\$)(6)
Emily M. Leproust	8/7/2013(7)	—	—	0.40	N/A	102,330	1,534,950
	9/29/2015(8)	75,749	25,250	5.95	9/28/2025	—	—
	9/29/2017(9)	57,598	173,096	8.82	9/28/2027	—	—
James M. Thorburn	6/7/2018(10)	—	176,749	11.59	6/6/2028	—	—
Mark Daniels	8/30/2016(11)	22,619	36,297	5.95	8/29/2026	—	—
	9/29/2017(9)	—	13,566	8.82	9/28/2017	—	—
	2/2/2018(12)	—	32,088	10.70	2/1/2028	—	—

- (1) All awards were granted under our 2013 Plan.
- (2) Because all stock options granted to our named executive officers under the 2013 Plan are early exercisable, and early exercised shares are subject to a repurchase right in favor of the Company which lapses as the option vests, this column reflects the number of options held by our named executive officers that were exercisable and vested as of September 30, 2018.
- (3) Because all stock options granted to our named executive officers under the 2013 Plan are early exercisable, and early exercised shares are subject to a repurchase right in favor of the Company which lapses as the option vests, this column reflects the number of options held by our named executive officers that were exercisable and unvested as of September 30, 2018.
- (4) This column represents the fair market value of a share of our common stock on the date of grant, as determined by our board of directors.
- (5) The shares in this column represent shares of restricted stock issued pursuant to the exercise of a restricted stock purchase right that remained unvested as of September 30, 2018. We have a right to repurchase any unvested shares subject to each such award if the holder of the award ceases to provide services to us prior to the applicable vesting dates.
- (6) The market value of our common stock is based upon the assumed initial public offering price of \$15.00 per share, which is the midpoint of the estimated offering price range set forth on the cover page of this prospectus.
- (7) All of restricted shares are subject to certain restrictions as set forth in a restricted stock purchase agreement between the named executive officer and the Company dated September 26, 2013. The named executive officer retains the right to vote but not the right to dispose of such shares while such shares remain subject to such restrictions.
- (8) The option grant is subject to a 4-year vesting schedule, with 25% of the shares vesting on September 1, 2016 and 1/48th of the shares vesting monthly thereafter, subject to continuous service through each applicable vesting date. The option grant is also subject to a 50% single trigger acceleration provision and a 100% double trigger acceleration provision (in each case, as described below).
- (9) The option grant is subject to a 4-year vesting schedule, with 10% of the shares vesting on September 29, 2017, 15% of the shares vesting on September 28, 2018 and 1/48th of the shares vesting monthly thereafter, subject to continuous service through each applicable vesting date.
- (10) The option grant is subject to a 4-year vesting schedule, with 25% of the shares vesting on April 23, 2019 and 1/48th of the shares monthly thereafter, subject to continuous service through each applicable vesting date.
- (11) The option grant is subject to a 4-year vesting schedule, with 25% of the shares vesting on August 8, 2017 and 1/48th of the shares thereafter, subject to continuous service through each applicable vesting date.
- (12) The option grant is subject to a 4-year vesting schedule, with 25% of the shares vesting on January 4, 2019 and 1/48th of the shares thereafter, subject to continuous service through each applicable vesting date.

Base salary

We use base salaries to recognize the experience, skills, knowledge and responsibilities required of all our employees, including our named executive officers. None of our named executive officers is currently party to an employment agreement or other agreement or arrangement that provides for automatic or scheduled increases in base salary.

Annual bonus

We have an annual objective-setting and review process for our named executive officers that is the basis for the determination of potential annual bonuses. Our board of directors reviews and approves both the annual objectives and the payment of annual bonuses for our executives. Each of our named executive officers is eligible for annual performance-based bonuses of up to a specific percentage of their salary, subject to approval by our board of directors or the compensation committee. The performance-based bonus is tied to a set of specified goals and strategic objectives for our named executive officers and we conduct an annual performance review to determine the attainment of such goals and objectives. Our management may propose bonus awards to our board of directors primarily based on such review process. Our board of directors or the compensation committee makes the final determination of the achievement of both the specified corporate and strategic objectives and the eligibility requirements for and the amount of such bonus awards. For fiscal 2017 and the first half of fiscal 2018, bonuses were paid out based on the satisfaction of certain revenue goals and strategic objectives. The bonuses for the second half of fiscal 2018 will be paid on the same basis as prior bonuses.

Equity-based incentive awards

Our equity-based incentive awards are designed to align our interests and the interests of our stockholders with those of our employees and consultants, including our named executive officers. Our board of directors or the compensation committee is responsible for approving equity grants to employees and consultants.

Prior to this offering, we have granted all equity incentive awards pursuant to our 2013 Plan. Following this offering, we will grant equity incentive awards under the terms of our 2018 Plan. The terms of our equity plans are described below under "Equity incentive plans."

All stock options are granted with an exercise price per share that is no less than the fair market value of our common stock on the date of grant of each award. Our stock option awards generally vest over a four-year period and may be subject to acceleration of vesting and exercisability under certain termination and corporate transaction events.

On September 29, 2017, the compensation committee granted stock options to Emily Leproust to purchase 230,794 shares, at an exercise price of \$8.82 per share. Ten percent of the shares subject to the option grant were vested on the date of grant and 15% of the shares will vest on September 28, 2018, and 1/48th of the shares will vest on each monthly anniversary thereafter, subject to the named executive officer's continuous service through each applicable vesting date. On June 6, 2018 and February 2, 2018, the compensation committee granted stock options to Mr. Thorburn (176,749 shares at an exercise price of \$11.59 per share) and Mr. Daniels (32,088 shares at an exercise price of \$10.70 per share), respectively. Each option vests as to 25% of the shares on the one year anniversary of the vesting commencement date (April 23, 2018 for Mr. Thorburn and January 4, 2018 for Mr. Daniels), and 1/48th of the shares will vest on each monthly anniversary thereafter, subject to the named executive officer's continuous service through each applicable vesting date.

Employment agreements

In connection with the offering, we entered into an amended and restated employment agreement with each of the named executive officers, effective as of the effective time of the registration statement. These agreements provide for at-will employment and establish the named executive officer's base salary, eligibility to participate in an incentive bonus plan and standard employee benefits.

These amended and restated employment agreements also provide for certain severance payments and benefits in connection with each named executive officer's termination of employment under various

circumstances, including in connection with a change in control of the Company. The material terms and conditions of these provisions are summarized below in “—Potential Payments Upon Termination or Change in Control.” The severance and change in control benefits described below will be in effect for 3 years from the effective date of the registration statement.

Potential payments upon termination or change in control

Involuntary Termination of Employment Not in Connection with Change in Control

In the event that we terminate a named executive officer’s employment without “cause” or such named executive officer dies, experiences a “disability” or resigns for “good reason,” in each case, other than in connection with or during the 12-month period following, a change in control, such named executive officer will be eligible to receive the following severance benefits, subject to, among other things, executing a general release of claims in favor of the Company and complying with the terms of his or her confidentiality agreement:

- a cash payment equal to 12 months of her then-current base salary in the case of Ms. Leproust and 6 months of his then-current base salary in the case of Mr. Thorburn and Mr. Daniels, payable in installments over such period according to our regular payroll schedule; and
- a pro-rata incentive bonus for the year of termination (days worked relative to 365 days) based on actual performance and paid when bonuses are normally paid.
- COBRA premiums for a period of 12 months in the case of Ms. Leproust and 6 months in the case of Mr. Thorburn and Mr. Daniels.

Involuntary Termination of Employment in Connection with Change in Control

In the event that we terminate a named executive officer’s employment without “cause” or such named executive officer dies, experiences a “disability” or resigns for “good reason,” in each case, in connection with or during the 12-month period following a change in control, such named executive officer will be eligible to receive the following severance benefits, subject to, among other things, executing a general release of claims in favor of the Company and complying with the terms of his or her confidentiality agreement:

- a cash payment equal to 24 months of her then-current base salary in the case of Ms. Leproust and 12 months of his then-current base salary in the case of Mr. Thorburn and Mr. Daniels, payable in installments over such period according to our regular payroll schedule;
- a cash payment equal to two times her average bonus for the two years prior to the termination in the case of Ms. Leproust and one times in the case of Mr. Thorburn and Mr. Daniels, which will be paid pro-rata in equal installments with the cash severance;
- COBRA premiums for a period of 24 months in the case of Ms. Leproust and 12 months in the case of Mr. Thorburn and Mr. Daniels; and
- 100% immediate vesting acceleration of all of the shares of our common stock underlying any then-outstanding unvested stock options and other unvested equity awards.

Each named executive officer’s employment agreement contains a “better after-tax” provision, which provides that if any of the payments to an executive constitutes a parachute payment under Section 280G of the Code, the payments will either be (i) reduced or (ii) provided in full to the executive, whichever results in the named executive officer receiving the greater amount after taking into consideration the excise tax under Section 4999 of the Code and any interest or penalties associated with such excise tax.

As defined in each named executive officer's employment agreement, "cause" means the named executive officer's (i) material breach of the employment agreement any other written agreement with the Company, which breach to the extent deemed curable by the board of directors is not cured within 10 business days after written notice thereof from the Company; (ii) material failure to comply with the Company's written policies or rules, which breach to the extent deemed curable by the board of directors is not cured within ten (10) business days after written notice thereof from the Company; (iii) repeated failure to follow reasonable and lawful instructions from the board of directors, which failure is not cured within 10 business days after written notice thereof from the Company; (iv) commission, conviction of, or a plea of "guilty" or "no contest" to, a felony under the laws of the United States or any state if such felony is work-related, impairs his or her ability to perform services for the Company in accordance with the employment agreement, or results in a loss to the Company or damage to the reputation of the Company; (v) misappropriation of funds or property of the Company; (vi) gross neglect of his or her duties; (vii) act or omission that results directly or indirectly in material financial accounting improprieties for the Company; (viii) failure to cooperate with a government investigation; or (ix) gross or willful misconduct resulting in a loss to the Company or damage to the reputation of the Company.

As defined in each named executive officer's employment agreement, "good reason" means a resignation by the named executive officer within 90 days after one of the following conditions has come into existence without his or her written consent: (i) a material diminution in executive's authority, duties or responsibilities; (ii) a material reduction of executive's annual base salary unless there is a corresponding reduction in the base salaries of all other executive officers of the Company; or (iii) a material change in the geographic location at executive you must perform services. A condition shall not be considered "good reason" unless executive gives the Company written notice of the condition within 30 days after the condition comes into existence and the Company fails to remedy the condition within 30 days after receiving executive's written notice.

As defined in each named executive officer's employment agreement, "disability" means that the named executive officer is unable to perform the essential functions of his or her position, with or without reasonable accommodation, for a period of at least 120 consecutive days because of a physical or mental impairment.

Option agreements

The stock option award granted to Emily Leproust on September 29, 2015, provides that in the event of a "corporate transaction" (as defined in the 2013 Plan) that occurs during the executive officer's service, 50% of the then unvested shares subject to the stock option shall vest as of immediately prior to such corporate transaction. In addition, if the executive officer is terminated (A) upon the consummation of, or within 12 months following, a corporate transaction and (B) by the Company without "cause" or by the executive officer for "good reason" (each, as defined below), then 100% of the then unvested shares subject to the option shall immediately vest as of the date of such termination.

For purposes of the stock options granted to Emily Leproust on September 29, 2015, "cause" exists if the executive officer is terminated as a result of the following: (i) dishonest statements or acts of the executive officer with respect to the Company that are materially injurious to the Company; (ii) commission by the executive officer of, or indictment of the executive officer for, (A) a felony or (B) a misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) commission of an act involving a violation of material procedures or policies of the Company, which, if curable, remain uncured for more than 30 days after the executive officer's knowledge of such violation; (iv) material and sustained failure of the executive officer to perform the duties and responsibilities assigned under her or his employment agreement, which if curable, remain uncured for more than 30 days after the executive officer is given notice of such breach; (v) gross negligence, willful misconduct or insubordination of the executive officer with respect to the Company or any affiliate of the Company that is materially injurious to the Company; (vi) a material breach by the executive officer of any of her or his obligations under the employment agreement or any other agreement with the Company; or

(vii) termination by the executive officer of her or his employment upon less than 60 days advance written notice.

For purposes of the stock options granted to Emily Leproust on September 29, 2015, “good reason” means a resignation of the employment by the applicable executive officer after the occurrence of any of the following events: (i) a material reduction in the executive officer’s then current base salary except in certain limited circumstances; (ii) a material reduction in the executive officer’s authority, duties, or responsibilities except in certain limited circumstances; or (iii) a relocation of the executive officer’s principal office to a location which increases the executive officer’s commute more than 50 miles from the location of the executive officer’s principal office.

Equity incentive plans

2018 equity incentive plan

General. Our 2018 Equity Incentive Plan, or 2018 Plan, was adopted by our board of directors on September 26, 2018 and approved by our stockholders on October 16, 2018. The 2018 Plan will become effective on the day immediately prior to the date that the registration statement of which this prospectus forms a part becomes effective.

Share Reserve. The maximum aggregate number of shares that may be issued under the 2018 Plan is 5,856,505 shares of our common stock, which number is the sum of (i) 2,494,700 shares of our common stock plus (ii) any shares remaining available for issuance under the 2013 Stock Plan at the time the 2018 Plan becomes effective, in an amount not to exceed 928,974 shares, plus (iii) any shares subject to awards under the 2013 Plan that otherwise would have been returned to the 2013 Plan on account of the expiration, cancellation or forfeiture of such awards following the effectiveness of the 2018 Plan, in an amount not to exceed 2,432,831 shares. In addition, the number of shares reserved for issuance under the 2018 Plan will be increased automatically on the first day of each fiscal year, following the fiscal year in which the 2018 Plan becomes effective, by a number equal to the least of:

- 999,900 shares;
- 4% of the shares of common stock outstanding at that time; or
- such number of shares determined by our board of directors.

If an award expires, is forfeited or becomes unexercisable for any reason without having been exercised in full, or is surrendered pursuant to an exchange program, the unissued shares that were subject to the award will, unless the 2018 Plan is terminated, continue to be available under the 2018 Plan for issuance pursuant to future awards. In addition, any shares which are retained by the Company upon exercise of an award in order to satisfy the exercise or purchase price for such award or any withholding taxes due with respect to such award will be treated as not issued and will continue to be available under the 2018 Plan for issuance pursuant to future awards. Shares issued under the 2018 Plan and later forfeited to the Company due to the failure to vest or repurchased by the Company at the original purchase price paid to the Company for the shares (including, without limitation, upon forfeiture to or repurchase by the Company in connection with a participant ceasing to be a service provider) will again be available for future grant under the 2018 Plan. To the extent an award under the 2018 Plan is paid out in cash rather than shares, such cash payment will not result in reducing the number of Shares available for issuance under the 2018 Plan.

Plan administration. Our board of directors has delegated its authority to administer the 2018 Plan to our compensation committee. Subject to the provisions of our 2018 Plan, the administrator has the power to determine the terms of awards, including the recipients, the exercise price, if any, the number of shares subject

to each award, the fair market value of a share of our common stock, the vesting schedule applicable to the awards, together with any vesting acceleration, and the form of consideration, if any, payable upon exercise of the award and the terms of the award agreement for use under the 2018 Plan. The administrator also has the authority, subject to the terms of the 2018 Plan, to amend existing awards, to prescribe rules and to construe and interpret the 2018 Plan and awards granted thereunder and to institute an exchange program by which outstanding awards may be surrendered in exchange for awards of the same type which may have a lower exercise price or different terms, awards of a different type and/or cash subject to stockholder approval.

Eligibility. Employees, members of our board of directors who are not employees and consultants are eligible to participate in our 2018 Plan.

Types of award. Our 2018 Plan provides for the grant of incentive stock options, within the meaning of Section 422 of the Code, to our employees and the employees of our subsidiaries, and for the grant of nonstatutory stock options, stock appreciation rights, restricted stock, restricted stock units, performance units, and performance shares to our employees, directors, and consultants and the employees and consultants of our subsidiaries.

Stock options. The administrator may grant incentive and/or non-statutory stock options under our 2018 Plan, provided that incentive stock options may only be granted to employees. The exercise price of such options must generally be equal to at least the fair market value of our common stock on the date of grant. The term of an option may not exceed 10 years; provided, however, that an incentive stock option held by a participant who owns more than 10% of the total combined voting power of all classes of our stock, or of certain of our subsidiary corporations, may not have a term in excess of five years and must have an exercise price of at least 110% of the fair market value of our common stock on the grant date. The administrator will determine the methods of payment of the exercise price of an option, which may include cash, shares or other property acceptable to the administrator. Subject to the provisions of our 2018 Plan, the administrator determines the remaining terms of the options (e.g., vesting). After the termination of service of an employee, director or consultant, the participant may exercise his or her option, to the extent vested, for the period of time stated in his or her option agreement. Generally, if termination is due to death or disability, the option will remain exercisable for 12 months. In the event of a termination for cause, options generally terminate immediately upon the termination of the participant for cause. In all other cases, the option will generally remain exercisable for three months following the termination of service. However, in no event may an option be exercised later than the expiration of its term. The maximum aggregate number of shares of our common stock that may be issued under the 2018 Plan pursuant to incentive stock options may not exceed the maximum number of shares initially reserved under the 2018 Plan and to the extent allowable under Section 422 of the Internal Revenue Code, or the Code, any other shares that become available for issuance or reissuance pursuant to the terms of the 2018 Plan.

Stock appreciation rights. Stock appreciation rights may be granted under our 2018 Plan. Stock appreciation rights allow the recipient to receive the appreciation in the fair market value of our common stock between the date of grant and the exercise date. Subject to the provisions of our 2018 Plan, the administrator determines the terms of stock appreciation rights, including when such rights vest and become exercisable and whether to settle such awards in cash or with shares of our common stock, or a combination thereof, except that the per share exercise price for the shares to be issued pursuant to the exercise of a stock appreciation right will be no less than 100% of the fair market value per share on the date of grant. The specific terms will be set forth in an award agreement.

Restricted stock. Restricted stock may be granted under our 2018 Plan. Restricted stock awards are grants of shares of our common stock that are subject to various restrictions, including restrictions on transferability and forfeiture provisions. Shares of restricted stock will vest and the restrictions on such shares will lapse, in

accordance with terms and conditions established by the administrator. Such terms may include, among other things, vesting upon the achievement of specific performance goals determined by the administrator and/or continued service. The administrator, in its sole discretion, may accelerate the time at which any restrictions will lapse or be removed. Recipients of restricted stock awards generally will have voting and dividend rights with respect to such shares upon grant without regard to vesting, unless the administrator provides otherwise. Shares of restricted stock that do not vest for any reason will be subject to our right of repurchase or forfeited by the recipient and will revert to us. The specific terms will be set forth in an award agreement.

Restricted stock units. Restricted stock units may be granted under our 2018 Plan, and may include the right to dividend equivalents, as determined in the discretion of the administrator. Each restricted stock unit granted is a bookkeeping entry representing an amount equal to the fair market value of one share of our common stock. The administrator determines the terms and conditions of restricted stock units, including the vesting criteria, which may include achievement of specified performance criteria and/or continued service, and the form and timing of payment. The administrator, in its sole discretion, may accelerate the time at which any restrictions will lapse or be removed. The administrator determines, in its sole discretion, whether an award will be settled in stock, cash or a combination of both. The specific terms will be set forth in an award agreement.

Performance units/performance shares. Performance units and performance shares may be granted under our 2018 Plan. Performance units and performance shares are awards that will result in a payment to a participant only if performance goals established by the administrator are achieved and any other applicable vesting provisions are satisfied. The administrator will establish organizational or individual performance goals in its discretion, which, depending on the extent to which they are met, will determine the number and/or the value of performance units and performance shares to be paid out to participants. For purposes of such awards, the performance goals may be based on one or more of the following performance criteria and any adjustment(s) thereto, in each case as determined by the administrator: (i) sales or non-sales revenue; (ii) return on revenues; (iii) operating income; (iv) income or earnings including operating income; (v) income or earnings before or after taxes, interest, depreciation, and/or amortization; (vi) income or earnings from continuing operations; (vii) net income; (viii) pre-tax income or after-tax income; (ix) net income excluding amortization of intangible assets, depreciation and impairment of goodwill and intangible assets, and/or excluding charges attributable to the adoption of new accounting pronouncements; (x) raising of financing or fundraising; (xi) project financing; (xii) revenue backlog; (xiii) gross margin; (xiv) operating margin or profit margin; (xv) capital expenditures, cost targets, reductions and savings, and expense management; (xvi) return on assets (gross or net), return on investment, return on capital or invested capital, or return on stockholder equity; (xvii) cash flow, free cash flow, cash flow return on investment (discounted or otherwise), net cash provided by operations, or cash flow in excess of cost of capital; (xviii) performance warranty and/or guarantee claims; (xix) stock price or total stockholder return; (xx) earnings or book value per share (basic or diluted); (xxi) economic value created; (xxii) pre-tax profit or after-tax profit; (xxiii) strategic business criteria, consisting of one or more objectives based on meeting specified market penetration or market share, completion of strategic agreements such as licenses, funded collaborations, joint ventures, acquisitions, and the like, geographic business expansion, objective customer satisfaction or information technology goals, and/or intellectual property asset metrics; (xxiv) objective goals relating to divestitures, joint ventures, mergers, acquisitions, and similar transactions; (xxv) objective goals relating to staff management, results from staff attitude and/or opinion surveys, staff satisfaction scores, staff safety, staff accident and/or injury rates, compliance headcount, performance management, and completion of critical staff training initiatives; (xxvi) objective goals relating to projects, including project completion timing and/or achievement of milestones, project budget, and technical progress against work plans; (xxvii) key regulatory objectives or milestones; and (xxviii) enterprise resource planning. However, awards issued to participants may take into account other factors (including subjective factors). In addition, performance goals may differ from participant to participant, performance period to performance period, and from award to award. Any criteria used may be

[Table of Contents](#)

measured, as applicable, (i) in absolute terms, (ii) in relative terms (including, but not limited to, any increase (or decrease) over the passage of time and/or any measurement against other companies or financial or business or stock index metrics particular to us), (iii) on a per share and/or share per capita basis, (iv) against our performance as a whole or against any of our affiliate(s), or a particular segment(s), a business unit(s) or a product(s) of ours or individual project company, (v) on a pre-tax or after-tax basis, and/or (vi) using an actual foreign exchange rate or on a foreign exchange neutral basis. After the grant of a performance unit or performance share, the administrator, in its sole discretion, may reduce or waive any performance objectives or other vesting provisions for such performance units or performance shares. Performance units shall have an initial dollar value established by the administrator prior to the grant date. Performance shares shall have an initial value equal to the fair market value of our common stock on the grant date. The administrator, in its sole discretion, may pay earned performance units or performance shares in the form of cash, in shares, or in some combination thereof.

Non-transferability of awards. Unless the administrator provides otherwise, our 2018 Plan generally does not allow for the transfer of awards and only the recipient of an option or stock appreciation right may exercise such an award during his or her lifetime.

Certain adjustments. In the event of certain corporate events or changes in our capitalization, to prevent diminution or enlargement of the benefits or potential benefits available under the 2018 Plan, the administrator will make adjustments to one or more of the number, kind and class of securities that may be delivered under the 2018 Plan and/or the number, kind, class and price of securities covered by each outstanding award.

Liquidation or dissolution. In the event of our proposed winding up, liquidation or dissolution, the administrator will notify participants as soon as practicable and all awards will terminate immediately prior to the consummation of such proposed transaction.

Corporate transaction. Our 2018 Plan provides that in the event of certain significant corporate transactions, including: (1) a transfer of all or substantially all of our assets, (2) a merger, consolidation or other capital, reorganization or business combination transaction of the Company with or into another corporation, entity or person, or (3) the consummation of a transaction, or series of related transactions, in which any person becomes the beneficial owner, directly or indirectly, of more than 50% of the Company's then outstanding capital stock, each outstanding award will be treated as the administrator determines. Such determination may provide that such awards will be (i) continued if we are the surviving corporation, (ii) assumed by the surviving corporation or its parent, (iii) substituted by the surviving corporation or its parent for a new award, (iv) canceled in exchange for a payment equal to the excess of the fair market value of our shares subject to such award over the exercise price or purchase price paid for such shares, or if such award is "underwater" canceled for no consideration, if any, or (v) in the case of options, accelerated prior to the consummation of the corporate transaction and cancelled for no consideration if not exercised.

Change of control. The administrator may provide, in an individual award agreement or in any other written agreement between a participant and us that the stock award will be subject to additional acceleration of vesting and exercisability in the event of a change of control. Under the 2018 Plan, a "change of control" is generally (1) a merger, consolidation, or any other corporate reorganization in which our stockholders immediately before the transaction do not own, directly or indirectly, more than a majority of the combined voting power of the surviving entity (or the parent of the surviving entity), (2) the consummation of the sale, transfer or other disposition of all or substantially all of our assets, (3) an unapproved change in the majority of the board of directors, and (4) the acquisition by any person or company of more than 50% of the total voting power of our then outstanding stock.

Clawback/recovery. Stock awards granted under the 2018 Plan will be subject to recoupment in accordance with any clawback policy we may be required to adopt pursuant to applicable law and listing requirements. In addition, the administrator may impose such other clawback, recovery or recoupment provisions in any stock award agreement as it determines necessary or appropriate.

Amendment or termination. Our board of directors has the authority to amend, suspend or terminate the 2018 Plan provided such action does not impair the existing rights of any participant. Our 2018 Plan will automatically terminate in 2028, unless we terminate it sooner. We will obtain stockholder approval of any amendment to our 2018 Plan as required by applicable law or listing requirements.

2013 stock plan

General. Our board of directors adopted, and our stockholders approved, our 2013 Stock Plan, or the 2013 Plan, on February 4, 2013. The 2013 Plan was last amended on June 1, 2017. Our 2013 Stock Plan, or 2013 Plan, will be terminated effective immediately prior to the effectiveness of the registration statement of which this prospectus forms a part, and no new awards will be granted under our 2013 Plan following this offering, but previously granted awards will continue to be subject to the terms and conditions of the 2013 Plan and the stock award agreements pursuant to which such awards were granted.

Share reserve. Under our 2013 Plan, we have reserved for issuance an aggregate of 3,464,916 shares. In general, if an award granted under our 2013 Plan is canceled or terminated or otherwise forfeited by a participant, then the number of shares underlying such award will again become available for awards under the 2013 Plan. Following the effectiveness of our 2018 Plan, such shares will again become available for awards under the 2018 Plan.

Plan administration. Our board of directors has administered the 2013 Plan before this offering. Our board of directors has delegated its authority to administer the 2013 Plan to our compensation committee following this offering.

Eligibility. Employees, members of our board of directors who are not employees and consultants are eligible to participate in our 2013 Plan.

Types of award. Our 2013 Plan provides for incentive and nonstatutory stock options to purchase shares of our common stock and restricted stock awards.

Stock options. The administrator may grant incentive and/or non-statutory stock options under our 2013 Plan, provided that incentive stock options are only granted to employees. The exercise price of such options must generally be equal to at least the fair market value of our common stock on the date of grant except for certain grants made to certain foreign employees. The term of an option must not exceed 10 years; provided, however, that an incentive stock option held by a participant who owns more than 10% of the total combined voting power of all classes of our stock, or of certain of our subsidiary corporations, must not have a term in excess of 5 years and must have an exercise price of at least 110% of the fair market value of our common stock on the grant date. The administrator determines the methods of payment of the exercise price of an option. In addition, the administrator determines the vesting schedule applicable to options, together with any vesting acceleration, and the terms of the option agreements for use under our 2013 Plan. After the termination of service of an employee, director or consultant, the participant may exercise his or her option, to the extent vested, for the period of time stated in his or her option agreement. Generally, if termination is due to death or disability, the option will remain exercisable for 12 months. In the event of a termination for cause, options generally terminate immediately upon the termination of the participant for cause. In all other cases, the option will generally remain exercisable for 3 months following the termination of service. However, in no event may an option be exercised later than the expiration of its term.

Restricted stock. Restricted stock may be granted under our 2013 Plan. Restricted stock awards are grants of shares of our common stock that are subject to various restrictions, including restrictions on transferability and forfeiture provisions. Shares of restricted stock will vest and the restrictions on such shares will lapse, in accordance with terms and conditions established by the administrator. The administrator, in its sole discretion, may accelerate the time at which any restrictions will lapse or be removed. Recipients of restricted stock awards generally will have the same rights as other shareholders with respect to such shares upon grant without regard to vesting, subject to any applicable agreements. Shares of restricted stock that do not vest for any reason will be subject to our right of repurchase or forfeited by the recipient and will revert to us. The specific terms will be set forth in an award agreement.

Non-transferability of awards. Unless the administrator provides otherwise, our 2013 Plan generally does not allow for the transfer of awards and only the recipient of an option or stock appreciation right may exercise such an award during his or her lifetime.

Certain adjustments. In the event of certain corporate events or changes in our capitalization, to prevent diminution or enlargement of the benefits or potential benefits available under the 2013 Plan, the administrator will make adjustments to one or more of the number, kind and class of securities that may be delivered under the 2013 Plan and/or the number, kind, class and price of securities covered by each outstanding award.

Liquidation or dissolution. In the event of our proposed winding up, liquidation or dissolution, all awards will terminate immediately prior to the consummation of such proposed transaction.

Corporate transaction. The 2013 Plan provides that in the event of certain significant corporate transactions, including: (1) a transfer of all or substantially all of our assets, (2) a merger, consolidation or other capital, reorganization or business combination transaction of the Company with or into another corporation, entity or person, or (3) the consummation of a transaction, or series of related transactions, in which any person becomes the beneficial owner, directly or indirectly, of more than 50% of the Company's then outstanding capital stock, each outstanding award will be treated as the administrator determines. Such determination may provide that such awards will be (i) continued if we are the surviving corporation, (ii) assumed by the surviving corporation or its parent, (iii) substituted by the surviving corporation or its parent for a new award, (iv) canceled in exchange for a payment equal to the excess of the fair market value of our shares subject to such award over the exercise price or purchase price paid for such shares, or if such award is "underwater" canceled for no consideration, if any, or (v) in the case of options, accelerated prior to the consummation of the corporate transaction and cancelled for no consideration if not exercised.

Amendment or termination. Our board of directors may amend or terminate the 2013 Plan at any time. If our board of directors amends a plan, it does not need to ask for stockholder approval of the amendment unless such amendment increases the number of shares available for issuance under the 2013 Plan or as otherwise required by applicable law. No further awards will be made under the 2013 Plan after this offering.

Employee stock purchase plan

General. Our Employee Stock Purchase Plan, or 2018 ESPP, was adopted by our board of directors on September 26, 2018 and approved by our stockholders on October 16, 2018. The 2018 ESPP will become effective on the day immediately prior to the date that the registration statement of which this prospectus forms a part becomes effective. The 2018 ESPP is intended to qualify as an "employee stock purchase plan" within the meaning of Section 423 of the Code for U.S. employees. In addition, the 2018 ESPP authorizes grants of purchase rights that do not comply with Section 423 of the Code under a separate non-423 component for non-U.S. employees and certain non-U.S. service providers.

Share reserve. We have reserved 275,225 shares of our common stock for issuance under the ESPP. The number of shares reserved for issuance under the ESPP will be increased automatically on the first day of each

[Table of Contents](#)

fiscal year for a period of up to ten years, starting with the fiscal year following the year in which the ESPP becomes effective, by a number equal to the least of:

- 249,470 shares;
- 1% of the shares of common stock outstanding at that time; or
- such number of shares determined by our board of directors.

As of the date hereof, no shares of our common stock have been purchased under the ESPP.

Plan administration. The ESPP will be administered by our board of directors or a committee designated by our board of directors. Our board of directors has delegated its authority to administer the ESPP to our compensation committee.

Eligibility. Generally, all regular employees, including executive officers, employed by us or by any of our designated affiliates and certain non-U.S. service providers may participate in the ESPP.

Employees may have to satisfy one or more of the following service requirements before participating in the ESPP, as determined by the administrator, including: (1) being customarily employed for more than 20 hours per week, (2) being customarily employed for more than five months per calendar year, or (3) continuous employment with us or one of our affiliates for a period of time (not to exceed two years). No employee may purchase shares under the ESPP at a rate in excess of \$25,000 worth of our common stock based on the fair market value per share of our common stock at the beginning of an offering for each year such a purchase right is outstanding. Finally, no employee will be eligible for the grant of any purchase rights under the ESPP if immediately after such rights are granted, such employee has voting power over 5% or more of our outstanding capital stock measured by vote or value under Section 424(d) of the Code.

Non-U.S. service providers must provide bona fide services to the Company and may be subject to additional eligibility criteria as the administrator may determine even if such criteria is not consistent with Section 423 of the Code.

Offerings. The 2018 ESPP is implemented through a series of offerings under which participants are granted purchase rights to purchase shares of our common stock on specified dates during such offerings. Under the 2018 ESPP, we may specify offerings with durations of not more than 27 months, and may specify shorter purchase periods within each offering. Each offering will have one or more purchase dates on which shares of our common stock will be purchased for participants in the offering. An offering under the 2018 ESPP may be terminated under certain circumstances. The administrator will have the discretion to structure an offering so that if the fair market value of a share of our common stock on the first trading day of a new purchase period within that offering is less than or equal to the fair market value of a share of our common stock on the offering date for that offering, then that offering will terminate immediately as of that first trading day, and the participants in such terminated offering will be automatically enrolled in a new offering beginning on the first trading day of such new offering period.

Payroll deductions. Participants who are employees may contribute, normally through payroll deductions, up to 15% of their earnings (as defined in the 2018 ESPP) for the purchase of our common stock under the ESPP. Participants who are not employees will contribute on an after-tax basis in a manner determined by the administrator.

Unless otherwise determined by the administrator, common stock will be purchased for the accounts of participants in the 2018 ESPP at a price per share that is at least the lesser of (1) 85% of the fair market value of a share of our common stock on the first date of an offering, or (2) 85% of the fair market value of a share of our common stock on the date of purchase.

Certain adjustments. In the event that there occurs a change in our capital structure through such actions as a stock split, reverse stock split, stock dividend, combination, consolidation, recapitalization (including a recapitalization through a large nonrecurring cash dividend) or reclassification of our common stock, subdivision of our common stock, a rights offering, a reorganization, merger, spin-off, split-up, repurchase, or exchange of our common stock or other significant corporate transaction, or other change affecting our common stock, the administrator will make appropriate adjustments to: (1) the classes) and maximum number of shares reserved under the 2018 ESPP, (2) the class(es) and maximum number of shares by which the share reserve may increase automatically each year, (3) the class(es) and number of shares and purchase price of all outstanding purchase rights, and (4) the class(es) and number of shares that are subject to purchase limits under ongoing offerings.

Dissolution or liquidation. In the event of our proposed winding up, liquidation or dissolution, any offering period then in progress will be shortened by setting a new purchase date, and will terminate immediately prior to the consummation of such proposed dissolution or liquidation, unless provided otherwise by the administrator. The administrator will notify each participant that the purchase date has been changed and that the participant's purchase right will be exercised automatically on the new purchase date unless prior to such date the participant has withdrawn from the offering period.

Corporate transactions. The 2018 ESPP provides that in the event of certain significant corporate transactions, including: (1) a transfer of all or substantially all of our assets, (2) a merger, consolidation or other capital, reorganization or business combination transaction of the Company with or into another corporation, entity or person, or (3) the consummation of a transaction, or series of related transactions, in which any person becomes the beneficial owner, directly or indirectly, of more than 50% of the Company's then outstanding capital stock, a successor corporation may assume or substitute each outstanding purchase right. If the successor corporation refuses to assume or substitute the purchase right, the offering period then in progress will be shortened, and a new purchase date will be set. The administrator will notify each participant that the purchase date has been changed and that the participant's purchase right will be exercised automatically on the new purchase date unless prior to such date the participant has withdrawn from the offering period.

Amendment or termination. The administrator has the authority to amend, suspend or terminate our ESPP, except that, subject to certain exceptions described in our ESPP, no such action may adversely affect any outstanding rights to purchase stock under our ESPP without the holder's consent. We will obtain stockholder approval of any amendment to our ESPP as required by applicable law or listing requirements.

Executive incentive bonus plan

Our Executive Incentive Bonus Plan, or Bonus Plan, was adopted by our board of directors on September 26, 2018. The Bonus Plan will become effective on the day immediately prior to the date that the registration statement of which this prospectus forms a part becomes effective. The purpose of the Bonus Plan is to motivate and reward eligible officers and employees for their contributions toward the achievement of certain performance goals.

Administration. The Bonus Plan will be administered by the compensation committee, which shall have the discretionary authority to interpret the provisions of the Bonus Plan, including all decisions on eligibility to participate, the establishment of performance goals, the amount of awards payable under the plan, and the payment of awards. The compensation committee, in its sole discretion and on such terms and conditions as it may provide, may delegate all or part of its authority and powers under the Bonus Plan to one or more directors and/or officers of the Company.

Eligibility. Officers and other key employees of the Company designated by the compensation committee to participate in the Bonus Plan will be eligible to participate in this Bonus Plan, provided the compensation

[Table of Contents](#)

committee has not, in its sole discretion, withdrawn such designation and he or she meets the following conditions: (a) is a full-time regular employee of the Company as of the last day of the applicable performance period; and (b) is not subject to disciplinary action, is in good standing with the Company and is not subject to a performance improvement plan.

Performance criteria. Commencing with fiscal 2019, we expect the compensation committee to establish cash bonus targets and corporate performance metrics for a specific performance period pursuant to the Bonus Plan. Corporate performance goals may be based on one or more of the following criteria, as determined by our compensation committee and any adjustments thereto established by the compensation committee: (i) sales or non-sales revenue; (ii) return on revenues; (iii) operating income; (iv) income or earnings including operating income; (v) income or earnings before or after taxes, interest, depreciation, and/or amortization; (vi) income or earnings from continuing operations; (vii) net income; (viii) pre-tax income or after-tax income; (ix) net income excluding amortization of intangible assets, depreciation, and impairment of goodwill and intangible assets and/or excluding charges attributable to the adoption of new accounting pronouncements; (x) raising of financing or fundraising; (xi) project financing; (xii) revenue backlog; (xiii) gross margin; (xiv) operating margin or profit margin; (xv) capital expenditures, cost targets, reductions, and savings and expense management; (xvi) return on assets (gross or net), return on investment, return on capital or invested capital, or return on stockholder equity; (xvii) cash flow, free cash flow, cash flow return on investment (discounted or otherwise), net cash provided by operations, or cash flow in excess of cost of capital; (xviii) performance warranty and/or guarantee claims; (xix) stock price or total stockholder return; (xx) earnings or book value per share (basic or diluted); (xxi) economic value created; (xxii) pre-tax profit or after-tax profit; (xxiii) strategic business criteria, consisting of one or more objectives based on meeting specified market penetration or market share, completion of strategic agreements such as licenses, funded collaborations, joint ventures acquisitions, and the like, geographic business expansion, objective customer satisfaction or information technology goals, or intellectual property asset metrics; (xxiv) objective goals relating to divestitures, joint ventures, mergers, acquisitions, and similar transactions; (xxv) objective goals relating to staff management, results from staff attitude and/or opinion surveys, staff satisfaction scores, staff safety, staff accident and/or injury rates, compliance, headcount, performance management, or completion of critical staff training initiatives; (xxvi) objective goals relating to projects, including project completion, timing and/or achievement of milestones, project budget, or technical progress against work plans; (xxvii) key regulatory objectives or milestones; and (xxviii) enterprise resource planning.

However, awards issued to participants may take into account other factors (including subjective factors). Performance goals may differ from participant to participant, performance period to performance period, and from award to award. Any criteria used may be measured, as applicable, (i) in absolute terms, (ii) in relative terms (including, but not limited to, any increase (or decrease) over the passage of time and/or any measurement against other companies or financial or business or stock index metrics particular to us), (iii) on a per share and/or share per capita basis, (iv) against our performance as a whole or against any of our affiliate(s), or a particular segment(s), a business unit(s) or a product(s) of ours or individual project company, (v) on a pre-tax or after-tax basis, and/or (vi) using an actual foreign exchange rate or on a foreign exchange neutral basis.

Service requirement. Unless otherwise determined by the compensation committee, a participant must be actively employed and in good standing with the Company on the date the award is paid. The compensation committee may make exceptions to this requirement in the case of retirement, death or disability, an unqualified leave of absence or under other circumstances, as determined by the compensation committee in its sole discretion.

Limits. The total awards under the Bonus Plan may not exceed \$15 million in the aggregate during the applicable reliance period (within the meaning of Section 162(m) of the Code).

Amendment or termination. The compensation committee may terminate the Bonus Plan at any time, provided such termination shall not affect the payment of any awards accrued under the Bonus Plan prior to the date of the termination. The compensation committee may, at any time, or from time to time, amend or suspend and, if suspended, reinstate, the Bonus Plan in whole or in part.

Perquisites, health, welfare and retirement benefits

Our named executive officers are eligible to participate in our employee benefit plans, including our medical, dental, vision, group life, disability and accidental death and dismemberment insurance plans, in each case on the same basis as all of our other employees, except that beginning in fiscal 2018, our named executive officers along with certain other key employees will be eligible to participate in a supplemental disability plan for which we will pay premiums. We provide a 401(k) plan to our employees, including our current named executive officers, as discussed in the section below entitled “—401(k) Plan.”

We generally do not provide perquisites or personal benefits to our named executive officers, except in limited circumstances.

401(k) plan

We maintain a tax-qualified retirement plan (401(k) plan) that provides eligible employees with an opportunity to save for retirement on a tax advantaged basis. Eligible employees are able to defer eligible compensation subject to applicable annual Code limits. Employees are immediately and fully vested in their contributions. The 401(k) plan permits us to make matching contributions and profit sharing contributions to eligible participants, although we have not made any such contributions to date. We intend for our 401(k) plan to qualify under Sections 401(a) and 501(a) of the Code so that contributions by employees to the 401(k) plan, and earnings on those contributions, are not taxable to employees until withdrawn from the 401(k) plan.

Pension benefits

None of our named executive officers participate in or have an account balance in any qualified or non-qualified defined benefit plan sponsored by us.

Nonqualified deferred compensation

We have not offered any nonqualified deferred compensation plans or arrangements or entered into any such arrangements with any of our named executive officers

Rule 10b5-1 sales plans

We expect that some of our executive officers and directors may enter into stock selling plans in accordance with Rule 10b5-1 of the Securities Exchange Act of 1934, as amended, and our insider trading policy.

Certain relationships and related party transactions

In addition to the compensation arrangements, including employment, termination of employment and change in control arrangements, and indemnification arrangements, discussed, when required, in the sections titled “Management” and “Executive compensation” and the registration rights described in the section titled “Description of capital stock—Registration rights,” the following is a description of each transaction since October 1, 2014 and each currently proposed transaction in which:

- we have been or are to be a participant;
- the amount involved exceeded or will exceed \$120,000; and
- any of our directors, executive officers, or holders of more than 5% of any class of our voting securities, or any immediate family member of, or person sharing the household with, any of these persons, had or will have a direct or indirect material interest.

Equity financings

Series A convertible preferred stock financing

In three closings between July 2013 and January 2014, we sold an aggregate of 2,817,723 shares of our Series A convertible preferred stock at a purchase price of \$3.26 per share and upon conversion of certain convertible promissory notes with an aggregate conversion amount of approximately \$610,000, for an aggregate purchase price of approximately \$9.1 million. Each share of our Series A convertible preferred stock will convert automatically into one share of our common stock immediately prior to the completion of our initial public offering.

The following table summarizes the Series A convertible preferred stock purchased by our directors, executive officers and beneficial holders of more than 5% of our capital stock. The terms of these purchases, notwithstanding the conversion terms of the convertible promissory notes, were the same for all purchasers of our Series A convertible preferred stock.

Name of stockholder*	Shares of series A convertible preferred stock	Total purchase price (cash)	Total purchase price (conversion of indebtedness)
Entities affiliated with ARCH Venture Partners(1)	1,182,645	\$3,399,999.83	\$ 407,144.31
Illumina, Inc.(2)	542,203	\$1,539,999.65	\$ 203,572.01
Entities affiliated with Paladin Capital Group(3)	417,503	\$1,359,999.48	\$ 0.00

* Owners of more than 5% of our common stock

- (1) Keith Crandell, a member of our board of directors, is a managing director at ARCH Venture Partners VII, LLC, which is affiliated with ARCH Venture Fund VII, L.P. Consists of shares held by ARCH Venture Fund VII, L.P.
- (2) Robert Ragusa, a member of our board of directors, is Senior Vice President, Global Quality and Operations of Illumina, Inc.
- (3) Paul Conley, a member of our board of directors, is a managing director of Paladin Capital Management, LLC, which is affiliated with the Paladin funds holding our shares but Mr. Conley does not beneficially own any of the shares held by the Paladin funds. Consists of shares held by Paladin III (CA), LP, Paladin III (Cayman Islands) LP, Paladin III (HR), LP, Paladin III (NY City), LP, Paladin III Co-Investment, LLC and Paladin III, LP.

Series B convertible preferred stock financing

In May 2014, we sold an aggregate of 3,315,645 shares of our Series B convertible preferred stock at a purchase price of \$7.84 per share for an aggregate purchase price of approximately \$26.0 million. Each share of our Series B convertible preferred stock will convert automatically into one share of our common stock immediately prior to the completion of our initial public offering.

The following table summarizes the Series B convertible preferred stock purchased by our directors, executive officers and beneficial holders of more than 5% of our capital stock. The terms of these purchases were the same for all purchasers of our Series B convertible preferred stock.

Name of Stockholder*	Shares of series B convertible preferred	
	stock	Total purchase price
Entities affiliated with ARCH Venture Partners(1)	718,275	\$ 5,632,421.26
Illumina, Inc.(2)	329,305	\$ 2,582,280.36
Entities affiliated with Paladin Capital Group(3)	417,616	\$ 3,274,794.07
Entities affiliated with Tao Capital Partners(4)	962,815	\$ 7,549,999.78

* Owners of more than 5% of our common stock

- (1) Keith Crandell, a member of our board of directors, is a managing director at ARCH Venture Partners VII, LLC, which is affiliated with ARCH Venture Fund VII, L.P. Consists of shares held by ARCH Venture Fund VII, L.P.
- (2) Robert Ragusa, a member of our board of directors, is Senior Vice President, Global Quality and Operations of Illumina, Inc.
- (3) Paul Conley, a member of our board of directors, is a managing director of Paladin Capital Management, LLC, which is affiliated with the Paladin funds holding our shares but Mr. Conley does not beneficially own any of the shares held by the Paladin funds. Consists of shares held by Paladin III (CA), LP, Paladin III (Cayman Islands) LP, Paladin III (HR), LP, Paladin III (NY City), LP, Paladin III Co-Investment, LLC and Paladin III, LP.
- (4) Frederick Craves, a member of our board of directors, was appointed to the board by Tao Invest LLC but Mr. Craves does not beneficially own any of the shares held by Tao Invest LLC.

Series C convertible preferred stock financing

In May 2015, we sold an aggregate of 2,491,483 shares of our Series C convertible preferred stock at a purchase price of \$14.85 per share for an aggregate purchase price of approximately \$37.0 million. Each share of our Series C convertible preferred stock will convert automatically into one share of our common stock immediately prior to the completion of our initial public offering.

The following table summarizes the Series C convertible preferred stock purchased by our directors, executive officers and beneficial holders of more than 5% of our capital stock. The terms of these purchases were the same for all purchasers of our Series C convertible preferred stock.

Name of Stockholder*	Shares of series C convertible preferred	
	stock	Total purchase price
Entities affiliated with ARCH Venture Partners(1)	266,776	\$ 3,961,766.86
Illumina, Inc.(2)	673,378	\$ 9,999,999.79
Entities affiliated with Paladin Capital Group(3)	117,199	\$ 1,740,512.46
Entities affiliated with Tao Capital Partners(4)	135,122	\$ 2,006,630.72
Entities affiliated with Fidelity Select Portfolios(5)	1,010,066	\$ 14,999,998.94

* Owners of more than 5% of our common stock

- (1) Keith Crandell, a member of our board of directors, is a managing director at ARCH Venture Partners VII, LLC, which is affiliated with ARCH Venture Fund VII, L.P. Consists of shares held by ARCH Venture Fund VII, L.P.
- (2) Robert Ragusa, a member of our board of directors, is Senior Vice President, Global Quality and Operations of Illumina, Inc.
- (3) Paul Conley, a member of our board of directors, is a managing director of Paladin Capital Management, LLC, which is affiliated with the Paladin funds holding our shares but Mr. Conley does not beneficially own any of the shares held by the Paladin funds. Consists of shares held by Paladin III (CA), LP, Paladin III (Cayman Islands) LP, Paladin III (HR), LP, Paladin III (NY City), LP, Paladin III Co-Investment, LLC and Paladin III, LP.
- (4) Frederick Craves, a member of our board of directors, was designated to our board by Tao Invest LLC but Mr. Craves does not beneficially own any of the shares held by Tao Invest LLC.
- (5) Consists of shares held by Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund and Fidelity Select Portfolios: Biotechnology Portfolio.

Series D convertible preferred stock financing

In multiple closings between January 2016 and July 2018, we sold an aggregate of 10,326,454 shares of our Series D convertible preferred stock at a purchase price of \$21.24 per share for an aggregate purchase price of

[Table of Contents](#)

approximately \$291.5 million. Each share of our Series D convertible preferred stock will convert automatically into one share of our common stock immediately prior to the completion of our initial public offering.

The following table summarizes the Series D convertible preferred stock purchased by our directors, executive officers and beneficial holders of more than 5% of our capital stock. The terms of these purchases were the same for all purchasers of our Series D convertible preferred stock.

Name of stockholder*	Shares of series D convertible preferred stock	Total purchase price
Entities affiliated with ARCH Venture Partners(1)	1,118,872	\$ 23,769,955.17
Illumina, Inc.(2)	157,215	\$ 3,339,975.16
Entities affiliated with Paladin Capital Group(3)	141,983	\$ 3,016,478.70
Entities affiliated with Fidelity Select Portfolios(4)	245,422	\$ 5,213,900.80
Entities affiliated with Tao Capital Partners(5)	210,758	\$ 4,477,485.83
Ever Alpha Fund L.P.(6)	3,294,961	\$ 69,999,997.21

* Owners of more than 5% of our common stock

- (1) Keith Crandell, a member of our board of directors, is a managing director at ARCH Venture Partners VII, LLC, which is affiliated with ARCH Venture Fund VII, L.P. and a managing director at ARCH Venture Partners VIII, LLC, which is affiliated with ARCH Venture Fund VII Overage, L.P. Consists of shares held by ARCH Venture Fund VII, L.P. and ARCH Venture Fund VII Overage, L.P.
- (2) Robert Ragusa, a member of our board of directors, is Senior Vice President, Global Quality and Operations of Illumina, Inc.
- (3) Paul Conley, a member of our board of directors, is a managing director of Paladin Capital Management, LLC, which is affiliated with the Paladin funds holding our shares but Mr. Conley does not beneficially own any of the shares held by the Paladin funds. Consists of shares held by Paladin III (CA), LP, Paladin III (Cayman Islands) LP, Paladin III (HR), LP, Paladin III (NY City), LP, Paladin III Co-Investment, LLC and Paladin III, LP.
- (4) Consists of shares held by Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund and Fidelity Select Portfolios: Biotechnology Portfolio.
- (5) Frederick Craves, a member of our board of directors, was designated to our board by Tao Invest LLC but Mr. Craves does not beneficially own any of the shares held by Tao Invest LLC.
- (6) Xiaoying Mai, a member of our board of directors, is an Investment Director of GF Xinde Investment Management Co. Ltd, which is affiliated with Ever Alpha Fund L.P. but Ms. Mai does not beneficially own any of the shares held by Ever Alpha Fund L.P.

Participation in this Offering

Certain of our stockholders, including stockholders affiliated with certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$30 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no shares in this offering to any of these stockholders, or any of these stockholders may determine to purchase more, fewer or no shares in this offering.

Side Letter with Ever Alpha Fund. L.P.

In March 2018, in connection with Ever Alpha Fund L.P. and certain other investors' purchase of Series D convertible preferred stock, we entered into a side letter with Ever Alpha Fund L.P. and certain other parties pursuant to which, among other things, we have committed to using commercially reasonable efforts to invest up to \$5.0 million, \$10.0 million and \$10.0 million over a three year period in connection with the incorporation, business and/or operations of a wholly owned foreign enterprise in the PRC, subject to and contingent upon the approval of our board of directors and any applicable regulatory agencies in the PRC and U.S., and compliance with any applicable laws and regulations. The foreign enterprise will be exclusively owned and controlled by us through a subsidiary that we will wholly own, and Ever Alpha Fund L.P. will not have any direct economic, voting or other interests in this enterprise or any of our subsidiaries. Ever Alpha Fund L.P.'s interests in this enterprise are limited to its equity interest as a

stockholder in the Company and its belief that expanding our manufacturing capacity and growing our sales organization in China will have a positive impact on our business and long-term value.

Indemnification agreements and directors' and officers' liability insurance

We have entered into or intend to enter into indemnification agreements with each of our directors and executive officers. The indemnification agreements and our certificate of incorporation and bylaws require us to indemnify our directors and officers to the fullest extent permitted by Delaware law, including indemnification of expenses such as attorneys' fees, judgments, penalties fines and settlement amounts incurred by the director or executive officer in any action or proceeding, including any action or proceeding by or in right of us, arising out of the person's services as a director or executive officer. We have obtained an insurance policy that insures our directors and officers against certain liabilities, including liabilities arising under applicable securities laws. For more information regarding these indemnification agreements, see "Executive compensation—Limitation of liability and indemnification of directors and officers."

Registration rights agreement

In January 2016, we entered into an amended and restated registration rights agreement, as amended in March 2018, with certain holders of our convertible preferred stock, including entities affiliated with Arch Venture Partners, Fidelity Advisor, Illumina, Inc., Paladin Holdings, and Tao Invest LLC, which each hold more than 5% of our capital stock and some of which certain of our directors are affiliated. Pursuant to the amended and restated registration rights agreement, these holders are entitled to rights with respect to the registration of their shares following this offering under the Securities Act. For a more detailed description of these registration rights, see "Description of capital stock—Registration rights."

Stockholders agreement

In January 2016, we entered into an amended and restated stockholders agreement, as amended in March 2018, under which certain holders of our capital stock, including entities with which certain of our directors are affiliated, have agreed to vote their shares on certain matters, including with respect to the election of directors. This agreement grants certain of our investors the right of co-sale with respect to proposed transfers of our securities by certain stockholders. This agreement will terminate upon the completion of this offering and thereafter none of our stockholders will have any special rights regarding the election or designation of members of our board of directors, co-sale or the voting of our capital stock.

Other transactions

We have granted stock options and other equity awards to our executive officers and certain of our directors. For a description of these options and equity awards, see "Executive Compensation—Outstanding equity awards as of September 30" and "Management—Non-employee director compensation Table."

We have entered into certain employment arrangements or agreements with some of our executive officers that provide for severance and change in control benefits. We intend to amend such agreements in connection with the completion of this offering and we will disclose the terms of such agreements once finalized. For a description of the current employment arrangements, see "Executive compensation—Executive employment arrangements."

On November 10, 2017, we entered into a separation and release agreement with Solange Glaize in connection with her resignation as our Chief Financial Officer on October 23, 2017. Pursuant to the terms of her separation and release agreement, she received approximately \$160,000 in severance benefits, which consisted of cash severance and reimbursements for COBRA premiums and legal fees.

We purchase certain reagents and equipment from Illumina, Inc., a company that owns more than five percent of our outstanding capital stock and where Robert Ragusa, one of our board members, serves as the Senior Vice President, Global Quality and Operations. Purchases from Illumina, Inc. amounted to \$1.0 million and \$2.0 million for the years ended September 30, 2016 and 2017, respectively. Purchases from Illumina, Inc. amounted to \$1.3 million and \$1.8 million for the nine months ended June 30, 2017 and 2018, respectively. We do not currently have an agreement with Illumina, Inc., for the purchase of reagents but we acquire them on a purchase order basis. We believe that the prices we pay to Illumina, Inc. for reagents and equipment are comparable to prices available from third parties selling similar reagents and equipment of similar quality.

We sell our NGS tool kits and NGS sequencing tools to GRAIL, Inc., a spin-out of Illumina, Inc., a company that is affiliated with GRAIL and owns more than five percent of our outstanding capital stock. Sales to GRAIL amounted to approximately \$0.5 million in fiscal 2018. We do not currently have an agreement with GRAIL for the sale of our products, but we sell to them on a purchase order basis.

Policies and procedures for related party transactions

Our audit committee charter will be effective when we complete this offering. The charter states that our audit committee is responsible for reviewing and approving in advance any related party transaction. Our board of directors intends to adopt a written related person transaction policy to set forth the policies and procedures for the review and approval or ratification of related person transactions by the audit committee. Pursuant to the policy, all of our directors, officers and employees will be required to report to the audit committee prior to entering into any transaction, arrangement or relationship, or any series of similar transactions, arrangements or relationships in which we are to be a participant, the amount involved exceeds \$120,000 and a related person had or will have a direct or indirect material interest, including purchases of goods or services by or from the related person or entities in which the related person has a material interest, indebtedness, guarantees of indebtedness and employment by us of a related person.

We believe that we have executed all of the transactions set forth under the section entitled "Certain Relationships and Related Party Transactions" on terms no less favorable to us than we could have obtained from unaffiliated third parties. It is our intention to ensure that all future transactions between us and our officers, directors and principal stockholders and their affiliates, are approved by the audit committee of our board of directors, and are on terms no less favorable to us than those that we could obtain from unaffiliated third parties.

Principal stockholders

The following table and footnotes set forth information with respect to the beneficial ownership of our common stock as of September 30, 2018, subject to certain assumptions set forth in the footnote and as adjusted to reflect the sale of the shares of common stock offered in the public offering under this prospectus for:

- each holder of 5% or more of the outstanding shares of our common stock;
- each of our named executive officers;
- each of our directors; and
- all of our executive officers and directors as a group.

In accordance with SEC rules, each listed person's beneficial ownership includes:

- all shares the investor actually owns beneficially or of record;
- all shares over which the investor has or shares voting or dispositive control (such as in the capacity as a general partner of an investment fund); and
- all shares the investor has the right to acquire beneficial ownership of within 60 days after September 30, 2018.

Our calculation of the percentage of beneficial ownership prior to this offering is based on 22,178,708 shares of common stock outstanding as of September 30, 2018, assuming the automatic conversion of all outstanding shares of our convertible preferred stock on a one-for-one basis into 18,951,305 shares of common stock and shares outstanding after completion of this offering. The percentage ownership information assumes no exercise of the underwriters' option to purchase additional shares. Shares of common stock that a person has the right to acquire within 60 days after September 30, 2018 are deemed outstanding for purposes of computing the percentage ownership of the person holding such rights, but are not deemed outstanding for purposes of computing the percentage ownership of any other person, except with respect to the percentage ownership of all directors and executive officers as a group.

Certain of our stockholders, including stockholders affiliated with certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$30 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no shares in this offering to any of these stockholders, or any of these stockholders may determine to purchase more, fewer or no shares in this offering. The figures in the table below do not reflect the purchase of the shares in this offering by these potential investors in the amounts they have indicated an interest in purchasing.

Unless otherwise indicated, we believe, based on the information furnished to us, that the persons named in the table below have sole voting and investment power with respect to all securities that they beneficially own, subject to community property laws where applicable. Unless otherwise noted below, the business address of the stockholders listed below is the address of our principal executive office, 455 Mission Bay Boulevard South, Suite 545, San Francisco, CA 94158.

Name of beneficial owner			Shares beneficially owned prior to the offering		Shares beneficially owned after the offering	
	Common stock	Options exercisable within 60 days	Aggregate number of shares beneficially owned	%	Aggregate number of shares beneficially owned	%
5% or more stockholders:						
Ever Alpha Fund L.P.(1)	3,294,961	—	3,294,961	14.9%	3,294,961	12.1%
Entities affiliated with ARCH Venture Partners(2)	3,286,568	—	3,286,568	14.8%	3,286,568	12.1%
Illumina, Inc.(3)	1,702,101	—	1,702,101	7.7%	1,702,101	6.3%
Entities affiliated with Tao Capital Partners(4)	1,308,695	—	1,308,695	5.9%	1,308,695	4.8%
Entities affiliated with Fidelity Select Portfolios(5)	1,255,488	—	1,255,488	5.7%	1,255,488	4.6%
Entities affiliated with Paladin Capital Group(6)	1,094,301	—	1,094,301	4.9%	1,094,301	4.0%
Named executive officers and directors:						
Emily M. Leproust(7)	708,330	331,793	1,040,123	4.6%	1,040,123	3.8%
James M. Thorburn(8)	—	176,749	176,749	*	176,749	*
Mark Daniels(9)	21,355	104,569	125,924	*	125,924	*
William Banyai(10)	708,330	253,508	961,838	4.3%	961,838	3.5%
Robert Chess(11)	69,822	35,521	105,343	*	105,343	*
Frederick B. Craves(12)	66,771	—	66,771	*	66,771	*
Paul A. Conley(13)	—	—	—	*	—	*
Keith Crandell(2)	3,286,568	—	3,286,568	14.8%	3,286,568	12.1%
Jan Johannessen	—	—	—	*	—	*
Xiaoying Mai(14)	—	—	—	*	—	*
Robert Ragusa(3)	1,702,101	—	1,702,101	7.7%	1,702,101	6.3%
All directors and executive officers as a group(15) (15 persons)	7,326,134	1,338,743	8,664,877	36.8%	8,664,877	30.4%

* Represents beneficial ownership of less than one percent of the outstanding shares of our common stock.

- (1) Consists of 3,294,961 shares held of record by Ever Alpha Fund L.P. Ever Glory Limited is the general partner of Ever Alpha Fund L.P. Ever Glory Limited is a wholly owned subsidiary of Guangfa Xinde Capital Management Limited. Guangfa Xinde Capital Management Limited is a wholly owned subsidiary of Guangfa Investment (Hong Kong) Company Limited. Guangfa Investment (Hong Kong) Company Limited is a wholly owned subsidiary of Guangfa Holding (Hong Kong) Corporation Limited. Guangfa Holding (Hong Kong) Corporation Limited is the wholly owned subsidiary of Guangfa Securities Co., Ltd, a publicly listed company in Hong Kong. Sun Shuming, Lin Zhihai, Qin Li, Sun Xiaoyan, Yang Xiong, Tang Xin, Chan Kalok, Shang Shuzhi, Li Xiulin, Li Yanxi and Liu Xuetao serve on the Board of Directors of Guangfa Securities Co., Ltd and may be deemed to share voting and dispositive power over the shares held by Ever Alpha Fund L.P. The address of Ever Alpha Fund L.P. is Fl 16th, 183rd Tianhebei Rd, Guangzhou, PR China.
- (2) Consists of (i) 2,392,422 shares held of record by ARCH Venture Fund VII, L.P., or ARCH VII and (ii) 894,146 shares held of record by ARCH Venture Fund VIII Overage, L.P., or ARCH VIII Overage. ARCH Venture Partners VII, L.P., or the GPLP, is the sole general partner of ARCH VII and ARCH Venture Partners VII, LLC, or the GPLLC, is the sole general partner of the GPLP. ARCH Venture Partners VIII, LLC, or ARCH VIII Partners, is the sole general partner of ARCH VIII Overage. Keith Crandell, Clinton Bybee and Robert Nelsen are the managing directors of the GPLLC and ARCH VIII Partners, and therefore, may be deemed to share voting and dispositive power over the shares held of record by ARCH VII and ARCH VIII Overage. The address for each of the entities identified in this footnote is 8755 West Higgins Road, Suite 1025, Chicago, IL 60631.
- (3) Consists of 1,702,101 shares held of record by Illumina, Inc. Robert Ragusa is Senior Vice President, Global Quality and Operations of Illumina, Inc., and has sole voting and dispositive power over the shares held of record by Illumina, Inc. The address of Illumina, Inc. is 25861 Industrial Boulevard, Hayward, CA 94545.

Table of Contents

- (4) Consists of (i) 1,218,815 shares held of record by Tao Invest, LLC and (ii) 89,880 shares held of record by Tao Invest II, LLC, or collectively, the Tao Funds. Tao Capital Management LP is the managing member of each of the Tao Funds. Tao Capital Management Inc. is the general partner of Tao Capital Management LP. Nicholas J. Pritzker is the chairman and Joseph I. Perkovich is the president of Tao Capital Management Inc. and each may be deemed to have voting and dispositive power over the shares held of record by the Tao Funds. The address of Tao Invest LLC is 1 Letterman Drive, San Francisco, CA 94129.
- (5) Consists of (i) 234,357 shares held of record by Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund and (ii) 1,021,131 shares held of record by Fidelity Select Portfolios: Biotechnology Portfolio, or collectively, the Fidelity Funds. The Fidelity Funds are managed by direct or indirect subsidiaries of FMR LLC. Edward C. Johnson 3d is a Director and the Chairman of FMR LLC and Abigail P. Johnson is a Director, the Vice Chairman and the President of FMR LLC. Members of the family of Edward C. Johnson 3d, including Abigail P. Johnson, are the predominant owners, directly or through trusts, of Series B voting common shares of FMR LLC, representing 49% of the voting power of FMR LLC. The Johnson family group and all other Series B shareholders have entered into a shareholders' voting agreement under which all Series B voting common shares will be voted in accordance with the majority vote of Series B voting common shares. Accordingly, through their ownership of voting common shares and the execution of the shareholders' voting agreement, members of the Johnson family may be deemed, under the Investment Company Act of 1940, to form a controlling group with respect to FMR LLC. Neither FMR LLC nor Edward C. Johnson 3d nor Abigail P. Johnson has the sole power to vote or direct the voting of the shares owned directly by the various investment companies registered under the Investment Company Act advised by Fidelity Management & Research Company, or FMR Co, a wholly owned subsidiary of FMR LLC, which power resides with the Fidelity Funds' Boards of Trustees. Fidelity Management & Research Company carries out the voting of the shares under written guidelines established by the Fidelity Funds' Boards of Trustees. The address for each of the entities identified in this footnote is 525 Washington Boulevard, New Jersey, NJ 07310.
- (6) Consists of (i) 99,840 shares held of record by Paladin III (CA), LP, (ii) 201,015 shares held of record by Paladin III (Cayman Islands), LP, (iii) 99,840 shares held of record by Paladin III (HR), LP, (iv) 292,684 shares held of record by Paladin III (NY City), LP, (v) 346,786 shares held of record by Paladin III, LP, or collectively, the Paladin Funds, and (vi) 54,136 shares held of record by Paladin III Co-Investment, LLC. Paladin Holdings III, L.P. is the general partner of the Paladin Funds and Managing Member of Paladin III Co-Investment, LLC and its Investment Committee, which consists of Michael Steed and Mark Maloney, may be deemed to have voting and dispositive power over the shares held of record by the Paladin Funds and Paladin III Co-Investment LLC. The address for each of the entities identified in this footnote is c/o Paladin Capital Management, LLC, 2020 K Street, NW - Suite 620, Washington, DC 20006.
- (7) Consists of (i) 708,330 shares of common stock and (ii) 331,793 shares issuable upon the exercise of early-exercisable stock options, 147,272 of which would be vested within 60 days after September 30, 2018.
- (8) Consists of 176,749 shares issuable upon the exercise of early-exercisable stock options, none of which would be vested within 60 days after August 31, 2018.
- (9) Consists of (i) 21,355 shares of common stock and (ii) 104,569 shares issuable upon the exercise of early-exercisable stock options, 26,529 of which would be vested within 60 days after September 30, 2018.
- (10) Consists of (i) 708,330 shares of common stock and (ii) 253,508 shares issuable upon the exercise of early-exercisable stock options, 124,439 of which would be vested within 60 days after September 30, 2018.
- (11) Consists of (i) 69,822 shares of common stock and (ii) 35,521 shares issuable upon the exercise of early-exercisable stock options, 4,913 of which would be vested within 60 days after September 30, 2018.
- (12) Consists of 66,771 shares held of record by The Craves Family Foundation. Fred Craves may be deemed to hold sole voting and dispositive power with respect to the shares held by The Craves Family Foundation. Mr. Craves does not have voting and dispositive power over the shares held of record by the Tao Funds. Mr. Craves' address is 750 Battery Street, Suite 400, San Francisco, CA 94111.
- (13) Paul Conley does not have voting and dispositive power over the shares held of record by the Paladin Funds and Paladin III Co-Investment LLC.
- (14) Xiaoying Mai does not have voting and dispositive power over the shares held of record by Ever Alpha Fund L.P.
- (15) Consists of (i) 2,270,694 shares of common stock, (ii) 1,338,743 shares of common stock that may be acquired pursuant to the exercise of stock options within 60 days after September 30, 2018 and (iii) 5,055,440 shares of common stock issuable upon conversion of preferred stock.

Description of capital stock

The following is a description of the material terms of our amended and restated certificate of incorporation and amended and restated bylaws as each will be in effect as of the completion of this offering, and of specific provisions of Delaware law. The following description is intended as a summary only and is qualified in its entirety by reference to our amended and restated certificate of incorporation, our amended and restated bylaws and the DGCL. Copies of our amended and restated certificate of incorporation and amended and restated bylaws have been filed as exhibits to the registration statement of which this prospectus is a part.

General

Immediately following the closing of this offering, our authorized capital stock will consist of 100,000,000 shares of common stock, \$0.00001 par value per share, and 10,000,000 shares of preferred stock, \$0.00001 par value per share, all of which preferred stock will be undesignated. The following information reflects the filing of our amended and restated certificate of incorporation and the conversion of all outstanding shares of our preferred stock into shares of common stock immediately prior to the closing of this offering.

Upon the closing of this offering and based on 21,609,991 shares of our common stock outstanding as of June 30, 2018, 26,609,991 shares of our common stock will be outstanding, assuming the conversion of all outstanding shares of our convertible preferred stock into 18,386,457 shares of our common stock immediately prior to the closing of this offering. As of June 30, 2018, we had 196 stockholders of record.

Effective October 16, 2018, we effected a one-for-0.101 reverse stock split, or the Reverse Stock Split, of our issued and outstanding common stock, convertible preferred stock, stock options, warrants to purchase shares of our convertible redeemable preferred stock and warrants to purchase shares of our common stock. We will make a cash payment to stockholders for all fractional shares which would otherwise be required to be issued as a result of the Reverse Stock Split.

Common stock

As of June 30, 2018, we had 21,609,991 shares of common stock issued and outstanding assuming the conversion of all outstanding shares of our convertible preferred stock into 18,386,457 shares of our common stock as if such conversion had occurred on June 30, 2018. The holders of our common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders. Cumulative voting for the election of directors is not provided for in our amended and restated certificate of incorporation, which means the holders of a majority of our shares of common stock can elect all of the directors then standing for election. Subject to preferences that may be applicable to any outstanding convertible preferred stock, holders of common stock are entitled to receive ratably such dividends as may be declared by the board of directors out of funds legally available for that purpose. See "Dividend policy." In the event of liquidation, dissolution or winding up of the company, the holders of our common stock are entitled to share ratably in all assets remaining after payment of liabilities, subject to the prior distribution rights of any outstanding convertible preferred stock. The common stock has no preemptive or conversion rights or other subscription rights. The outstanding shares of common stock are, and the shares of common stock to be issued upon completion of this offering will be, fully paid and non-assessable.

Preferred stock

As of June 30, 2018, there were 18,386,457 shares of convertible preferred stock outstanding, which will automatically convert, immediately prior to the completion of this offering, into 18,386,457 shares of our

common stock. After the closing of this offering, the board of directors will have the authority, without further action by the stockholders, to issue up to 10,000,000 shares of preferred stock, \$0.00001 par value per share, in one or more series. The board of directors will also have the authority to designate the rights, preferences, privileges and restrictions of each such series, including dividend rights, preferences, privileges and restrictions of each such series, including dividend rights, dividend rates, conversion rights, voting rights, terms of redemption, redemption prices, liquidation preferences, sinking fund terms and the number of shares constituting any series.

The issuance of preferred stock may have the effect of delaying, deferring or preventing a change in control of the company without further action by the stockholders. The issuance of convertible preferred stock with voting and conversion rights may also adversely affect the voting power of the holders of common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation. In certain circumstances, an issuance of preferred stock could have the effect of decreasing the market price of the common stock. As of the closing of the offering, no shares of convertible preferred stock will be outstanding. We currently have no plans to issue any shares of convertible preferred stock.

Warrants

As of June 30, 2018, we had warrants outstanding to purchase 143,571 shares of our common stock, assuming the conversion of our convertible preferred stock into common stock, and which will become exercisable for an additional 64,126 shares of our common stock at an exercise price of \$6.24 per share upon the drawing down of additional loans under our credit facility, at exercise prices ranging from approximately \$3.26 to \$21.24 per share. Each outstanding warrant contains provisions for the adjustment of the exercise price and the number of shares issuable upon exercise in the event of stock dividends, stock splits, reorganizations and reclassifications, consolidations and the like.

Options

As of June 30, 2018, we had outstanding options to purchase 2,424,024 shares of our common stock under our 2013 Plan and 944,123 shares remained available for future awards.

Registration rights

Based on the number of shares outstanding as of June 30, 2018, under our amended and restated registration rights agreement, after the consummation of this offering, the holders of up to approximately 20.5 million shares of common stock, or their affiliates or transferees, have the right to require us to register their shares under the Securities Act so that those shares may be publicly resold, or to include their shares in any registration statement we file, in each case as described below.

The registration rights terminate with respect to the registration rights of an individual holder on the earliest to occur of (i) five years following the consummation of this offering, (ii) the liquidation, dissolution or indefinite cessation of the business operations of our company, or the closing of a deemed liquidation, dissolution or winding up of our company pursuant to our amended and restated certificate of incorporation, or (iii) such time as Rule 144 or another similar exemption under the Securities Act is available for the sale of such stockholder's shares.

Demand registration rights

Based on the number of shares outstanding as of June 30, 2018, after the consummation of this offering, the holders of approximately 18.4 million shares of our common stock (on an as-converted basis), or their transferees, will be entitled to certain demand registration rights. At any time after one hundred eighty

(180) days following the effectiveness of the registration statement of which this prospectus is a part, the holders of at least a majority of the registrable securities may demand that we effect a registration under the Securities Act covering the public offering and sale of at least the number of registrable securities held by such stockholders having an anticipated aggregate offering price, net of underwriting discounts and commissions, of at least \$10,000,000. Upon any such demand, we must effect the registration of such registrable securities that have been requested to register together with all other registrable securities that we may have been requested to register by other stockholders pursuant to the incidental registration rights described below. We are only obligated to effect two registrations in response to these demand registration rights. In the event we are required to effect such a demand registration, we may not effect any other registration of securities for sale for our own account (other than a registration effected solely to implement an employee benefit plan or in certain business combination transactions) within 120 days following the effective date of the demand registration.

Piggyback registration rights

In connection with this offering, certain holders were entitled to, and the necessary percentage of holders waived, their rights to notice of this offering and to include their shares of registrable securities in this offering. If we register any securities for public sale in another offering, including pursuant to any stockholder initiated demand registration, holders of such registrable securities will have the right to include their shares in the registration statement for such offering, subject to certain exceptions. The underwriters of any underwritten offering will have the right to limit the number registrable securities to be included in the registration statement, subject to certain restrictions.

Form S-3 registration rights

Following this offering, we are required to use our best efforts to qualify and remain qualified to register securities pursuant to a registration statement on Form S-3 under the Securities Act. At any time after we are qualified to file a registration statement on Form S-3, the holders of registrable securities anticipated to have an aggregate sale price, net of underwriting discounts and commission, in excess of \$5,000,000 may request in writing an unlimited number of registration statements on Form S-3 for the registrable securities held by such requesting holder or holders, and we are required to use our best efforts to effect such registrations.

Expenses of registration

We will pay all registration expenses related to any demand, piggyback or Form S-3 registration, including reasonable fees and disbursements of one special counsel for the holders of such registrable securities, other than underwriting fees, discounts or commissions (if any), which will be borne by the holders of such registrable securities.

Anti-takeover effects of Delaware law and our amended and restated certificate of incorporation and amended and restated bylaws

Our amended and restated certificate of incorporation and our amended and restated bylaws, which will be in effect upon the completion of this offering, will contain certain provisions that could have the effect of delaying, deterring or preventing another party from acquiring control of us. These provisions and certain provisions of Delaware law, which are summarized below, are expected to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed, in part, to encourage persons seeking to acquire control of us to negotiate first with our board of directors. We believe that the benefits of increased protection of our potential ability to negotiate more favorable terms with an unfriendly or unsolicited acquirer outweigh the disadvantages of discouraging a proposal to acquire us.

Undesignated preferred stock

As discussed above, our board of directors will have the ability to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to change control of us. These and other provisions may have the effect of deterring hostile takeovers or delaying changes in control or management of our company.

Limits on ability of stockholders to act by written consent or call a special meeting

Our amended and restated certificate of incorporation will provide that our stockholders may not act by written consent, which may lengthen the amount of time required to take stockholder actions. As a result, a holder controlling a majority of our capital stock would not be able to amend our bylaws or remove directors without holding a meeting of our stockholders called in accordance with our bylaws.

In addition, our amended and restated bylaws will provide that special meetings of the stockholders may be called only by the majority of our board of directors. Stockholders may not call a special meeting, which may delay the ability of our stockholders to force consideration of a proposal or for holders controlling a majority of our capital stock to take any action, including the removal of directors.

Requirements for advance notification of stockholder nominations and proposals

Our amended and restated bylaws will establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board of directors or a committee of our board of directors. These provisions may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed. These provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of our company.

Board classification

Upon the closing of the offering, our board of directors will be divided into three classes, one class of which is elected each year by our stockholders. The directors in each class will serve three-year terms. For more information on the classified board, see "Management—Board of directors." A third party may be discouraged from making a tender offer or otherwise attempting to obtain control of us as it is more difficult and time-consuming for stockholders to replace a majority of the directors on a classified board.

No cumulative voting

Our amended and restated certificate of incorporation and amended and restated bylaws will not provide for cumulative voting in the election of directors. Cumulative voting allows a stockholder to vote a portion or all of its shares for one or more candidates for seats on the board of directors. Without cumulative voting, a minority stockholder may not be able to gain as many seats on our board of directors as the stockholder would be able to gain if cumulative voting were permitted. The absence of cumulative voting makes it more difficult for a minority stockholder to gain a seat on our board of directors to influence our board's decision regarding a takeover.

Amendment of charter and bylaws provisions

The amendment of the above provisions of our amended and restated certificate of incorporation will require approval by holders of at least two thirds of our outstanding capital stock entitled to vote generally in the election of directors. The amendment of certain provisions of our bylaws will also require approval by the holders of at least two thirds of our outstanding capital stock entitled to vote generally in the election of directors.

Delaware anti-takeover statute

We are subject to the provisions of Section 203 of the DGCL regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging, under certain circumstances, in a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

- prior to the date of the transaction, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, calculated as provided under Section 203; or
- at or subsequent to the date of the transaction, the business combination is approved by our board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation's outstanding voting stock. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. We anticipate that Section 203 may also discourage attempts that might result in a premium over the market price for the shares of common stock held by stockholders.

The provisions of Delaware law and the provisions of our amended and restated certificate of incorporation and amended and restated bylaws, as amended upon the completion of this offering, could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they might also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions might also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders might otherwise deem to be in their best interests.

Our amended and restated certificate of incorporation to be in effect upon completion of this offering provides that the Court of Chancery of the State of Delaware is the sole and exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, any action asserting a claim against us arising pursuant to any provisions of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws to be in effect upon completion of this offering, any action or proceeding asserting a claim as to which the Delaware General Corporation Law confers jurisdiction upon the Court of Chancery of the State of Delaware or any action asserting a claim against us that is governed by the internal affairs doctrine, subject in each case to the Court of Chancery having personal jurisdiction over the parties named as defendants therein. Our amended and restated certificate of incorporation to be in effect upon completion of this offering further provides that the federal district courts of the United States will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. Although our amended and restated certificate of incorporation contains the choice of forum provision described above, it is possible that a court could find that such a provision is inapplicable for a particular claim or action or that such provision is unenforceable.

Transfer agent and registrar

Upon the completion of this offering, the transfer agent and registrar for our common stock will be American Stock Transfer & Trust Company, LLC. The transfer agent and registrar's address is 6201 15th Avenue, Brooklyn, NY 11219, and its telephone number is (718) 921-8124.

Listing

We have applied to list our common stock on the Nasdaq Global Market under the trading symbol "TWST."

Shares eligible for future sale

Prior to this offering, there has not been any public market for our common stock, and we make no prediction as to the effect, if any, that market sales of shares of common stock or the availability of shares of common stock for sale will have on the market price of common stock prevailing from time to time. Nevertheless, sales of substantial amounts of common stock in the public market, or the perception that such sales could occur, could adversely affect the market price of common stock and could impair our future ability to raise capital through the sale of equity securities.

Sale of restricted shares

Based on the number of shares outstanding as of June 30, 2018, when this offering is complete, we will have an aggregate of 26,609,991 shares of common stock outstanding.

Of the outstanding shares, all of the 5,000,000 shares sold in this offering will be freely tradable. The remaining 21,609,991 shares of common stock will be deemed "restricted securities" as defined in Rule 144. Restricted securities may be sold in the public market only if registered or if they qualify for an exemption from registration under Rule 144 or Rule 701, promulgated under the Securities Act, which rules are summarized below.

As a result of the contractual restrictions described below and the provisions of Rules 144 and 701, the restricted shares will be available for sale in the public market as follows:

- no shares will be eligible for sale when this offering is complete; and
- 21,609,991 shares will be eligible for sale upon the expiration of the lock-up agreements, described below, beginning 181 days after the date of this prospectus.

In addition, of the 2,424,024 shares of our common stock that were subject to stock options outstanding as of June 30, 2018, options to purchase 750,264 shares of common stock were vested as of June 30, 2018 and will be eligible for sale 181 days following the date of this prospectus.

Lock-up agreements and obligations

We, all of our directors, officers and all of our securityholders have entered into lock-up agreements that generally provide that these holders will not offer, pledge, sell, agree to sell, directly or indirectly, or otherwise dispose of any shares of common stock or any securities convertible into or exchangeable for shares of common stock without the prior written consent of J.P. Morgan Securities LLC and Cowen and Company, LLC for a period of 180 days from the date of this prospectus, subject to certain exceptions. These agreements, and the exceptions thereto, are described beginning on page 164 of this prospectus in the section titled "Underwriting."

In addition, each grant agreement under our 2013 Plan contains restrictions similar to those set forth in the lock-up agreements described above limiting the disposition of securities issuable pursuant to those plans for a period of 180 days following the date of this prospectus.

Rule 144

In general, under Rule 144 as currently in effect, once we have been subject to public company reporting requirements for at least 90 days, a person who is not deemed to have been one of our affiliates for purposes of the Securities Act at any time during the 90 days preceding a sale and who has beneficially owned the shares proposed to be sold for at least six months, including the holding period of any prior owner other than our

affiliates, is entitled to sell such shares without complying with the manner of sale, volume limitation or notice provisions of Rule 144, subject to compliance with the public information requirements of Rule 144. If such a person has beneficially owned the shares proposed to be sold for at least one year, including the holding period of any prior owner other than our affiliates, then such person is entitled to sell such shares without complying with any of the requirements of Rule 144.

In general, under Rule 144, as currently in effect, our affiliates or persons selling shares on behalf of our affiliates are entitled to sell upon expiration of the lock-up agreements described above, within any three-month period beginning 90 days after the date of this prospectus, a number of shares that does not exceed the greater of:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately shares, assuming no exercise of the underwriters' option to purchase additional shares of common stock, immediately after this offering; or
- the average weekly trading volume of our common stock on the Nasdaq Global Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to such sale.

Sales under Rule 144 by our affiliates or persons selling shares on behalf of our affiliates are also subject to certain manner of sale provisions and notice requirements and to the availability of current public information about us.

Rule 701

Rule 701, as presently in effect, generally allows a stockholder who purchased shares of our common stock pursuant to a written compensatory plan or contract and who is not deemed to have been an affiliate of our company during the immediately preceding 90 days to sell these shares in reliance upon Rule 144, but without being required to comply with the public information, holding period, volume limitation, or notice provisions of Rule 144. Rule 701 also permits affiliates of our company to sell their Rule 701 shares under Rule 144 without complying with the holding period requirements of Rule 144. All holders of Rule 701 shares, however, are required to wait until 90 days after the date of the prospectus before selling such shares pursuant to Rule 701.

As of June 30, 2018, 1,002,525 shares of our outstanding stock had been issued in reliance on Rule 701 as a result of exercises of stock options and stock awards. These shares will be eligible for resale in reliance on this rule upon expiration of the lock-up agreements described above.

Stock options

We intend to file a registration statement on Form S-8 under the Securities Act covering all of the shares of our common stock subject to options outstanding or reserved for issuance under our stock plans, and shares of our common stock issued upon the exercise of options by employees. We expect to file this registration statement as soon as permitted under the Securities Act. Shares covered by this registration statement will be eligible for sale in the public market, upon the expiration or release from the terms of the lock-up agreements, and subject to vesting of such shares.

Registration rights

When this offering is complete, the holders of an aggregate of 20,545,416 shares of our common stock, or their transferees, will be entitled to rights with respect to the registration of their shares under the Securities Act. Registration of these shares under the Securities Act would result in these shares becoming freely tradeable without restriction under the Securities Act immediately upon the effectiveness of such registration. For a further description of these rights, see "Description of capital stock—Registration rights."

Material U.S. federal income tax considerations for non-U.S. holders

This section discusses certain material U.S. federal income tax consequences of the ownership and sale, exchange or other taxable disposition of our common stock sold pursuant to this offering to a “non-U.S. holder” (as defined below). This discussion does not provide a complete analysis of all potential tax considerations. The information provided below is based upon provisions of the Internal Revenue Code of 1986, as amended, or Code, Treasury regulations promulgated thereunder, administrative rulings and judicial decisions currently in effect. These authorities may change at any time, possibly on a retroactive basis, or the Internal Revenue Service, or IRS, might interpret the existing authorities differently. In either case, the U.S. federal income tax considerations of owning or disposing of our common stock could differ from those described below. As a result, we cannot assure you that the U.S. federal income tax considerations described in this discussion will not be challenged by the IRS or will be sustained by a court if challenged by the IRS.

This discussion does not address the tax considerations arising under the alternative minimum tax, the net investment income tax, the laws of any state, local or non-U.S. jurisdiction, or under U.S. federal gift and estate tax laws. In addition, this discussion does not address tax considerations applicable to an investor’s particular circumstances or to investors that may be subject to special tax rules, including, without limitation:

- banks, insurance companies or other financial institutions;
- partnerships or entities or arrangements treated as partnerships or other pass-through entities for U.S. federal income tax purposes (or investors in such entities);
- corporations that accumulate earnings to avoid U.S. federal income tax;
- tax-exempt or governmental organizations or tax-qualified retirement plans;
- real estate investment trusts or regulated investment companies;
- controlled foreign corporations or passive foreign investment companies;
- persons who acquired our common stock pursuant to the exercise of an employee stock option or otherwise as compensation for services;
- dealers in securities or currencies;
- traders in securities that elect to use a mark-to-market method of accounting for their securities holdings;
- persons that own, or are deemed to own, more than 5% of our capital stock (except to the extent specifically set forth below);
- certain former citizens or long-term residents of the United States;
- persons who hold our common stock as a position in a hedging transaction, “straddle,” “conversion transaction” or other risk reduction transaction;
- persons who do not hold our common stock as a capital asset within the meaning of Section 1221 of the Code (generally, for investment purposes); or
- persons deemed to sell our common stock under the constructive sale provisions of the Code.

In addition, if a partnership or entity classified as a partnership for U.S. federal income tax purposes is a beneficial owner of our common stock, the tax treatment of a partner in the partnership or an owner of the entity will depend upon the status of the partner or other owner and the activities of the partnership or other entity. Accordingly, this discussion does not address U.S. federal income tax considerations applicable to partnerships that hold our common stock, and partners in such partnerships should consult their tax advisors.

Investors considering the purchase of our common stock should consult their own tax advisors regarding the application of the U.S. federal income, gift and estate tax laws to their particular situations and the consequences of non-U.S., state or local laws, and tax treaties.

Non-U.S. holder defined

For purposes of this section, a “non-U.S. holder” is any holder of our common stock, other than an entity taxable as a partnership for U.S. federal income tax purposes, that is not:

- an individual who is a citizen or resident of the United States for U.S. federal income tax purposes;
- a corporation, or other entity taxable as a corporation for U.S. federal income tax purposes, created or organized under the laws of the United States, any state therein or the District of Columbia or otherwise treated as such for U.S. federal income tax purposes;
- a trust that (1) is subject to the primary supervision of a U.S. court and one or more U.S. persons have authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable Treasury regulations to be treated as a U.S. person; or
- an estate whose income is subject to U.S. federal income tax regardless of source.

If you are a non-U.S. citizen who is an individual, you may, in many cases, be deemed to be a resident alien, as opposed to a nonresident alien, by virtue of being present in the United States for at least 31 days in the calendar year and for an aggregate of at least 183 days during a three-year period ending in the current calendar year. For these purposes, all the days present in the current year, one-third of the days present in the immediately preceding year, and one-sixth of the days present in the second preceding year are counted. Resident aliens are subject to U.S. federal income tax as if they were U.S. citizens. Such an individual is urged to consult his or her own tax advisor regarding the U.S. federal income tax consequences of the ownership and sale, exchange or other taxable disposition of our common stock.

Distributions

We do not anticipate paying any distributions in the foreseeable future. If we do make any distributions on shares of our common stock, however, such distributions will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. Distributions in excess of our current and accumulated earnings and profits will constitute a return of capital that is applied against and reduces, but not below zero, a non-U.S. holder’s adjusted tax basis in shares of our common stock. Any remaining excess will be treated as gain realized on the sale, exchange or other taxable disposition of our common stock. See “—Sale of common stock.”

Subject to the discussion below regarding the Foreign Account Tax Compliance Act, or FATCA, and backup withholding, any distribution made to a non-U.S. holder on our common stock that is not effectively connected with a non-U.S. holder’s conduct of a trade or business in the United States will generally be subject to U.S. withholding tax at a 30% rate. The withholding tax might not apply, however, or might apply at a reduced rate, under the terms of an applicable income tax treaty between the United States and the non-U.S. holder’s country of residence. You should consult your tax advisors regarding your entitlement to benefits under a relevant income tax treaty. Generally, in order for us or our paying agent to withhold tax at a lower treaty rate, a non-U.S. holder must certify its entitlement to treaty benefits. A non-U.S. holder generally can meet this certification requirement by providing an IRS Form W-8BEN, W-8BEN-E (or any successor form to the IRS Form W-8BEN or W-8BEN-E) to us or our paying agent. If the non-U.S. holder holds the stock through a financial institution or other agent acting on the non-U.S. holder’s behalf, the non-U.S. holder will be required to provide appropriate documentation to the agent. The non-U.S. holder’s agent will then be required to provide certification to us or our paying agent, either directly or through other intermediaries. If you are eligible for a reduced rate of U.S. federal withholding tax under an income tax treaty, you may obtain a refund or credit from the IRS of any excess amounts withheld by filing an appropriate claim for a refund with the IRS in a timely manner.

Distributions received by a non-U.S. holder that are effectively connected with a U.S. trade or business conducted by the non-U.S. holder, and, if required by an applicable income tax treaty between the United States and the non-U.S. holder's country of residence, are attributable to a permanent establishment maintained by the non-U.S. holder in the United States, are not subject to such withholding tax. To obtain this exemption, a non-U.S. holder must provide us with an IRS Form W-8ECI properly certifying such exemption. Such effectively connected distributions, although not subject to U.S. withholding tax, are generally taxed at the same graduated rates applicable to U.S. persons, net of certain deductions and credits. In addition to the graduated tax described above, distributions received by corporate non-U.S. holders that are effectively connected with a U.S. trade or business of the corporate non-U.S. holder may also be subject to a branch profits tax equal to 30% of its effectively connected earnings and profits for the taxable year, as adjusted for certain items, although an applicable income tax treaty between the United States and the non-U.S. holder's country of residence might provide for a lower rate.

Sale of common stock

Subject to the discussion below regarding FATCA and backup withholding, non-U.S. holders will generally not be subject to U.S. federal income tax on any gains realized on the sale, exchange or other taxable disposition of our common stock unless:

- the gain (1) is effectively connected with the conduct by the non-U.S. holder of a U.S. trade or business and (2) if required by an applicable income tax treaty between the United States and the non-U.S. holder's country of residence, is attributable to a permanent establishment (or, in the case of an individual, a fixed base) maintained by the non-U.S. holder in the United States (in which case the special rules described below apply);
- the non-U.S. holder is an individual who is present in the United States for 183 days or more in the taxable year of the sale, exchange or other taxable disposition of our common stock, and certain other requirements are met (in which case the gain would be subject to a flat 30% tax, or such reduced rate as may be specified by an applicable income tax treaty, which may be offset by U.S.-source capital losses, even though the individual is not considered a resident of the United States, provided that the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses); or
- the rules of the Foreign Investment in Real Property Tax Act, or FIRPTA, treat the gain as effectively connected with a U.S. trade or business.

The FIRPTA rules may apply to a sale, exchange or other taxable disposition of our common stock if we are at the time of the sale, exchange, or other taxable disposition, or were within the shorter of the five-year period preceding the disposition and the non-U.S. holder's holding period, a "United States real property holding corporation," or USRPHC. In general, we would be a USRPHC if the value of our interests in U.S. real property comprised at least half of the value of our business assets and our U.S. and non-U.S. real property interests. If we are or become a USRPHC, as long as our common stock is regularly traded on an established securities market, such common stock will be treated as U.S. real property interests subject to the FIRPTA rules only if a non-U.S. holder actually owns or constructively holds more than 5% of our outstanding common stock at any time within the shorter of the five-year period preceding the disposition and the non-U.S. holder's holding period. Currently, we believe we are not, and do not anticipate becoming, a USRPHC.

If any gain from the sale, exchange or other taxable disposition of our common stock, (1) is effectively connected with a U.S. trade or business conducted by a non-U.S. holder and (2) if required by an applicable income tax treaty between the United States and the non-U.S. holder's country of residence, is attributable to a permanent establishment (or, in the case of an individual, a fixed base) maintained by such non-U.S. holder in

the United States, then the gain generally will be subject to U.S. federal income tax at the same graduated rates applicable to U.S. persons, net of certain deductions and credits. If the non-U.S. holder is a corporation, under certain circumstances, that portion of its earnings and profits that is effectively connected with its U.S. trade or business, subject to certain adjustments, generally would be subject to a "branch profits tax." The branch profits tax rate is equal to 30% of its effectively connected earnings and profits for the taxable year, as adjusted for certain items, although an applicable income tax treaty between the United States and the non-U.S. holder's country of residence might provide for a lower rate.

Backup withholding and information reporting

Payments of dividends on our common stock will not be subject to backup withholding, provided the non-U.S. holder certifies its non-U.S. status, such as by furnishing a valid IRS Form W-8BEN, W-8BEN-E or W-8ECI (and we or our paying agent do not have actual knowledge or reason to know the holder is a U.S. person or that the conditions of any other exemption are not, in fact, satisfied), or otherwise establishes an exemption. However, information returns are required to be filed with the IRS in connection with any dividends on our common stock paid to the non-U.S. holder, regardless of whether any tax was actually withheld. Copies of these reports may be made available to tax authorities in the country where the non-U.S. holder resides. In addition, proceeds of the sale or other taxable disposition of our common stock within the United States or conducted through certain U.S.-related brokers generally will not be subject to backup withholding or information reporting, if the applicable withholding agent receives the certification described above or the non-U.S. holder otherwise establishes an exemption. Proceeds of a disposition of our common stock conducted through a non-U.S. office of a non-U.S. broker that does not have certain enumerated relationships with the United States generally will not be subject to backup withholding or information reporting. The backup withholding rate is currently 24%.

Backup withholding is not an additional tax. Any amounts withheld from a payment to a holder of our common stock under the backup withholding rules can be credited against any U.S. federal income tax liability of the holder and may entitle the holder to a refund from the IRS, provided that the required information is furnished to the IRS in a timely manner.

Foreign account tax compliance act, or FATCA

FATCA imposes U.S. federal withholding tax of 30% on certain types of U.S. source "withholdable payments" (including dividends and the gross proceeds from the sale, exchange or other taxable disposition of U.S. stock) to foreign financial institutions, which are broadly defined for this purpose, and other non-U.S. entities that fail to comply with certain certification and information reporting requirements regarding U.S. account holders or owners of such institutions or entities. The obligation to withhold under FATCA applies to any dividends on our common stock, and will apply to gross proceeds from the sale, exchange or other taxable disposition of our common stock paid after December 31, 2018 and to certain "pass-thru" payments received with respect to instruments held through foreign financial institutions after the later of December 31, 2018 and the date on which applicable final Treasury regulations are issued. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph. Non-U.S. holders should consult their own tax advisors regarding the possible implications of FATCA on their investment in our common stock.

The preceding discussion of U.S. federal income tax considerations is for general information only. It is not tax advice. Each prospective investor should consult its own tax advisor regarding the particular U.S. federal, state, local and non-U.S. tax consequences of the sale, exchange or other taxable disposition of our common stock, including the consequences of any proposed change in applicable laws.

Underwriting

We are offering the shares of common stock described in this prospectus through a number of underwriters. J.P. Morgan Securities LLC and Cowen and Company, LLC are acting as joint book-running managers of the offering and as representatives of the underwriters. We have entered into an underwriting agreement with the underwriters. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, the number of shares of common stock listed next to its name in the following table:

Name	Number of shares
J.P. Morgan Securities LLC	
Cowen and Company, LLC	
Allen & Company LLC	
Robert W. Baird & Co. Incorporated	
Total	5,000,000

The underwriters are committed to purchase all the shares of common stock offered by us if they purchase any shares. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the shares of common stock directly to the public at the initial public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of \$ _____ per share. Any such dealers may resell shares to certain other brokers or dealers at a discount of up to \$ _____ per share from the initial public offering price. After the initial offering of the shares to the public, the offering price and other selling terms may be changed by the underwriters. Sales of shares made outside of the United States may be made by affiliates of the underwriters.

The underwriters have an option to buy up to 750,000 additional shares of common stock from us solely to cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters have 30 days from the date of this prospectus to exercise this option to purchase additional shares. If any shares are purchased with this option to purchase additional shares, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock. The underwriting fee is \$ _____ per share. The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Without exercise of option to purchase additional shares	With full exercise of option to purchase additional shares
Per share	\$	\$
Total	\$	\$

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be

[Table of Contents](#)

approximately \$3.5 million. We have agreed to reimburse the underwriters for expenses relating to the clearance of this offering with the Financial Industry Regulatory Authority, Inc. (in an amount not to exceed \$40,000).

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters and selling group members that may make Internet distributions on the same basis as other allocations.

We have agreed that we will not (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, or file with the Securities and Exchange Commission a registration statement under the Securities Act of 1933, as amended, or the Securities Act, relating to, any shares of our common stock or any securities convertible into or exchangeable or exercisable for any shares of our common stock, or publicly disclose the intention to make any offer, sale, pledge, disposition or filing, or (ii) enter into any swap or other arrangement that transfers all or a portion of the economic consequences associated with the ownership of any shares of common stock or any such other securities (regardless of whether any of these transactions are to be settled by the delivery of shares of common stock or such other securities, in cash or otherwise), in each case without the prior written consent of J.P. Morgan Securities LLC and Cowen and Company, LLC for a period of 180 days after the date of this prospectus, other than (i) the shares of our common stock to be sold hereunder, or (ii) any shares of our common stock issued upon the exercise of options granted under our existing equity incentive plans.

Our directors and executive officers, and all of our stockholders have entered into lock-up agreements with the underwriters prior to the commencement of this offering pursuant to which each of these persons or entities, with limited exceptions, for a period of 180 days after the date of this prospectus, may not, without the prior written consent of J.P. Morgan Securities LLC and Cowen and Company, LLC, (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such directors, executive officers and stockholders in accordance with the rules and regulations of the Securities and Exchange Commission and securities which may be issued upon exercise of a stock option or warrant), or publicly disclose the intention to make any offer, sale, pledge or disposition, (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of our common stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of common stock or such other securities, in cash or otherwise or (3) make any demand for or exercise any right with respect to the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock.

The restrictions described in the immediately preceding paragraph do not apply to, among other items:

- transfers or dispositions of shares of common stock:
 - as a bona fide gift;
 - to any trust for the direct or indirect benefit of the party subject to the lock-up restrictions or the immediate family of such person;
 - to any corporation, partnership, limited liability company or other entity under the ownership of the party subject to the lock-up restrictions or the immediate family of such person;

[Table of Contents](#)

- by will, other testamentary document or intestate succession to the legal representative, heir, beneficiary or a member of the immediate family of the party subject to the lockup restrictions;
- as distributions to partners, members or stockholders of the party subject to the lock-up restrictions; and
- as transfers to affiliates, investment funds or other entities controlled or managed by the party subject to the lock-up restrictions,

provided that in the case of any transfer or distribution pursuant to the above six subclauses, (i) each transferee, donee or distributee shall sign and deliver a lock-up letter in the form executed by the party subject to the lock up restrictions and (ii) no filing or other public announcement under Section 16(a) of the Exchange Act of 1934, as amended, or the Exchange Act shall be required or shall be voluntarily made during the restricted period (other than a filing on Form 5 or a required filing on a Schedule 13F or 13G);

- the transfer pursuant to a bona fide third-party tender offer, merger, consolidation or other similar transaction made to all holders of our common stock involving a change of control; provided that in the event such tender offer, merger, consolidation or other such transaction is not completed, the shares of our common stock shall remain subject to the lock-up restrictions;
- the exercise of outstanding warrants or options to purchase shares of common stock granted under any stock incentive plan or stock purchase plan of the Company, provided that the underlying shares shall continue to be subject to the lock-up restrictions;
- the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, provided that (i) such plan does not provide for the transfer of shares of common stock during the restricted period and (ii) no filing under the Exchange Act or other public announcement shall be required or voluntarily made by or on behalf of the party subject to the lock-up restrictions regarding the establishment of such plan;
- the transfer or disposition of shares of common stock acquired in this offering or on the open market following this offering, provided that no filing under the Exchange Act or other public announcement shall be required or voluntarily made in connection with such transfer or disposition during the restricted period (other than a required filing on a Schedule 13F or 13G);
- transfers or surrenders to us of shares of common stock pursuant to any contractual arrangement that provides us with an option to repurchase such shares in connection with the termination of the party subject to the lock-up's employment or service relationship with us, or pursuant to a right of first refusal with respect to transfers of such shares of common stock or other securities, or on a cashless or "net exercise" basis or to cover tax withholding obligations of the party subject to the lock-up, in connection with the vesting or exercise of such shares of common stock or other securities, provided that any filing under Section 16 of the Exchange Act shall clearly indicate in the footnotes thereto that the filing relates to such circumstances described above and no other public announcement shall be required or voluntarily made in connection with such transfers or surrenders; and
- transfers or dispositions of shares of common stock by operation of law pursuant to a qualified domestic order or in connection with a divorce settlement or other court order, provided that the recipient of such shares shall execute and deliver to J.P. Morgan Securities LLC and Cowen and Company, LLC a lock-up letter in the form of this Letter Agreement, provided, further that any filing under Section 16 of the Exchange Act shall clearly indicate in the footnotes that the filing relates to the circumstances described above and no other public announcement shall be required or voluntarily made in connection with such transfer or disposition.

[Table of Contents](#)

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

We have applied to list shares of our common stock on the Nasdaq Global Market under the symbol "TWST."

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of common stock in the open market for the purpose of preventing or retarding a decline in the market price of the common stock while this offering is in progress. These stabilizing transactions may include making short sales of the common stock, which involves the sale by the underwriters of a greater number of shares of common stock than they are required to purchase in this offering, and purchasing shares of common stock on the open market to cover positions created by short sales. Short sales may be "covered" shorts, which are short positions in an amount not greater than the underwriters' option to purchase additional shares referred to above, or may be "naked" shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their option to purchase additional shares, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the option to purchase additional shares. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of the common stock, including the imposition of penalty bids. This means that if the representatives of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of the common stock or preventing or retarding a decline in the market price of the common stock, and, as a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on the Nasdaq Global Market, in the over-the-counter market or otherwise.

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be determined by negotiations between us and the representatives of the underwriters. In determining the initial public offering price, we and the representatives of the underwriters expect to consider a number of factors including:

- the information set forth in this prospectus and otherwise available to the representatives of the underwriters;
- our prospects and the history and prospects for the industry in which we compete;
- an assessment of our management;
- our prospects for future earnings;
- the general condition of the securities markets at the time of this offering;

- the recent market prices of, and demand for, publicly traded common stock of generally comparable companies; and
- other factors deemed relevant by the underwriters and us.

Neither we nor the underwriters can assure investors that an active trading market will develop for our common shares, or that the shares will trade in the public market at or above the initial public offering price.

Indications of Interest

Certain of our stockholders, including stockholders affiliated with certain of our directors, have indicated an interest in purchasing an aggregate of approximately \$30 million of shares of our common stock in this offering at the initial public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no shares in this offering to any of these stockholders, or any of these stockholders may determine to purchase more, fewer or no shares in this offering. The underwriters will receive the same underwriting discount on any shares purchased by these persons or entities as they will on any other shares sold to the public in this offering.

Selling restrictions

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

Notice to prospective investors in the European economic area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State"), with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State, no offer of shares may be made to the public in that Relevant Member State other than:

- a) to any legal entity which is a qualified investor as defined in the Prospectus Directive;
- b) to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), subject to obtaining the prior consent of the underwriters; or
- c) in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares shall require the Company or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive and each person who initially acquires any shares or to whom any offer is made will be deemed to have represented, acknowledged and agreed to and with each of the underwriters and the Company that it is a "qualified investor" within the meaning of the law in that Relevant Member State implementing Article 2(1)(e) of the Prospectus Directive.

In the case of any shares being offered to a financial intermediary as that term is used in Article 3(2) of the Prospectus Directive, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the shares acquired by it in the offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer of any shares to the public other than their offer or resale in a Relevant Member State to qualified investors as so defined or in circumstances in which the prior consent of the representatives has been obtained to each such proposed offer or resale.

For the purposes of this provision, the expression an "offer of shares to the public" in relation to any shares in any Relevant Member State means the communication in any form and by means of sufficient information on the terms of the offer and the shares to be offered so as to enable an investor to decide to purchase shares, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression "Prospectus Directive" means Directive 2003/71/EC (as amended, including by Directive 2010/73/EU), and includes any relevant implementing measure in the Relevant Member State.

Notice to prospective investors in the United Kingdom

In addition, in the United Kingdom, this document is being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are "qualified investors" (as defined in the Prospectus Directive) (i) who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended, or the Order and/or (ii) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2)(a) to (d) of the Order (all such persons together being referred to as "relevant persons") or otherwise in circumstances which have not resulted and will not result in an offer to the public of the shares in the United Kingdom within the meaning of the Financial Services and Markets Act 2000.

Any person in the United Kingdom that is not a relevant person should not act or rely on the information included in this document or use it as basis for taking any action. In the United Kingdom, any investment or investment activity that this document relates to may be made or taken exclusively by relevant persons.

Notice to prospective investors in Canada

The shares may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Notice to prospective investors in Switzerland

The shares may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange, or SIX or on any other stock exchange or regulated trading facility in Switzerland. This document does not constitute a prospectus within the meaning of, and has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, the Company or the shares has been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of shares will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA, or FINMA, and the offer of shares has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes, or CISA. The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of shares.

Notice to prospective investors in the Dubai international financial centre, or DIFC

This document relates to an Exempt Offer in accordance with the Markets Rules 2012 of the Dubai Financial Services Authority, or DFSA. This document is intended for distribution only to persons of a type specified in the Markets Rules 2012 of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus supplement nor taken steps to verify the information set forth herein and has no responsibility for this document. The securities to which this document relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the securities offered should conduct their own due diligence on the securities. If you do not understand the contents of this document you should consult an authorized financial advisor.

In relation to its use in the DIFC, this document is strictly private and confidential and is being distributed to a limited number of investors and must not be provided to any person other than the original recipient, and may not be reproduced or used for any other purpose. The interests in the securities may not be offered or sold directly or indirectly to the public in the DIFC.

Notice to prospective investors in the United Arab Emirates

The shares have not been, and are not being, publicly offered, sold, promoted or advertised in the United Arab Emirates (including the Dubai International Financial Centre) other than in compliance with the laws of the United Arab Emirates (and the Dubai International Financial Centre) governing the issue, offering and sale of securities. Further, this prospectus does not constitute a public offer of securities in the United Arab Emirates (including the Dubai International Financial Centre) and is not intended to be a public offer. This prospectus has not been approved by or filed with the Central Bank of the United Arab Emirates, the Securities and Commodities Authority or the Dubai Financial Services Authority.

Notice to prospective investors in Australia

This prospectus:

- does not constitute a product disclosure document or a prospectus under Chapter 6D.2 of the Corporations Act 2001 (Cth) of the Corporations Act;

- has not been, and will not be, lodged with the Australian Securities and Investments Commission, or ASIC, as a disclosure document for the purposes of the Corporations Act and does not purport to include the information required of a disclosure document under Chapter 6D.2 of the Corporations Act;
- does not constitute or involve a recommendation to acquire, an offer or invitation for issue or sale, an offer or invitation to arrange the issue or sale, or an issue or sale, of interests to a “retail client” (as defined in section 761G of the Corporations Act and applicable regulations) in Australia; and
- may only be provided in Australia to select investors who are able to demonstrate that they fall within one or more of the categories of investors, or Exempt Investors, available under section 708 of the Corporations Act.

The shares may not be directly or indirectly offered for subscription or purchased or sold, and no invitations to subscribe for or buy the shares may be issued, and no draft or definitive offering memorandum, advertisement or other offering material relating to any shares may be distributed in Australia, except where disclosure to investors is not required under Chapter 6D of the Corporations Act or is otherwise in compliance with all applicable Australian laws and regulations. By submitting an application for the shares, you represent and warrant to us that you are an Exempt Investor.

As any offer of shares under this document will be made without disclosure in Australia under Chapter 6D.2 of the Corporations Act, the offer of those securities for resale in Australia within 12 months may, under section 707 of the Corporations Act, require disclosure to investors under Chapter 6D.2 if none of the exemptions in section 708 applies to that resale. By applying for the shares you undertake to us that you will not, for a period of 12 months from the date of issue of the shares, offer, transfer, assign or otherwise alienate those securities to investors in Australia except in circumstances where disclosure to investors is not required under Chapter 6D.2 of the Corporations Act or where a compliant disclosure document is prepared and lodged with ASIC.

Notice to prospective investors in Japan

The shares have not been and will not be registered pursuant to Article 4, Paragraph 1 of the Financial Instruments and Exchange Act. Accordingly, none of the shares nor any interest therein may be offered or sold, directly or indirectly, in Japan or to, or for the benefit of, any “resident” of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to or for the benefit of a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Act and any other applicable laws, regulations and ministerial guidelines of Japan in effect at the relevant time.

Notice to prospective investors in Hong Kong

The shares have not been offered or sold and will not be offered or sold in Hong Kong, by means of any document, other than (a) to “professional investors” as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance; or (b) in other circumstances which do not result in the document being a “prospectus” as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32) of Hong Kong or which do not constitute an offer to the public within the meaning of that Ordinance. No advertisement, invitation or document relating to the shares has been or may be issued or has been or may be in the possession of any person for the purposes of issue, whether in Hong Kong or elsewhere, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to “professional investors” as defined in the Securities and Futures Ordinance and any rules made under that Ordinance.

Warning

The contents of this document have not been reviewed by any regulatory authority in Hong Kong. You are advised to exercise caution in relation to the offer. If you are in any doubt about any of the contents of this document, you should obtain independent professional advice.

Notice to prospective investors in Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore, or the SFA, (ii) to a relevant person pursuant to Section 275(1), or any person pursuant to Section 275(1A), and in accordance with the conditions specified in Section 275 of the SFA, or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the shares are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

- a) a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or
- b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities (as defined in Section 239(1) of the SFA) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the shares pursuant to an offer made under Section 275 of the SFA except:

- a) to an institutional investor or to a relevant person defined in Section 275(2) of the SFA, or to any person arising from an offer referred to in Section 275(1A) or Section 276(4)(i)(B) of the SFA;
- b) where no consideration is or will be given for the transfer;
- c) where the transfer is by operation of law;
- d) as specified in Section 276(7) of the SFA; or
- e) as specified in Regulation 32 of the Securities and Futures (Offers of Investments) (Shares and Debentures) Regulations 2005 of Singapore.

Notice to prospective investors in Bermuda

Shares may be offered or sold in Bermuda only in compliance with the provisions of the Investment Business Act of 2003 of Bermuda which regulates the sale of securities in Bermuda. Additionally, non-Bermudian persons (including companies) may not carry on or engage in any trade or business in Bermuda unless such persons are permitted to do so under applicable Bermuda legislation.

Notice to prospective investors in Saudi Arabia

This document may not be distributed in the Kingdom of Saudi Arabia except to such persons as are permitted under the Offers of Securities Regulations as issued by the board of the Saudi Arabian Capital Market Authority,

or CMA pursuant to resolution number 2-11-2004 dated 4 October 2004 as amended by resolution number 1-28-2008, as amended, or the CMA Regulations. The CMA does not make any representation as to the accuracy or completeness of this document and expressly disclaims any liability whatsoever for any loss arising from, or incurred in reliance upon, any part of this document. Prospective purchasers of the securities offered hereby should conduct their own due diligence on the accuracy of the information relating to the securities. If you do not understand the contents of this document, you should consult an authorised financial adviser.

Notice to prospective investors in the British Virgin Islands

The shares may be offered to persons located in the British Virgin Islands who are “qualified investors” for the purposes of SIBA. Qualified investors include (i) certain entities which are regulated by the Financial Services Commission in the British Virgin Islands, including banks, insurance companies, licensees under SIBA and public, professional and private mutual funds; (ii) a company, any securities of which are listed on a recognised exchange; and (iii) persons defined as “professional investors” under SIBA, which is any person (a) whose ordinary business involves, whether for that person’s own account or the account of others, the acquisition or disposal of property of the same kind as the property, or a substantial part of the property of the Company; or (b) who has signed a declaration that he, whether individually or jointly with his spouse, has net worth in excess of US\$1,000,000 and that he consents to being treated as a professional investor.

Notice to prospective investors in China

This prospectus does not constitute a public offer of shares, whether by sale or subscription, in the People’s Republic of China, or the PRC. The shares are not being offered or sold directly or indirectly in the PRC to or for the benefit of, legal or natural persons of the PRC.

Further, no legal or natural persons of the PRC may directly or indirectly purchase any of the shares or any beneficial interest therein without obtaining all prior PRC’s governmental approvals that are required, whether statutorily or otherwise. Persons who come into possession of this document are required by the issuer and its representatives to observe these restrictions.

Notice to prospective investors in Korea

The shares have not been and will not be registered under the Financial Investments Services and Capital Markets Act of Korea and the decrees and regulations thereunder, or the FSCMA, and the shares have been and will be offered in Korea as a private placement under the FSCMA. None of the shares may be offered, sold or delivered directly or indirectly, or offered or sold to any person for re-offering or resale, directly or indirectly, in Korea or to any resident of Korea except pursuant to the applicable laws and regulations of Korea, including the FSCMA and the Foreign Exchange Transaction Law of Korea and the decrees and regulations thereunder, or the FETL. Furthermore, the purchaser of the shares shall comply with all applicable regulatory requirements (including but not limited to requirements under the FETL) in connection with the purchase of the shares. By the purchase of the shares, the relevant holder thereof will be deemed to represent and warrant that if it is in Korea or is a resident of Korea, it purchased the shares pursuant to the applicable laws and regulations of Korea.

Notice to prospective investors in Malaysia

No prospectus or other offering material or document in connection with the offer and sale of the shares has been or will be registered with the Securities Commission of Malaysia, or Commission for the Commission’s approval pursuant to the Capital Markets and Services Act 2007. Accordingly, this prospectus and any other

document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Malaysia other than (i) a closed end fund approved by the Commission; (ii) a holder of a Capital Markets Services Licence; (iii) a person who acquires the shares, as principal, if the offer is on terms that the shares may only be acquired at a consideration of not less than RM250,000 (or its equivalent in foreign currencies) for each transaction; (iv) an individual whose total net personal assets or total net joint assets with his or her spouse exceeds RM3 million (or its equivalent in foreign currencies), excluding the value of the primary residence of the individual; (v) an individual who has a gross annual income exceeding RM300,000 (or its equivalent in foreign currencies) per annum in the preceding twelve months; (vi) an individual who, jointly with his or her spouse, has a gross annual income of RM400,000 (or its equivalent in foreign currencies), per annum in the preceding twelve months; (vii) a corporation with total net assets exceeding RM10 million (or its equivalent in a foreign currencies) based on the last audited accounts; (viii) a partnership with total net assets exceeding RM10 million (or its equivalent in foreign currencies); (ix) a bank licensee or insurance licensee as defined in the Labuan Financial Services and Securities Act 2010; (x) an Islamic bank licensee or takaful licensee as defined in the Labuan Financial Services and Securities Act 2010; and (xi) any other person as may be specified by the Commission; provided that, in the each of the preceding categories (i) to (xi), the distribution of the shares is made by a holder of a Capital Markets Services Licence who carries on the business of dealing in securities. The distribution in Malaysia of this prospectus is subject to Malaysian laws. This prospectus does not constitute and may not be used for the purpose of public offering or an issue, offer for subscription or purchase, invitation to subscribe for or purchase any securities requiring the registration of a prospectus with the Commission under the Capital Markets and Services Act 2007.

Notice to prospective investors in Taiwan

The shares have not been and will not be registered with the Financial Supervisory Commission of Taiwan pursuant to relevant securities laws and regulations and may not be sold, issued or offered within Taiwan through a public offering or in circumstances which constitutes an offer within the meaning of the Securities and Exchange Act of Taiwan that requires a registration or approval of the Financial Supervisory Commission of Taiwan. No person or entity in Taiwan has been authorised to offer, sell, give advice regarding or otherwise intermediate the offering and sale of the shares in Taiwan.

Notice to prospective investors in South Africa

Due to restrictions under the securities laws of South Africa, the shares are not offered, and the offer shall not be transferred, sold, renounced or delivered, in South Africa or to a person with an address in South Africa, unless one or other of the following exemptions applies:

- a) the offer, transfer, sale, renunciation or delivery is to:
 - i) persons whose ordinary business is to deal in securities, as principal or agent;
 - ii) the South African Public Investment Corporation;
 - iii) persons or entities regulated by the Reserve Bank of South Africa;
 - iv) authorised financial service providers under South African law;
 - v) financial institutions recognised as such under South African law;

- vi) a wholly-owned subsidiary of any person or entity contemplated in (c), (d) or (e), acting as agent in the capacity of an authorised portfolio manager for a pension fund or collective investment scheme (in each case duly registered as such under South African law); or
 - vii) any combination of the person in (a) to (f); or
- b) the total contemplated acquisition cost of the securities, for any single addressee acting as principal is equal to or greater than ZAR 1,000,000.

No “offer to the public” (as such term is defined in the South African Companies Act, No. 71 of 2008 (as amended or re-enacted), or the South African Companies Act) in South Africa is being made in connection with the issue of the shares. Accordingly, this document does not, nor is it intended to, constitute a “registered prospectus” (as that term is defined in the South African Companies Act) prepared and registered under the South African Companies Act and has not been approved by, and/or filed with, the South African Companies and Intellectual Property Commission or any other regulatory authority in South Africa. Any issue or offering of the shares in South Africa constitutes an offer of the shares in South Africa for subscription or sale in South Africa only to persons who fall within the exemption from “offers to the public” set out in section 96(1)(a) of the South African Companies Act. Accordingly, this document must not be acted on or relied on by persons in South Africa who do not fall within section 96(1)(a) of the South African Companies Act (such persons being referred to as “SA Relevant Persons”). Any investment or investment activity to which this document relates is available in South Africa only to SA Relevant Persons and will be engaged in South Africa only with SA relevant persons.

Legal matters

The validity of the issuance of our common stock offered in this prospectus will be passed upon for us by Orrick, Herrington & Sutcliffe LLP, 1000 Marsh Road, Menlo Park, California 94025. Latham & Watkins LLP, 140 Scott Drive, Menlo Park, California 94025, is acting as counsel for the underwriters in connection with this offering. Orrick, Herrington & Sutcliffe LLP and certain attorneys and investment funds affiliated with the firm own shares of our preferred stock which will be converted into an aggregate of 38,041 shares of common stock immediately prior to the completion of this offering.

Experts

The consolidated financial statements as of September 30, 2017 and 2016 and for each of the two years in the period ended September 30, 2017 included in this prospectus have been so included in reliance on the report (which contains an explanatory paragraph relating to the Company’s ability to continue as a going concern as described in Note 1 to the consolidated financial statements) of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

Where you can find more information

We have filed with the Securities and Exchange Commission a registration statement on Form S-1 under the Securities Act with respect to this offering of our common stock. This prospectus, which constitutes a part of the registration statement, does not contain all of the information set forth in the registration statement, some items of which are contained in exhibits to the registration statement as permitted by the rules and regulations of the Securities and Exchange Commission. For further information with respect to us and our common stock, we refer you to the registration statement, including the exhibits and the financial statements and notes filed as a part of the registration statement. Statements contained in this prospectus concerning the contents of any

[Table of Contents](#)

contract or any other document are not necessarily complete. If a contract or document has been filed as an exhibit to the registration statement, please see the copy of the contract or document that has been filed. Each statement in this prospectus relating to a contract or document filed as an exhibit is qualified in all respects by the filed exhibit. The exhibits to the registration statement should be referenced for the complete contents of these contracts and documents. You may obtain copies of this information by mail from the Public Reference Section of the Securities and Exchange Commission, 100 F Street, N.E., Room 1580, Washington, D.C. 20549, at prescribed rates. You may obtain information on the operation of the public reference rooms by calling the Securities and Exchange Commission at 1-800-SEC-0330. The Securities and Exchange Commission also maintains an Internet website that contains reports, proxy statements and other information about issuers, like us, that file electronically with the Securities and Exchange Commission. The address of that website is www.sec.gov.

As a result of this offering, we will become subject to the information and reporting requirements of the Exchange Act and, in accordance with this law, will file periodic reports, proxy statements and other information with the Securities and Exchange Commission. These periodic reports, proxy statements and other information will be available for inspection and copying at the Securities and Exchange Commission's public reference facilities and the website of the Securities and Exchange Commission referred to above.

Twist Bioscience Corporation

Index to consolidated financial statements

INDEX TO AUDITED CONSOLIDATED FINANCIAL STATEMENTS AS OF SEPTEMBER 30, 2016 AND 2017	
REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM	F-2
CONSOLIDATED BALANCE SHEETS AS OF SEPTEMBER 30, 2016 AND 2017	F-3
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS FOR THE YEARS ENDED SEPTEMBER 30, 2016 AND 2017	F-4
CONSOLIDATED STATEMENTS OF REDEEMABLE CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' DEFICIT AS OF SEPTEMBER 30, 2016 AND 2017	F-5
CONSOLIDATED STATEMENTS OF CASH FLOWS FOR THE YEARS ENDED SEPTEMBER 30, 2016 AND 2017	F-6
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS FOR THE YEARS ENDED SEPTEMBER 30, 2016 AND 2017	F-7
INDEX TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS AS OF JUNE 30, 2018 AND FOR THE NINE MONTHS ENDED JUNE 30, 2017 AND 2018	
CONDENSED CONSOLIDATED BALANCE SHEETS AS OF SEPTEMBER 30, 2017 AND JUNE 30, 2018 (UNAUDITED)	F-37
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS FOR THE NINE MONTHS ENDED JUNE 30, 2017 AND 2018 (UNAUDITED)	F-38
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS FOR THE NINE MONTHS ENDED JUNE 30, 2017 AND 2018 (UNAUDITED)	F-39
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS FOR THE NINE MONTHS ENDED JUNE 30, 2017 AND 2018 (UNAUDITED)	F-40

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Twist Bioscience Corporation

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations and comprehensive loss, of redeemable convertible preferred stock and stockholders' deficit and of cash flows present fairly, in all material respects, the financial position of Twist Bioscience Corporation and its subsidiaries as of September 30, 2017 and 2016, and the results of their operations and their cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has generated net losses and negative cash flows since inception that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenue from contracts with customers in 2018.

/s/ PricewaterhouseCoopers LLP
San Jose, California

February 8, 2018, except for the effects of the change in the manner in which the Company accounts for revenue from contracts with customers as discussed in Note 2 to the consolidated financial statements, as to which the date is September 11, 2018, and except for the effects of the reverse stock split as discussed in Note 2 to the consolidated financial statements, as to which the date is October 17, 2018.

Twist Bioscience Corporation Consolidated balance sheets

(In thousands, except share and per share amounts)	September 30, 2016	September 30, 2017
Assets		
Current assets		
Cash and cash equivalents	\$ 28,596	\$ 31,227
Short-term investments	27,324	30,977
Accounts receivable, net	723	2,346
Inventory	1,228	1,827
Prepaid expenses and other current assets	1,168	1,492
Total current assets	\$ 59,039	\$ 67,869
Property and equipment, net	14,617	14,834
Goodwill	1,138	1,138
Intangible assets, net	1,133	920
Restricted cash, non-current	322	202
Other non-current assets	214	694
Total assets	\$ 76,463	\$ 85,657
Current liabilities		
Accounts payable	\$ 2,337	\$ 2,849
Accrued expenses	2,218	2,092
Accrued payroll	2,403	3,470
Current portion of long-term debt	1,367	—
Other current liabilities	353	1,066
Total current liabilities	\$ 8,678	\$ 9,477
Redeemable convertible preferred stock warrant liability	383	644
Long-term debt, net of current portion	9,814	9,154
Other non-current liabilities	162	107
Total liabilities	\$ 19,037	\$ 19,382
Commitments and contingencies (Note 8)		
Redeemable convertible preferred stock		
Series A redeemable convertible preferred stock, \$0.00001 par value—2,854,576 shares authorized as of September 30, 2016 and 2017; 2,817,723 shares issued and outstanding as of September 30, 2016 and 2017. (Liquidation preference of \$9,111 as of September 30, 2016 and 2017)	\$ 9,141	\$ 9,141
Series B redeemable convertible preferred stock, \$0.00001 par value—3,331,878 shares authorized as of September 30, 2016 and 2017; 3,315,645 shares issued and outstanding as of September 30, 2016 and 2017. (Liquidation preference of \$26,000 as of September 30, 2016 and 2017)	25,900	25,900
Series C redeemable convertible preferred stock, \$0.00001 par value—2,510,354 shares authorized as of September 30, 2016 and 2017; 2,491,483 shares issued and outstanding as of September 30, 2016 and 2017. (Liquidation preference of \$37,000 as of September 30, 2016 and 2017)	36,726	36,726
Series D redeemable convertible preferred stock, \$0.00001 par value—3,074,670 and 6,476,580 shares authorized as of September 30, 2016 and 2017, respectively; 2,938,714 and 6,034,089 shares issued and outstanding as of September 30, 2016 and 2017, respectively. (Liquidation preference of \$62,432 and \$128,193 as of September 30, 2016 and 2017, respectively)	62,270	127,866
Total redeemable convertible preferred stock	\$ 134,037	\$ 199,633
Stockholders' equity (deficit)		
Common stock, \$0.00001 par value—16,665,000 and 21,210,000 shares authorized at September 30, 2016 and September 30, 2017, respectively; 3,146,233 and 3,178,819 shares issued and outstanding at September 30, 2016 and 2017, respectively.	\$ —	\$ —
Additional paid-in capital	3,689	6,228
Accumulated other comprehensive income	9	33
Accumulated deficit	(80,309)	(139,619)
Total stockholders' equity (deficit)	\$ (76,611)	\$ (133,358)
Total liabilities, redeemable convertible preferred stock and stockholders' equity (deficit)	\$ 76,463	\$ 85,657

The accompanying notes are an integral part of these consolidated financial statements.

Twist Bioscience Corporation

Consolidated statements of operations and comprehensive loss

(In thousands, except share and per share amounts)	Year ended September 30,	
	2016	2017
Revenues	\$ 2,269	\$ 10,767
Operating expenses:		
Cost of revenues	\$ 9,421	\$ 24,020
Research and development	18,230	19,169
Selling, general and administrative	18,274	26,060
Total operating expenses	\$ 45,925	\$ 69,249
Loss from operations	\$ (43,656)	\$ (58,482)
Interest income	241	412
Interest expense	(746)	(905)
Other income (expense), net	73	(55)
Loss before income taxes	\$ (44,088)	\$ (59,030)
Provision for income taxes	—	(280)
Net loss attributable to common stockholders	\$ (44,088)	\$ (59,310)
Other comprehensive loss:		
Change in unrealized gain (loss) on investments	\$ 9	\$ (9)
Foreign currency translation adjustment	—	33
Comprehensive loss	\$ (44,079)	\$ (59,286)
Net loss per share attributable to common stockholders—basic and diluted	\$ (23.58)	\$ (24.49)
Weighted average shares used in computing net loss per share attributable to common stockholders—basic and diluted	1,869,631	2,422,243
Pro forma net loss per share—basic and diluted (unaudited)		\$ (3.84)
Pro forma weighted-average shares used in computing pro forma net loss per share—basic and diluted (unaudited)		15,392,026

The accompanying notes are an integral part of these consolidated financial statements.

Twist Bioscience Corporation

Consolidated statements of redeemable convertible preferred stock and stockholders' deficit

(In thousands, except share data)	Series A convertible preferred stock		Series B convertible preferred stock		Series C convertible preferred stock		Series D convertible preferred stock		Common stock		Additional paid-in capital	Other comprehensive income	Accumulated deficit	Total stockholder deficit
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount				
Balances as of September 30, 2015	2,817,723	\$ 9,141	3,315,645	\$ 25,900	2,491,483	\$ 36,726	—	\$ —	2,390,201	\$ —	\$ 315	\$ —	(36,221)	\$ (35,906)
Issuance of Series D redeemable convertible preferred stock, net of financing costs of \$162	—	—	—	—	—	—	2,938,714	62,270	—	—	—	—	—	—
Issuance of common stock to owners of Genome Compiler Corporation	—	—	—	—	—	—	—	—	403,009	—	2,400	—	—	2,400
Issuance of restricted common stock to employees	—	—	—	—	—	—	—	—	320,170	—	160	—	—	160
Vesting of restricted common stock issued to member of the Board of Directors	—	—	—	—	—	—	—	—	—	—	7	—	—	7
Exercise of stock options	—	—	—	—	—	—	—	—	39,460	—	110	—	—	110
Repurchase of early exercised stock options	—	—	—	—	—	—	—	—	(6,607)	—	—	—	—	(6,607)
Stock based compensation	—	—	—	—	—	—	—	—	—	—	697	—	—	697
Other comprehensive income	—	—	—	—	—	—	—	—	—	—	—	9	—	9
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	(44,088)	(44,088)
Balances as of September 30, 2016	2,817,723	\$ 9,141	3,315,645	\$ 25,900	2,491,483	\$ 36,726	2,938,714	\$ 62,270	3,146,233	\$ —	\$ 3,689	\$ 9	(80,309)	\$ (76,620)
Issuance of Series D redeemable convertible preferred stock, net of financing costs of \$165	—	—	—	—	—	—	3,095,375	65,596	—	—	—	—	—	—
Vesting of restricted common stock issued to member of the Board of Directors	—	—	—	—	—	—	—	—	—	—	4	—	—	4
Exercise of stock options	—	—	—	—	—	—	—	—	32,586	—	162	—	—	162
Issuance of common stock warrants	—	—	—	—	—	—	—	—	—	—	486	—	—	486
Stock based compensation	—	—	—	—	—	—	—	—	—	—	1,887	—	—	1,887
Other comprehensive income	—	—	—	—	—	—	—	—	—	—	—	24	—	24
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	(59,310)	(59,310)
Balances as of September 30, 2017	2,817,723	\$ 9,141	3,315,645	\$ 25,900	2,491,483	\$ 36,726	6,034,089	\$ 127,866	3,178,819	\$ —	\$ 6,228	\$ 33	(139,619)	\$ (133,391)

The accompanying notes are an integral part of these consolidated financial statements.

Twist Bioscience Corporation

Consolidated statements of cash flows

(in thousands)	Year ended September 30,	
	2016	2017
Cash flows from operating activities		
Net loss attributable to common stockholders	\$(44,088)	\$(59,310)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation and amortization	4,229	5,021
Loss on disposal of property and equipment	—	507
Stock-based compensation	857	1,891
Non-cash interest expense	160	363
Change in fair value of redeemable convertible preferred stock warrant liability	(68)	261
Amortization of debt discount	78	95
Changes in assets and liabilities, net of impact of business combination:		
Accounts receivable	(702)	(1,623)
Inventory	(1,228)	(599)
Prepaid expenses and other current assets	(318)	(324)
Other non-current assets	(221)	(481)
Accounts payable	466	560
Accrued expenses	1,016	621
Accrued payroll	982	1,067
Other liabilities	245	650
Net cash used in operating activities	<u>(38,592)</u>	<u>(51,301)</u>
Cash flows from investing activities		
Purchases of property and equipment	(6,229)	(6,594)
Proceeds from sale of property and equipment	—	266
Purchases of investments	(27,290)	(40,587)
Maturity of investments	—	36,925
Change in restricted cash	(80)	120
Cash acquired through business combination	254	—
Net cash used in investing activities	<u>(33,345)</u>	<u>(9,870)</u>
Cash flows from financing activities		
Proceeds from issuance of common stock and exercise of stock options	152	205
Proceeds from issuance of Series D redeemable convertible preferred stock, net of issuance costs	62,270	65,596
Borrowings of long-term debt	7,652	2,174
Repayments on long-term debt	(426)	(4,173)
Net cash provided by financing activities	<u>69,648</u>	<u>63,802</u>
Net increase (decrease) in cash and cash equivalents	(2,289)	2,631
Cash and cash equivalents at beginning of year	30,885	28,596
Cash and cash equivalents at end of period	<u>\$ 28,596</u>	<u>\$ 31,227</u>
Supplemental disclosure of cash flow information		
Interest paid	\$ 391	\$ 702
Income taxes paid	14	6
Non-cash investing and financing activities		
Property and equipment additions included in accrued liabilities and accounts payable	\$ 1,079	\$ 285
Fair value of warrants issued in connection with debt	182	486
Fair value of common stock issued to owners of Genome Compiler Corporation	2,400	—

The accompanying notes are an integral part of these consolidated financial statements.

Twist Bioscience Corporation

Notes to consolidated financial statements

1. The company

Twist Bioscience Corporation (the Company) was incorporated in the state of Delaware on February 4, 2013. The Company is a synthetic biology company that has developed a disruptive DNA synthesis platform.

DNA is used in many applications across different industries: industrial chemicals, academic, healthcare and agriculture. For the first two years of its existence, the Company focused on business planning, research, recruiting, raising capital, building prototypes, proving its technology, and preparing for commercial launch. The Company began generating revenues from the sale of synthetic DNA in April 2016.

In April 2016, the Company acquired Genome Compiler Corporation (GCC), a company with research and development operations in Israel, to supplement the Company's digital biology workflow. Aggregate consideration of 0.4 million shares of the Company's common stock were issued to the holders of the outstanding shares of the acquired company in connection with the acquisition. The Company is utilizing GCC's technology and expertise to grow its digital products portfolio, including its e-commerce solution with gene design capabilities.

The Company has a limited operating history and its prospects are subject to risks, expenses and uncertainties frequently encountered by companies in this industry. These risks include, but are not limited to, the uncertainty of availability of additional financing, market acceptance of its products, the ability to retain and attract new customers, and the uncertainty of achieving future profitability.

The Company has generated net losses in all periods since inception. As of September 30, 2017, the Company had an accumulated deficit of \$139.6 million and has not generated positive cash flows from operations since inception. Losses are expected to continue as the Company continues to invest in product development, manufacturing, and sales and marketing. Based on its recurring losses from operations incurred since inception, expectation of continuing operating losses for the foreseeable future, and need to raise additional capital to finance its future operations, the Company has concluded that there is substantial doubt about its ability to continue as a going concern within one year after the date that the consolidated financial statements are issued.

The Company has raised multiple rounds of debt and equity financing, including an aggregate of \$65.6 million from the sale of preferred stock between March and September of 2017. However, there can be no assurance that additional financing will be successful in raising additional capital or that such capital, if available, will be on terms which are acceptable to us.

If the Company is unable to obtain funding, the Company could be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect its business prospects, or the Company may be unable to continue operations. Failure to raise additional capital or generate sufficient cash flows from operations could have a material adverse effect on the Company's ability to achieve its intended business objectives. Although management continues to pursue these plans, there is no assurance that the Company will be successful in obtaining sufficient funding on terms acceptable to the Company to fund continuing operations, if at all.

The accompanying consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty. Accordingly, the consolidated financial statements have been prepared on a basis that assumes the Company will continue as a going concern and which contemplates the realization of assets and satisfaction of liabilities and commitments in the ordinary course of business.

2. Summary of significant accounting policies

Basis of presentation and use of estimates

The presentation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities as of the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting period. Such estimates include the valuation of deferred tax assets, stock-based compensation expense, and the fair value of the Company's common stock and redeemable convertible preferred stock warrant liabilities. Actual results could differ from those estimates. The Company's consolidated financial statements include its wholly-owned subsidiaries. All intercompany balances and accounts are eliminated in consolidation.

Risks and uncertainties

The Company relies on third parties for the supply and manufacture of its products, as well as third-party logistics providers. In instances where these parties fail to perform their obligations, the Company may be unable to find alternative suppliers to satisfactorily deliver its products to its customers on time, if at all.

The Company operates in a dynamic and highly competitive industry and believes that changes in any of the following areas could have a material adverse effect on the Company's future financial position, results of operations, or cash flows; ability to obtain future financing; advances and trends in new technologies and industry standards; market acceptance of the Company's products; development of sales channels; certain strategic relationships; litigation or claims against the Company regarding intellectual property, patent, product, regulatory, or other factors; and the ability to attract and retain employees necessary to support its growth.

The Company has expended and expects to continue to expend substantial funds to complete the research and development of its production process. The Company may require additional funds to commercialize its products and may be unable to entirely fund these efforts with its current financial resources. Additional funds may not be available on acceptable terms, if at all. If adequate funds are unavailable on a timely basis from operations or additional sources of financing, the Company may have to delay the sale of the Company's products and services which would materially and adversely affect its business, financial condition and operations.

Concentration of credit risk

Financial instruments that potentially subject the Company to a concentration of credit risk consist of cash and cash equivalents, short-term investments and accounts receivable. Substantially all of the Company's cash is held by one financial institution that management believes is of high credit quality. Such deposits may, at times, exceed federally insured limits. The Company's investment policy addresses the level of credit exposure by establishing a minimum allowable credit rating and by limiting the concentration in any one investment.

The Company's accounts receivable is derived from customers located principally in the United States. The Company maintains credit insurance for certain of its customer balances, performs ongoing credit evaluations of its customers, and maintains allowances for potential credit losses on customers' accounts when deemed necessary. The Company does not typically require collateral from its customers. Credit losses historically have not been material. The Company continuously monitors customer payments and maintains an allowance for doubtful accounts based on its assessment of various factors including historical experience, age of the receivable balances, and other current economic conditions or other factors that may affect customers' ability to pay.

Customer concentration

Customers that accounted for equal to or greater than 10% of total revenues were as follows:

	Years ended September 30,	
	2016	2017
Customer A	30%	40%
Customer B	11%	0%

One customer accounted for greater than 10% of net accounts receivable as follows:

	September 30,	
	2016	2017
Customer A	41%	35%

Cash and cash equivalents

Cash equivalents that are readily convertible to cash are stated at cost, which approximates fair value. The Company considers all highly liquid investments with an original or remaining maturity of three months or less at the time of purchase to be cash equivalents. Cash equivalents primarily consist of investments in money market funds as of September 30, 2016 and 2017.

Short-term investments

The Company invests in various types of securities, including United States government, commercial paper, and corporate debt securities. It classifies its investments as available-for-sale and records them at fair value based upon market prices at period end. Unrealized gains and losses that are deemed temporary in nature are recorded in accumulated other comprehensive income (loss) as a separate component of stockholders' equity (deficit). Dividend and interest income are recognized when earned. Realized gains and losses are included in earnings and are derived using the specific identification method for determining the cost of investments sold. The Company may sell these securities at any time for use in current operations.

Accounts receivable

Trade receivables include amounts billed and currently due from customers, recorded at the net invoice value and are not interest bearing. The amounts due are stated at their net estimated realizable value. The Company maintains an allowance for doubtful accounts to provide for the estimated amounts of receivables that will not be collected. The allowance is based upon an assessment of customer creditworthiness, historical payment experience, the age of outstanding receivables and collateral to the extent applicable. The Company re-evaluates such allowance on a regular basis and adjusts its allowance as needed. Once a receivable is deemed to be uncollectible, such balance is charged against the allowance. The Company did not record any allowance for doubtful accounts as of September 30, 2016 and 2017.

The Company's accounts receivable balance consists of the following:

(in thousands)	September 30,	
	2016	2017
Trade Receivables	\$ 664	\$ 2,237
Other Receivables	59	109
Accounts Receivable	\$ 723	\$ 2,346

The Company has a short order-to-invoice lifecycle, as most products can be manufactured within one month. Upon delivery of the products to the customer, the Company invoices the customer. The typical timing of payment is net 30 days, with some customers having payment terms of net 90 days.

Fair value of financial instruments

The carrying amounts of the Company's financial instruments including cash equivalents, accounts payable and accrued liabilities approximate fair value due to their relatively short maturities. The carrying amounts of the redeemable convertible preferred stock warrant liability represent their fair values. Based on the borrowings rates currently available to the Company for loans with similar terms, the carrying value of the Company's long-term debt approximates its fair value (level 2 within the fair value hierarchy).

Inventory

Inventory is stated at the lower of cost or net realizable value. Cost is determined using the first-in, first-out method. Determining net realizable value of inventory involves judgments and assumptions, including projecting selling prices and costs to sell. Provisions are made to reduce excess and obsolete inventories to their estimated net realizable value based on forecasted demand, past experience, the age and nature of inventories.

Property and equipment

Property and equipment are stated at cost. Depreciation is computed using the straight-line method over the estimated useful lives of the assets or the remaining lease term of the respective leasehold improvements assets, if any. The Company recorded depreciation expense of \$4.1 million and \$4.8 million as of September 30, 2016 and 2017, respectively. Estimated lives of property and equipment are as follows:

Laboratory equipment	5 Years
Furniture, fixtures and other equipment	5 Years
Computer equipment	3 Years
Computer software	3 Years
Leasehold improvements	Lesser of useful life or facilities' lease term.

Maintenance and repairs are charged to expense as incurred, and improvements and betterments are capitalized and depreciated through the life of the lease. When assets are retired or otherwise disposed of, the cost and accumulated depreciation are removed from the balance sheet and any resulting gain or loss is reflected in operations in the period realized.

Capitalized software development costs

Costs associated with internal-use software systems, including those to improve e-commerce capabilities, during the application development stage are capitalized. Capitalization of costs begins when the preliminary project stage is completed, management has committed to funding the project, and it is probable that the project will be completed and the software will be used to perform the function intended. Capitalization ceases at the point when the project is substantially complete and is ready for its intended purpose. The capitalized amounts are included in property and equipment, net on the consolidated balance sheets.

Capitalized software development costs, net, were \$1.3 million as of September 30, 2017. The Company did not have any capitalized software development costs in prior years. Capitalized costs are amortized using the straight-line method over an estimated useful life of the assets, which is three years.

Long-lived assets

The Company reviews property and equipment and intangibles for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability is measured by comparison of the carrying amount to the future undiscounted cash flows which the assets are expected to generate. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the projected discounted future net cash flows arising from the asset. There have been no such impairments of long-lived assets during the years ended September 30, 2016 and 2017.

Business combinations

Assets acquired and liabilities assumed as part of a business combination are generally recorded at their fair value at the date of acquisition. The excess of purchase price over the fair value of assets acquired and liabilities assumed is recorded as goodwill. Determining the fair value of identifiable assets, particularly intangible assets acquired, and liabilities assumed requires management to make estimates, which are based on all available information and in some cases assumptions with respect to the timing and amount of future revenues and expenses associated with an asset. Costs to effect an acquisition are recorded in general and administrative expenses in the consolidated statements of operations and comprehensive loss as the expenses are incurred.

Goodwill and purchased intangible assets

Goodwill is evaluated for impairment annually or more frequently if events or changes in circumstances indicate that the carrying value of the asset may not be recoverable. If, based on a qualitative assessment, the Company determines it is more likely than not that goodwill is impaired, a quantitative assessment is performed to determine if the fair value of the Company's sole reporting unit is less than its carrying value.

Purchased intangible assets with finite lives are generally amortized over their estimated useful lives using the straight-line method. The Company reviews intangible assets for impairment whenever events or changes in business circumstances indicate that the carrying amounts of the assets may not be fully recoverable. Impairment assessments inherently involve judgment as to assumptions about expected future cash flows and the impact of market conditions on those assumptions.

Segment information

The Company has one business activity, which is manufacturing of synthetic DNA using its semiconductor based silicon platform and operates as one reportable and operating segment. The Company's chief operating decision-maker, its Chief Executive Officer (CEO), reviews the Company's operating results on an aggregate basis for purposes of allocating resources and evaluating financial performance.

Revenue recognition

Effective October 1, 2017, the Company elected to early adopt the requirements of Accounting Standards Codification (ASC) 606, *Revenue from Contracts with Customers* using the full retrospective method. The Company evaluated the impact on revenues, loss from operations, net loss attributable to common stockholders and basic and diluted earnings per share for all periods presented and concluded that there was no material impact on the Company's consolidated financial statements for all periods presented.

The Company's revenue is generated through the sale of synthetic biology tools, such as synthetic genes, or clonal genes and fragments, oligonucleotides pools, or oligo pools, next generation sequencing, or NGS tools and DNA libraries. The Company accounts for a contract when it has approval and commitment from both

[Table of Contents](#)

parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable.

Contracts with customers are generally in the written form of a purchase order or a quotation, which outline the promised goods and the agreed upon price. Such orders are often accompanied by a Master Supply or Distribution Agreement that establishes the terms and conditions, rights of the parties, delivery terms, and pricing. The Company assesses collectability based on a number of factors, including past transaction history and creditworthiness of the customer.

For all of the Company's contracts to date, the customer orders a specified quantity of a synthetic DNA sequence; therefore, the delivery of the ordered quantity per the purchase order is accounted for as one performance obligation. Some contracts may contain prospective discounts when certain order quantities are exceeded; however, these future discounts are either not significant, not deemed to be incremental to the pricing offered to other customers, or not enforceable options to acquire additional goods. As a result, these discounts do not constitute a material right and do not meet the definition of a separate performance obligation. The Company does not offer retrospective discounts or rebates.

The transaction price is determined based on the agreed upon rates in the purchase order or master supply agreements applied to the quantity of synthetic DNA that was manufactured and shipped to the customer. The Company's contracts include only one performance obligation – the delivery of the product to the customer. Accordingly, all of the transaction price, net of any discounts, is allocated to the one performance obligation. Therefore, upon delivery of the product, there are no remaining performance obligations. The Company's shipping and handling activities are considered a fulfillment cost. The Company has elected to exclude all sales and value added taxes from the measurement of the transaction price. The Company has not adjusted the transaction price for significant financing since the time period between the transfer of goods and payment is less than one year.

The Company recognizes revenue at a point in time when control of the products is transferred to the customer. Management applies judgment in evaluating when a customer obtains control of the promised good which is generally when the product is shipped or delivered to the customer. The Company's customer contracts generally include a standard assurance warranty to guarantee that its products comply with agreed specifications. The Company reduces revenue by the amount of expected returns which have been insignificant.

The Company has elected the practical expedient to not disclose the consideration allocated to remaining performance obligations and an explanation of when those amounts are expected to be recognized as revenue since the duration of the contracts is less than one year.

Refer to Note 17 for the disaggregation of revenues by geography and by product.

Revenues by industry were as follows:

(in thousands)	Years ended September 30,	
	2016	2017
Industrial chemicals	\$ 960	\$ 6,702
Academic research	830	2,709
Healthcare	461	1,226
Agricultural	18	130
Total revenues	\$ 2,269	\$ 10,767

The Company does not have any contract assets or contract liabilities as of September 30, 2016 and 2017. For all periods presented, the Company did not recognize revenue from amounts that were included in the contract

liability balance at the beginning of each period. In addition, for all periods presented, there was no revenue recognized in a reporting period from performance obligations satisfied in previous periods.

Based on the nature of the Company's contracts with customers which are recognized over a term of less than 12 months, the Company has elected to use the practical expedient whereby costs to obtain a contract are expensed as they are incurred.

Research and development

Research and development expenses consist of compensation costs, employee benefits, subcontractors, research supplies, allocated facility related expenses and allocated depreciation and amortization. All research and development costs are expensed as incurred.

Advertising costs

Costs related to advertising and promotions are expensed to sales and marketing as incurred. Advertising and promotion expenses for the years ended September 30, 2016 and 2017, were \$0.2 million and \$0.1 million, respectively.

Government contract payments

The Company recognizes payments received from its funded research and development agreement with Defense Advanced Research Projects Agency (DARPA) when milestones are achieved and records them as a reduction of research and development expenses. In the year ended September 30, 2016, milestones met and recorded as a reduction of research and development costs totaled \$2.4 million. There were no DARPA payments received during the year ended September 30, 2017.

Redeemable convertible preferred stock warrant liability

Outstanding warrants that are related to the Company's redeemable convertible preferred stock are classified as liabilities on the balance sheet. As the warrants to purchase redeemable convertible preferred stock are exercisable into shares of convertible preferred stock, the Company has recognized a liability for the fair value of its warrants on the consolidated balance sheets upon issuance and subsequently remeasures the liability to fair value at the end of each reporting period until the earlier of the expiration or exercise of the warrants. In connection with the closing of an initial public offering, all of the outstanding warrants to purchase redeemable convertible preferred stock will automatically convert to warrants to purchase common stock, which qualify for equity classification and no further measurement will be required thereafter.

Common stock warrants

Warrants to purchase the Company's common stock issued in conjunction with debt are recorded as additional paid-in-capital and classified as equity on the consolidated balance sheets. During the year ended September 30, 2017, the Company recorded \$0.5 million in additional paid-in-capital for the fair value of warrants to purchase common stock issued in connection with long-term debt.

Stock-based compensation

The Company maintains performance incentive plans under which incentive and nonqualified stock options are granted primarily to employees and may be granted to members of the Board of Directors and certain non-employee consultants.

The Company recognizes stock compensation in accordance with ASC 718, *Compensation — Stock Compensation*. ASC 718 requires the recognition of compensation expense, using a fair value based method, for costs related to all stock-based payments including stock options.

The Company recognizes fair value of stock options granted to non-employees as a stock-based compensation expense over the period in which the related services are received. The Company recognizes forfeitures as they occur. The Company believes that the estimated fair value of stock options is more readily measurable than the fair value of the services rendered.

Net loss per share attributable to common stockholders

The Company calculates its basic and diluted net loss per share attributable to common stockholders in conformity with the two-class method required for companies with participating securities. In computing diluted net loss attributable to common stockholders, undistributed earnings are re-allocated to reflect the potential impact of dilutive securities. The Company's basic net loss per share attributable to common stockholders is calculated by dividing the net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period. For purposes of the calculation of diluted net loss per share attributable to common stockholders, convertible preferred stock, unvested shares of common stock issued upon the early exercise of stock options, warrants to purchase redeemable convertible preferred stock, warrants to purchase common stock, unvested restricted common stock and stock options to purchase common stock are considered potentially dilutive securities but have been excluded from the calculation of diluted net loss per share attributable to common stockholders as their effect is antidilutive.

Basic and diluted net loss per share of common stock attributable to common stockholders is calculated by dividing the net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period, less shares subject to repurchase, and excludes any dilutive effects of employee stock-based awards and warrants. Because the Company has reported a net loss for the years ended September 30, 2016 and 2017, diluted net loss per common share is the same as the basic net loss per share for those years.

The Company considers all series of its convertible preferred stock to be participating securities as they are entitled to receive noncumulative dividends prior and in preference to any dividends on shares of common stock. Due to the Company's net losses, there is no impact on the loss per share calculation in applying the two-class method since the participating securities have no legal obligation to share in any losses.

Unaudited pro forma net loss per share

Pro forma net loss per share, basic and diluted was computed to give effect to the conversion of the Series A, Series B, Series C and Series D convertible preferred stock using the as-if converted method into common shares as though the conversion had occurred as of the beginning of the period or the original date of issuance, if later. Also, the numerator has been adjusted to reverse the fair value adjustments related to the redeemable convertible preferred stock warrants as they will become common stock warrants and at such time will no longer require periodic revaluation.

Reverse stock split

In October 2018, the Company's stockholders approved a one-for-0.101 reverse stock split of its common and redeemable convertible preferred stock which was effected on October 16, 2018. The par value of the common stock and redeemable convertible preferred stock were not adjusted as a result of the reverse stock split. Accordingly, all share and per share amounts for all periods presented in the consolidated financial statements and notes thereto have been adjusted retrospectively to reflect this reverse stock split.

Income taxes

The Company accounts for income taxes using the asset and liability method whereby deferred tax asset and liability accounts are determined based on differences between financial reporting and tax bases of assets and

liabilities and are measured using the enacted tax rates and laws that are currently in effect. Valuation allowances are established where necessary to reduce deferred tax assets to the amounts expected to be realized.

Recent accounting pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers (Topic 606)*, which provides accounting guidance for all revenue arising from contracts with customers, and supersedes most current revenue recognition guidance. The core principle of the new standard is that a company should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented and the cumulative effect of applying the standard would be recognized at the earliest period shown, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized at the date of initial application. The Company has adopted the new revenue standard using the full retrospective method.

In August 2014, the FASB issued ASU 2014-15, *Presentation of Financial Statements—Going Concern* which requires an entity's management to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the entity's ability to continue as a going concern within one year after the date that the financial statements are issued or available to be issued and requires disclosure of those conditions and management's plans. This standard is effective for the annual period ending after December 15, 2016, with early adoption permitted. The Company has adopted this standard for the year ended September 30, 2017.

In April 2015, the FASB issued ASU 2015-03, *Simplifying the Presentation of Debt Issuance Costs*. The standard requires that debt issuance costs be presented in the balance sheet as a direct deduction from the carrying amount of the related debt liability, similar to debt discounts. The standard will be effective for financial statements issued for annual periods beginning after December 15, 2015, and interim periods within those annual periods. Adoption of this new standard did not have a material impact on the Company's consolidated financial statements.

In September 2015, the FASB issued ASU 2015-16, *Business Combinations*, to simplify accounting for adjustments made to provisional amounts recognized in a business combination by eliminating the requirement to retrospectively account for those adjustments. This ASU is effective for financial statements issued for fiscal years beginning after December 15, 2015, and interim periods within those fiscal years with early adoption permitted. The amendments in this ASU require that the acquirer record, in the same period's financial statements, the effect on earnings of changes in depreciation, amortization or other income effects as a result of changes to provisional amounts, calculated as if the accounting had been completed at the acquisition date. The adoption of this standard did not have a material impact on the Company's consolidated financial statements.

In November 2015, the FASB issued ASU 2015-17, *Balance Sheet Classification of Deferred Taxes*. The new standard requires that the Company classify all deferred tax assets and liabilities as non-current. The new standard is effective for fiscal years beginning after December 15, 2016, though early adoption is permitted as of the beginning of an earlier interim or annual reporting period. The adoption of this standard did not have a material impact on the Company's consolidated financial statements.

In February 2016, the FASB issued new lease accounting guidance in ASU 2016-02, *Leases*. Under the new guidance, lessees will be required to recognize for all leases (with the exception of short-term leases) at the

[Table of Contents](#)

commencement date: (1) a lease liability, which is a lessee's obligation to make lease payments arising from a lease, measured on a discounted basis; and (2) a right-of-use asset, which is an asset that represents the lessee's right to use, or control the use of, a specified asset for the lease term. The new lease guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early application is permitted. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In March 2016, the FASB issued ASU 2016-09, *Improvements to Employee Share-Based Payment Accounting*, which impacts the accounting for stock-based payment transactions, including income tax consequences. The standard requires the tax impacts of stock-based awards to be reflected in the income statement and also requires excess tax benefits to be classified as an operating cash flow. The standard also allows an entity to elect to account for forfeitures of stock-based awards as they occur. The standard is effective for the annual period beginning after December 15, 2017, with early adoption permitted. The Company early adopted this standard for the year ended September 30, 2016 with no material impact on its consolidated financial statements.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments*, which was intended to reduce diversity in practice in how certain cash receipts and payments are presented and classified in the statement of cash flows. The standard provides guidance in a number of situations including, among others, settlement of zero-coupon bonds, contingent consideration payments made after a business combination, proceeds from the settlement of insurance claims, and distributions received from equity method investees. The ASU also provides guidance for classifying cash receipts and payments that have aspects of more than one class of cash flows. The ASU is effective for fiscal years beginning after December 15, 2017, and interim period within those fiscal years, with early adoption permitted. The amendments in this update should be applied in retrospective transition for each period presented. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In November 2016, the FASB has issued ASU 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash*. This ASU applies to all entities that have restricted cash or restricted cash equivalents and are required to present a statement of cash flows. The ASU requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. As a result, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. This ASU is effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years with early adoption is permitted. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In January 2017, the FASB has issued ASU 2017-01, *Business Combinations (Topic 805): Clarifying the Definition of a Business*, clarifying the definition of a business. The ASU affects all companies and other reporting organizations that must determine whether they have acquired or sold a business. The definition of a business affects many areas of accounting including acquisitions, disposals, goodwill, and consolidation. The ASU is effective for annual periods beginning after December 15, 2017, including interim periods within those periods. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In January 2017, the FASB issued ASU 2017-04, *Intangibles — Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*. This ASU simplifies the subsequent measurement of goodwill. The ASU eliminates step 2 from the goodwill impairment test, including for reporting units with a zero or negative carrying amount

that fail a qualitative test. An entity still has the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. This ASU should be applied on a prospective basis. This ASU is effective for annual or any interim goodwill impairment tests in fiscal years beginning after December 15, 2019. Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017. The Company has not yet determined whether it will early adopt this ASU.

In May 2017, the FASB issued ASU 2017-09, *Compensation — Stock Compensation (Topic 718): Scope of Modification Accounting*, which clarifies when to account for a change to the terms or conditions of a stock-based payment award as a modification. Under ASU 2017-09, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) changes as a result of the change in terms or conditions. This standard is effective for all entities for annual reporting periods beginning after December 15, 2017, including interim periods within that reporting period. Early adoption is permitted. The Company is evaluating the impact that this standard will have on its consolidated financial statements.

3. Acquisition

In April 2016, pursuant to the terms of an agreement and plan of merger, the Company acquired 100% of the outstanding shares of GCC. GCC was incorporated in Delaware with one subsidiary (Genome Compiler Israel Ltd.) in Tel Aviv, Israel. GCC provided software for genetic engineers and molecular and synthetic biologists. The acquisition of GCC provided the Company with a gene design tool as well as an experienced and highly skilled workforce to complement the Company's operations and develop a digital products portfolio, including an e-commerce solution with synthetic DNA design capabilities.

The results of GCC's operations from the acquisition date forward and the fair values of the acquired assets and liabilities assumed have been included in the consolidated financial statements.

The acquisition was completed in exchange for 0.4 million shares of common stock of the Company which were valued at \$2.4 million at the time of the closing of the acquisition. The following table summarizes the fair values of assets acquired, liabilities assumed and goodwill.

(in thousands)	
Cash and cash equivalents	\$ 254
Other assets	137
Property and equipment	7
Goodwill	1,138
Intangible assets	1,240
Total assets acquired	2,776
Accounts payable	(180)
Accrued expenses	(173)
Other liabilities	(23)
Net assets acquired	\$2,400

The fair value of the intangible assets was estimated by determining the present value of estimated future operating cash flows generated from existing technology. The fair values of the intangible assets were estimated by applying the income approach. The income approach is used to estimate fair value based on the income stream, such as cash flows or earnings that an asset can be expected to generate over its useful life. Refer to Note 6 for further discussion on intangible assets acquired from the acquisition.

Goodwill is not deductible for tax purposes and represents the excess of the purchase price over the fair value of the net tangible and intangible assets acquired. The goodwill is attributable to the workforce of the acquired

business and the synergies expected from the acquisition. Goodwill will not be amortized and will be tested for impairment at least annually. The pro forma effect of this acquisition as if it had occurred at the beginning of the year was not material to the consolidated financial statements.

4. Fair value measurement

The Company assesses the fair value of financial instruments based on the provisions of ASC 820, *Fair Value Measurements*. ASC 820 defines fair value as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. ASC 820 also establishes a fair value hierarchy which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

Level 1—Quoted prices in active markets for identical assets or liabilities.

Level 2—Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. The Company short-term investments primarily utilizes broker quotes in a non-active market for valuation of its short term investments.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

In determining fair value, the Company utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible as well as considers counterparty credit risk in its assessment of fair value.

The following table sets forth the cash, cash equivalents, and short-term investments as of September 30, 2016:

(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Cash and cash equivalents	\$ 28,596	\$ —	\$ —	\$28,596
Short-term investments	27,315	9	—	27,324
Total	\$ 55,911	\$ 9	\$ —	\$55,920

The following table sets forth the cash, cash equivalents, and short-term investments as of September 30, 2017:

(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Cash and cash equivalents	\$ 31,227	\$ —	\$ —	\$31,227
Short-term investments	30,977	—	—	30,977
Total	\$ 62,204	\$ —	\$ —	\$62,204

[Table of Contents](#)

As of September 30, 2016, financial assets and liabilities measured and recognized at fair value are as follows:

(in thousands)	Level 1	Level 2	Level 3	Fair value
Assets				
Money market funds	\$28,596	\$ —	\$ —	\$ 28,596
Corporate bonds	—	10,004	—	10,004
Commercial paper	—	3,500	—	3,500
U.S. government treasury bonds	—	13,820	—	13,820
Total	\$28,596	\$27,324	\$ —	\$ 55,920
Liabilities				
Redeemable convertible preferred stock warrant liability	\$ —	\$ —	\$ 383	\$ 383

As of September 30, 2017, financial assets and liabilities measured and recognized at fair value are as follows:

(in thousands)	Level 1	Level 2	Level 3	Fair value
Assets				
Cash and cash equivalents	\$ 3,793	\$ —	\$ —	\$ 3,793
Money market funds	21,494	—	—	21,494
Corporate bonds	—	1,707	—	1,707
Commercial paper	—	22,742	—	22,742
U.S. government treasury bills	12,468	—	—	12,468
Total	\$37,755	\$24,449	\$ —	\$ 62,204
Liabilities				
Redeemable convertible preferred stock warrant liability	\$ —	\$ —	\$ 644	\$ 644

Unrealized losses on cash equivalents and available-for-sale securities, which have been in an unrealized loss position for greater than twelve months, were not material as of September 30, 2016 and 2017.

Contractual maturities of short-term investments held at September 30, 2017 consists of amounts due within one year with an average maturity of 5.5 months.

Redeemable convertible preferred stock warrants

The following table provides a reconciliation of beginning and ending balances of the Level 3 instruments during the years ended September 30, 2016 and 2017:

(in thousands)	Series A	Series B	Series C	Series D	Total
Redeemable convertible preferred stock warrant liability:					
Fair value at September 30, 2015	\$ 214	\$ 55	\$ –	\$ –	\$ 269
Fair value related to issuance of redeemable convertible preferred stock warrants in connection with a loan agreement	–	–	141	41	182
Changes in fair value recorded in other income (expense), net	(30)	2	(33)	(7)	(68)
Fair value as of September 30, 2016	184	57	108	34	383
Change in fair value recorded in other income (expense), net	147	53	44	17	261
Fair value as of September 30, 2017	\$ 331	\$ 110	\$ 152	\$ 51	\$ 644

5. Balance sheet components

Inventory consists of the following:

(in thousands)	September 30,	
	2016	2017
Raw Materials	\$ 847	\$ 1,243
Work-in-process	266	385
Finished Goods	115	199
	\$ 1,228	\$ 1,827

Property and Equipment, net consists of the following:

(in thousands)	September 30,	
	2016	2017
Laboratory equipment	\$ 15,062	\$ 16,652
Furniture, fixtures and other equipment	398	553
Computer equipment	1,839	2,018
Computer software	1,082	1,171
Leasehold improvements	2,441	3,301
Construction in progress	1,136	3,080
	21,958	26,775
Less: Accumulated depreciation and amortization	(7,341)	(11,941)
	\$ 14,617	\$ 14,834

6. Goodwill and intangible assets

The Company's goodwill and intangible assets balances are the result of the acquisition of GCC (see Note 3). The Company recorded goodwill of \$1.1 million during the year ended September 30, 2016 and there were no changes to the carrying value of goodwill during the year ended September 30, 2017. Total amortization

Table of Contents

expense related to intangible assets was \$0.1 million for the year ended September 30, 2016 and \$0.2 million for the year ended September 30, 2017.

The intangible assets balances are presented below:

(in thousands, except for years)	September 30, 2016			
	Useful lives in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	6	\$ 1,220	\$ (102)	\$ 1,118
Tradenames & Trademarks	2	20	(5)	15
Total indefinite-lived intangible assets		\$ 1,240	\$ (107)	\$ 1,133

(in thousands, except for years)	September 30, 2017			
	Useful lives in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	6	\$ 1,220	\$ (305)	\$ 915
Tradenames & Trademarks	2	20	(15)	5
Total indefinite-lived intangible assets		\$ 1,240	\$ (320)	\$ 920

Future annual amortization expense is as follows (in thousands):

2018	\$ 208
2019	203
2020	203
2022	203
Thereafter	103
	<u>\$920</u>

7. Long-term debt

In October 2013, the Company entered into a Loan and Security Agreement (the First Loan) with Silicon Valley Bank (SVB) for loan amounts aggregating up to \$3.0 million in a series of up to three advances. The first advance was \$2.0 million and the remaining two advances were \$0.5 million, each upon achieving the milestone of receiving a minimum of an additional \$4.0 million in Series A convertible preferred stock financing through September 30, 2014. Each loan bore interest at a fixed rate equal to 2.25% plus the Prime Rate as published by the Wall Street Journal but not less than 5.5% at the funding date of each advance. The debt provided interest-only payments from October 2013 through September 2014. A final payment fee of \$0.2 million was due the earlier of the maturity date of March 2017 or the prepayment, acceleration demand by SVB, or termination of the loan. As part of the agreement, the Company issued a warrant to SVB to purchase 36,838 shares of Series A redeemable convertible preferred stock at an exercise price of \$3.26 per share. In October 2013, the Company drew down \$2.0 million of the loan at an interest rate of 5.5% as the prime rate was 3.25% at the time. In February 2014, the Company drew down the remaining \$1.0 million of the First Loan, also at an interest rate of 5.5% as the prime rate was 3.25% at the time.

In September 2014, the Company entered into an Amended and Restated Loan and Security Agreement (the Second Loan) with SVB for loan amounts aggregating up to \$10.0 million in a series of up to three advances. The first advance was in the amount of \$3.2 million. The second advance was up to \$3.8 million at any time after

[Table of Contents](#)

the Company achieved a specified product launch through December 31, 2015. The third advance was up to \$3.0 million at any time after the Company achieved cumulative revenue of \$5.0 million. Each loan bore interest at the greater of the Prime Rate as published by the Wall Street Journal at the time or 3.25%. The debt provided interest-only payments during the first twelve months. A final payment fee of 3.75% of the aggregate amount loaned was due the earlier of 42 months after the final tranche or the prepayment, acceleration demand by SVB, or termination of the loan. The Second Loan contained a subjective acceleration clause under which the loan could become due and payable to SVB in the event of a material adverse change in the Company's business, as determined by SVB.

At the time of the Second Loan, the Company drew down \$3.2 million to refinance the First Loan balance of \$3.0 million and the final payment fee of \$0.2 million. The Prime Rate and interest rate of the loan was 3.25%. As part of the Second Loan agreement, the Company issued a warrant to SVB to purchase 16,221 shares of Series B redeemable convertible preferred stock at an exercise price of \$7.84 per share. The Company accounted for this transaction as a debt modification. The Company did not incur any gains or losses relating to the debt modification.

In April 2015, the Company entered into a Master Loan and Security Agreement with a separate lender for loan amounts not to exceed \$3.0 million. In May 2015, the Company borrowed \$0.9 million using certain computer equipment as collateral. The term of the loan was 24 months and carried an interest rate of 4.44% with a final payment amount representing 10% of the principal amount of the loan. The loan was paid-off in 2017.

In December 2015, the Company entered into a Second Amended and Restated Loan and Security Agreement with SVB (the Third Loan), for loan amounts aggregating up to \$15.0 million in a series of three advances. The Third Loan contained an acceleration clause under which the loan could become due and payable to SVB in certain events of default, including in the event of a material adverse change in the Company's business. The term of the loan was 41 months with an interest rate equal to the greater of (i) the prime rate or (ii) 3.25%, and a final payment fee of 6% of the principal amount loaned. In addition, the Company obtained a revolving loan facility from SVB of up to \$5.0 million for which the principal amount outstanding under the revolving line would accrue interest at a floating per annum rate equal to 1.00% above the Prime Rate, which interest was payable monthly.

The first advance, totaling \$7.0 million, was drawn in December 2015 and comprised \$3.3 million to refinance the Second Loan and a new advance of \$3.7 million. The debt provided interest-only payments through December 31, 2016 at which time monthly principal payments become due. In connection with this advance, the Company issued a warrant to purchase 18,854 shares of Series C redeemable convertible preferred stock at an exercise price of \$14.85 per share. The Company accounted for this transaction as a debt modification and did not incur any gains or losses relating to the modification. The second advance, totaling \$4.0 million, was drawn in March 2016. In connection with this advance, the Company issued a warrant to purchase 7,531 shares of Series D redeemable convertible preferred stock at an exercise price of \$21.24 per share.

In April 2016, the Company entered into a Third Amended and Restated Loan and Security Agreement to include GCC as co-borrower on the loan.

In September 2017, the Company entered into a Fourth Amended and Restated Loan and Security Agreement (the Fourth Loan) with SVB for loan amounts aggregating up to \$20.0 million in a series of three advances. The first advance provides a principal amount of \$10.0 million, the second advance provides a principal amount of \$5.0 million and the third advance provides a principal amount of \$5.0 million during their respective draw down periods. In connection with the first advance the Company issued a warrant to purchase 64,127 shares of common stock at an exercise price of \$6.24 per share. If the Company draws down the second and third advances, the warrants would become exercisable for an additional 64,126 shares of common stock at an

Table of Contents

exercise price of \$6.24 per share. The Fourth Loan contains a subjective acceleration clause under which the Fourth Loan could become due and payable to SVB in the event of a material adverse change in the Company's business. The term of the loan was 51 months with an interest rate of prime plus 3.00% and a final payment fee of \$0.7 million.

The first advance, totaling \$10.0 million, was drawn in September 2017 and comprised \$7.8 million to refinance the Third Loan and a new advance of \$2.2 million. The debt provides for interest only payments through December 31, 2018 at which time monthly principal payments become due. In addition, the Company obtained a revolving loan facility for a principal amount of up to \$10.0 million for which the principal amount outstanding under the revolving line would accrue interest at a floating per annum rate equal to one percentage point (1.00%) above the prime rate, which interest shall be payable monthly. The Company accounted for this transaction as a debt modification and did not incur any gain or loss relating to the modification.

The Company's credit facilities contain customary representations and warranties and customary affirmative and negative covenants applicable to the Company and its subsidiaries, including, among other things, restrictions on changes in business, management, ownership or business locations, indebtedness, encumbrances, investments, mergers or acquisitions, dispositions, maintenance of collateral accounts, prepayment of other indebtedness, distributions and transactions with affiliates. The credit facilities contain customary events of default subject in certain cases to grace periods and notice requirements, including (a) failure to pay principal, interest and other obligations when due, (b) material misrepresentations, (c) breach of covenants, conditions or agreements in the credit facilities, (d) default under material indebtedness, (e) certain bankruptcy events, (f) a material adverse change; (g) attachment, levy or restraint on business, (h) default with respect to subordinated debt, (i) cross default under the Company's credit facilities, and (j) government approvals being revoked. As of September 30, 2017, all rights, title and interest to the Company's personal property with the exception of the Company's intellectual property, have been pledged as collateral, including cash and cash equivalents, short-term investments, accounts receivable, contractual rights to payment, license agreements, general intangibles, inventory and equipment. The Company was in compliance with all covenants under the loan and security agreement with SVB as of September 30, 2016 and September 30, 2017.

Future maturities of the loan as of September 30, 2017 are as follows:

(in thousands)	Principal	Interest	Total
Year ending September 30,			
2018	\$ —	\$ 715	\$ 715
2019	2,500	673	3,173
2020	3,333	440	3,773
2021	3,333	194	3,527
2022	834	10	844
	<u>10,000</u>	<u>2,032</u>	<u>12,032</u>
Less: Interest			(2,032)
Total amount of loan principal			10,000
Less unamortized debt discount			(860)
Add accretion of final payment fee			14
			<u>\$ 9,154</u>

8. Commitments and contingencies

Litigation

In February 2016, a complaint was filed in the Superior Court of the State of California (County of Santa Clara), dated February 3, 2016 on behalf of Agilent Technologies, Inc. (Agilent), against the Company and its CEO (the Complaint) alleging (i) breach of contract against the CEO, (ii) breach of duty of loyalty against the CEO, and (iii) misappropriation of trade secrets by the Company and the CEO. The Company believes that the complaint is without merit, and intends to vigorously defend itself. The Company is currently unable to predict the ultimate outcome of this matter or estimate a reasonably possible loss or range of loss, and no amounts have been accrued in the consolidated financial statements.

Indemnifications

In the ordinary course of business, the Company enters into agreements that may include indemnification provisions. Pursuant to such agreements, the Company may indemnify, hold harmless and defend the indemnified parties for losses suffered or incurred by the indemnified party. Some of the provisions will limit losses to those arising from third-party actions. In some cases, the indemnification will continue after the termination of the agreement. The maximum potential amount of future payments the Company could be required to make under these provisions is not determinable. To date, the Company has not incurred material costs to defend lawsuits or settle claims related to these indemnification provisions. The Company has also entered into indemnification agreements with its directors and officers that may require it to indemnify its directors and officers against liabilities that may arise by reason of their status or service as directors or officers to the fullest extent permitted by corporate law. The Company also has directors' and officers' insurance.

Leases

In July 2013, the Company entered into a non-cancelable operating lease agreement for office space in San Francisco with an expiration date of July 2016. In July 2014, the Company entered into a non-cancelable operating sublease agreement for additional office space in the same building. In May 2015, the Company entered into an amendment to the lease agreement to increase the rentable premises with a new expiration date of September 2016. In June 2015, the sublease agreement was terminated and the lease agreement was amended to include the additional office space. In January 2016, the Company extended the term of the lease for an additional three years with a new expiration date of September 2019.

In July 2014, the Company entered into a non-cancelable operating sublease agreement for office space in San Francisco with an expiration date of September 2016. In November 2015, the Company extended the term of this sublease by two years with a new expiration date of September 2018.

In May 2016, the Company entered into a non-cancelable operating lease agreement for additional space in South San Francisco that expires in May 2019. Future minimum lease payments under all non-cancelable operating leases as of September 30, 2017 are as follows:

(in thousands)	Operating leases
Years ended September 30,	
2018	\$ 2,133
2019	1,322
2020	143
Total minimum lease payments	<u>\$ 3,598</u>

Rent expense was \$1.6 million and \$2.2 million for the years ended September 30, 2016 and 2017, respectively. Rent expense is measured based upon amortizing minimum lease payments, including rent escalations under the lease term, using the straight-line method over the term of the lease.

The deferred rent liability was \$0.1 million as of September 30, 2016 and 2017.

9. Related party transactions

During the year ended September 30, 2016, the Company sold 126,469 shares of Series D redeemable convertible preferred stock. The Company also purchased raw materials from a related party investor in the amount of \$1.0 million. Payable balances and receipts and receivable balances with the related party were immaterial as of September 30, 2016.

During the year ended September 30, 2017, the Company sold 170,085 shares of Series D redeemable convertible preferred stock. The Company also purchased raw materials from a related party investor in the amount of \$2.0 million. Payable balances and receipts and receivable balances with the related party were immaterial as of September 30, 2017.

10. Government research agreement

In April 2014, the Company entered into a fixed fee research agreement with DARPA to develop the capability for large-scale, high-throughput construction of genetic designs. The total initial value of the agreement is \$2.4 million which is comprised of eight base milestones with each milestone assigned a certain fixed fee over a 12-month period. The agreement also includes an additional ten optional milestones totaling \$2.8 million to be completed over a 12-month period.

In July 2015, the DARPA agreement was amended to extend the project through the option period of an additional year. In June 2016, the DARPA agreement was amended to remove two remaining milestones from the project reducing the value of the project by \$0.6 million.

For the year ended September 30, 2016 a total of \$2.4 million was recorded as a reduction in research and development costs. There were no DARPA payments received during the year ended September 30, 2017.

11. Income taxes

The Company recorded an immaterial provision for income taxes during the year ended September 30, 2016 and \$0.3 million for the year ended September 30, 2017.

[Table of Contents](#)

The significant components of the Company's deferred tax assets and liabilities are as follows:

(in thousands)	September 30,	
	2016	2017
Net operating loss carryforwards	\$ 28,854	\$ 50,312
Research and development credit carryforwards	1,581	3,050
Accruals	436	724
Other	307	819
Sub-total	31,178	54,905
Less: Valuation allowance	(30,324)	(54,273)
Net deferred tax assets	854	632
Fixed assets	(444)	(274)
Intangible assets	(410)	(358)
Net deferred tax liabilities	(854)	(632)
Total net deferred tax assets	\$ —	\$ —

The following is a reconciliation of the statutory federal income tax rate to the Company's effective tax rate:

	Years ended September 30,	
	2016	2017
Tax expense computed at the federal statutory rate	35%	35%
Change in valuation allowance	(34)%	(35)%
Research and development credit benefit	0%	1%
Other expenses	(1)%	(1)%
Total income tax expense	—%	—%

Based on the available objective evidence, management believes it is more likely than not that the deferred tax assets will not be fully realizable. Accordingly, the Company has provided a full valuation allowance against its deferred tax assets at September 30, 2016 and 2017. For the year ended September 30, 2016, the valuation allowance increased by \$14.7 million due to increases in the Company's deferred tax assets against which the Company records a full valuation allowance. The increase is comprised primarily of a \$14.6 million increase related to net operating loss carryforwards and a \$0.4 million increase in research and development credits offset by an increase in deferred tax liabilities for intangible assets and fixed assets of \$0.5 million. For the year ended September 30, 2017, the valuation allowance increased by \$24.0 million due to increases in the Company's deferred tax assets against which the Company records a full valuation allowance. The increase is comprised primarily of a \$21.5 million increase related to net operating loss carryforwards and a \$1.5 million increase in research and development credits.

As of September 30, 2016, the Company had net operating loss carryforwards of approximately \$77.9 million and \$32.0 million available to reduce future taxable income, if any, for federal and state income tax purposes, respectively. As of September 30, 2017, the Company had net operating loss carryforwards of approximately \$134.9 million and \$81.2 million available to reduce future taxable income, if any, for federal and state income tax purposes, respectively. The net operating losses will begin to expire in 2033.

The Company also had federal and state research and development credit carryforwards of approximately \$2.6 million and \$2.7 million, respectively, at September 30, 2017 and \$1.3 million and \$1.4 million, respectively, at September 30, 2016. The federal credits will expire starting in 2033 if not utilized. The California research

Table of Contents

and development credits have no expiration date. Utilization of the net operating losses and tax credits is subject to annual limitation due to the ownership change limitations provided by the Internal Revenue Code and similar state provisions. Such annual limitations may result in the expiration of the net operating losses and tax credits before utilization.

The provisions of ASC 740-10, *Accounting for Uncertainty in Income Taxes*, prescribe a comprehensive model for the recognition, measurement, and presentation and disclosure in financial statements of any uncertain tax positions that have been taken or expected to be taken on a tax return. The Company has identified uncertain tax positions related to federal and state research and development credits. It is unlikely that the amount of unrecognized tax benefits will materially change over the next year.

The aggregate changes in the balance of gross unrecognized tax benefits are as follows:

(in thousands)	Federal and state
Balance as of September 30, 2015	\$ 626
Increases related to tax positions taken during 2016	196
Balance as of September 30, 2016	822
Increases related to tax positions taken during 2017	562
Increases related to tax positions in prior years	241
Balance as of September 30, 2017	\$ 1,625

It is the Company's policy to include penalties and interest expense related to income taxes as a component of other expense and interest expense, respectively, as necessary. The Company's management determined that no accrual for interest and penalties was required as of September 30, 2016 and 2017 due to the availability of net operating losses to offset any tax adjustment. The Company's tax years from 2013 through 2016 will remain open for examination by the federal and state authorities for three and four years, respectively, from the date of utilization of any net operating loss or tax credits. The Company does not have federal or state tax examinations in progress.

12. Warrants

In connection with its long-term debt agreements, the Company issued warrants for its redeemable convertible preferred stock and common stock as follows:

(in thousands, except share and per share data)	Number of shares underlying warrants		Fair value			Exercise price per share
Warrant class/series:	September 30, 2017			Issuance date	Expiration date	
Series A	36,838	\$ 331		October 8, 2013	October 8, 2023	\$ 3.26
Series B	16,221	110		September 2, 2014	September 2, 2024	\$ 7.84
Series C	18,854	152		December 22, 2015	December 22, 2025	\$ 14.85
Series D	7,531	51		March 28, 2016	March 28, 2026	\$ 21.24
Total preferred stock warrants	79,444	\$ 644				
Common stock warrants	64,127	\$ 486		September 6, 2017	September 6, 2027	\$ 6.24

The fair value of the Company's warrant to purchase redeemable convertible preferred stocks was derived from values as determined by management and approved by the Board of Directors. Management has determined

the fair value based primarily on analyses performed by the Company's third-party valuation specialists under a hybrid valuation method which incorporates the per share values calculated under the Option Pricing Method (OPM) and the Probability-Weighted Expected Return Method (PWERM) weighted appropriately to arrive at a fair market value of the warrants. Valuations performed by third-party valuation specialists were done contemporaneously and used the methodologies, approaches, and assumptions consistent with the American Institute of Certified Public Accountants (AICPA) Accounting and Valuation Guide: *Valuation of Privately-Held-Company Equity Securities Issued as Compensation* and Company specific factors.

On October 8, 2013, in connection with a debt financing arrangement, the Company issued a warrant to purchase 36,838 shares of Series A redeemable convertible preferred stock. The warrant was fully vested and immediately exercisable upon issuance and has an expiration date of October 8, 2023. The Company determined the fair value of the warrant granted was less than \$0.1 million on the date of issuance. For the years ending September 30, 2016 and 2017, the Company used a hybrid method and determined the change in fair value of the warrant which was recorded in other income (expense), net.

On September 2, 2014, in connection with a debt financing arrangement, the Company issued a warrant to purchase 16,221 shares of Series B redeemable convertible preferred stock. The warrant was fully vested and immediately exercisable upon issuance and has an expiration date of September 2, 2024. The Company determined the fair value of the warrant granted was less than \$0.1 million on the date of issuance. For the years ending September 30, 2016 and 2017, the Company used a hybrid method and determined the change in fair value of the warrant which was recorded in other income (expense), net.

On December 22, 2015, in connection with a debt financing arrangement, the Company issued a warrant to purchase 18,854 shares of Series C redeemable convertible preferred stock. The warrant was fully vested and immediately exercisable upon issuance and has an expiration date of December 22, 2025. The Company determined the fair value of the warrant granted was \$0.1 million on the date of issuance. For the years ending September 30, 2016 and 2017, the Company used a hybrid method and determined the change in fair value of the warrant which was recorded in other income (expense), net.

On March 28, 2016, in connection with a debt financing arrangement, the Company issued a warrant to purchase 7,531 shares of Series D redeemable convertible preferred stock. The warrant was fully vested and immediately exercisable upon issuance and has an expiration date of March 28, 2026. The Company determined the fair value of the warrant granted was less than \$0.1 million on the date of issuance. For the years ending September 30, 2016 and 2017, the Company used a hybrid method and determined the change in fair value of the warrant which was recorded in other income (expense), net.

As these warrants to acquire redeemable convertible preferred stock are classified as liabilities, any potential beneficial conversion feature related to those underlying shares of convertible preferred would not be recognized until such time as the warrant is exercised. At that point, any excess of the fair value of the Company's common stock into which the shares of redeemable convertible preferred are convertible over the effective conversion price, measured as the sum of the carrying amount of the warrant liability and the exercise price of the warrant, would be recognized as a beneficial conversion feature and would reduce earnings available to common stockholders in the calculation of earnings per share.

On September 6, 2017, in connection with the September 2017 debt refinancing, the Company issued a warrant to purchase 64,127 shares of common stock. The warrants were fully vested and immediately exercisable upon issuance and has an expiration date of September 6, 2027. The Company determined the fair value of the warrant granted was \$0.5 million.

[Table of Contents](#)

The fair values of the warrants to purchase common stock were determined using the Black-Scholes option pricing model with the following valuation assumptions:

Expected term (years)	6.25
Expected volatility	65.5%
Risk-free interest rate	2.02%
Dividend yield	0%

13. Redeemable convertible preferred stock

Redeemable convertible preferred stock as of September 30, 2016 and 2017 consists of the following:

(in thousands, except share and per share data)				September 30, 2016	
Series	Shares authorized	Outstanding	Price per share	Liquidation amount	Proceeds, net*
A	2,854,576	2,817,723	\$ 3.26	\$ 9,111	\$ 9,141
B	3,331,878	3,315,645	7.84	26,000	25,900
C	2,510,354	2,491,483	14.85	37,000	36,726
D	3,074,670	2,938,714	21.24	62,432	62,270
	11,771,478	11,563,565		\$ 134,543	\$ 134,037

(in thousands, except share and per share data)				September 30, 2017	
Series	Shares authorized	Outstanding	Price per share	Liquidation amount	Proceeds, net*
A	2,854,576	2,817,723	\$ 3.26	\$ 9,111	\$ 9,141
B	3,331,878	3,315,645	7.84	26,000	25,900
C	2,510,354	2,491,483	14.85	37,000	36,726
D	6,476,580	6,034,089	21.24	128,193	127,866
	15,173,388	14,658,940		\$ 200,304	\$ 199,633

* Net of issuance costs.

The holders of preferred stock have various rights and preferences as follows:

Voting rights

The holders of redeemable convertible preferred stock shares are entitled to vote on all matters on which the common stockholders are entitled to vote. Holders of redeemable convertible preferred stock and common stock vote together as a single class, not as separate classes. Each holder of Redeemable convertible preferred stock is entitled to the number of votes equal to the number of common stock shares into which the shares held by such holder are convertible.

Dividends

The holders of shares of Series D redeemable convertible preferred stock are entitled to receive, if declared by the board of directors, noncumulative dividends at the rate of 8% per share of the Series D issue price per annum. After dividends on the Series D redeemable convertible preferred stock have been paid, then the Company may declare and distribute in such year dividends among the holders of shares of Series A, Series B, and Series C redeemable convertible preferred stock on a pari passu basis. No dividends have been declared for any period through September 30, 2017.

Liquidation preference

The holders of redeemable convertible preferred stock are entitled to have their shares redeemed upon the occurrence of certain redemption events. A liquidation or winding up of the Company, a greater than 50% change in control, or a sale of substantially all of its assets, sales or exclusive licenses of all or substantially all of the Company's intellectual property would constitute a redemption event. As the redemption event is outside the control of the Company, all shares of preferred stock have been presented outside of permanent equity. Further, the Company has not adjusted the carrying values of the Series A, Series B, Series C and Series D redeemable convertible preferred stock to the redemption value of such shares, since it is uncertain whether or when a redemption event will occur. Adjustments to increase the carrying value to the redemption values will be made when it becomes probable that such redemption will occur.

In a liquidation, dissolution, or winding-up of the Company, either voluntary or involuntary, each holder of Series D redeemable convertible preferred stock is entitled to be paid in cash before any amount is paid or distributed to the holders of the Series A, Series B or Series C redeemable convertible preferred stock or common stock at an amount per share equal to the greater of \$21.24 plus an amount equal to all accrued and declared but unpaid dividends on such share of Series D redeemable convertible preferred stock (adjusted for stock splits, stock dividends, combinations, recapitalizations and the like) and the amount payable on shares of Series D redeemable convertible preferred stock had such shares been converted to shares of common stock immediately prior to such liquidation. If the amounts available for distribution by the Company to holders of Series D redeemable convertible preferred stock upon a liquidation are not sufficient to pay the Series D amount due, holders of Series D redeemable convertible preferred stock share ratably in any distribution.

Upon the completion of the initial Series D liquidation amount described above, the remaining assets and funds of the Company available for distribution to its stockholders shall be distributed to each holder of outstanding shares of Series A, Series B and Series C redeemable convertible preferred stock, who shall be entitled to paid in cash, on a pari passu basis based on the relative initial liquidation amount of each series, before any amount shall be paid or distributed to the holders of common stock, an amount per share equal to (i) \$3.26, in the case of Series A redeemable convertible preferred stock, (ii) \$7.84, in the case of Series B redeemable convertible preferred stock, and (iii) \$14.85, in the case of Series C redeemable convertible preferred stock plus an amount equal to all accrued and declared but unpaid dividends on such share of Preferred Stock. Should the Company's legally available assets be insufficient to satisfy the liquidation preferences, the funds will be distributed ratably among the holders of Series A, Series B and Series C redeemable convertible preferred stock in proportion to the preferential amount each holder is otherwise entitled to receive.

Conversion

Each share of Series A, Series B, Series C and Series D redeemable convertible preferred stock is convertible, at the option of the holder, into the number of shares of common stock into which such shares are convertible at the then-effective conversion ratio. The initial conversion price per share for Series A, Series B, Series C and Series D redeemable convertible preferred stock is \$3.26, \$7.84, \$14.85 and \$21.24 per share, respectively. The initial conversion price or ratio is subject to adjustment due to securities issued by the Company subject to certain limited exceptions, including securities issued in the acquisition of another entity, lending or equipment leasing transactions, and stock purchases, stock splits, stock dividends, reorganizations and public offerings. The current conversion ratio for each series of redeemable convertible preferred stock is 1:1.

Each share of Series A, Series B, Series C and Series D redeemable convertible preferred stock is convertible into common stock immediately prior to the completion of an initial public offering at a per share price of not less than \$26.24 (as adjusted for stock splits, stock dividends, reclassification and the like) in which the Company receives aggregate net proceeds not less than \$40,000,000, and the common stock is listed for

trading on the New York Stock Exchange or the Nasdaq Global or Global Select Markets. Each share of preferred stock is also convertible into common stock upon the written election of the holders of at least 60% of the then outstanding (i) Series A, Series B, Series C and Series D redeemable convertible preferred stock, voting together as a class on an as-converted to common stock basis and (ii) Series C and Series D redeemable convertible preferred stock voting together as a single class on as-converted to common stock basis.

14. Common stock

The fair value of the shares of common stock underlying the Company's stock options has historically been determined by management and approved by the board of directors. Because there has been no public market for the Company's common stock, management and the board of directors have determined the fair value of the common stock at the time of grant of any options by considering a number of objective and subjective factors, including valuations performed by an independent third-party specialists, valuations of comparable companies, operating and financial performance, the lack of liquidity of the common stock, recent private stock sale transactions and general and industry-specific economic outlooks. Valuations performed by third-party valuation specialists were completed and used the methodologies, approaches, and assumptions consistent with the AICPA, Accounting and Valuation Guide: *Valuation of Privately-Held-Company Equity Securities Issued as Compensation* and Company specific factors.

As of September 30, 2017, the Company reserved sufficient shares of common stock for issuance upon conversion of preferred stock and exercise of stock options and warrants. Each share of common stock is entitled to one vote. The holders of shares of common stock are also entitled to receive dividends whenever funds are legally available and when declared by the board of directors, subject to prior rights of the holders of preferred stock.

In February 2013, the Company issued a total of 1,818,000 shares of restricted common stock to Emily Leproust, William Banyai and Bill Peck, or the Founders. The shares were issued at par value of \$0.00001 per share in exchange for intellectual property and other assets. Of the shares issued, 20% were vested upon issuance and the remaining 80% were subject to repurchase at par value if the holder was no longer an employee of, or service provider to, the Company. The number of shares subject to repurchase decreases ratably over 48 months starting on February 1, 2013. As of September 30, 2017, all 1,818,000 shares have vested and are no longer subject to a right of repurchase.

In September 2013, the Company issued an additional 102,330 shares of restricted common stock to each Founder. The purchase price for the shares was \$0.40 per share of common stock. The purchase agreements for the shares stipulate that no shares would vest until the first commercial sale of synthetic biology products or synthetic oligos, or the Milestone. Following the achievement of the Milestone, 100% of the total shares would vests on the 3rd anniversary from the date of the Milestone, subject to the founders' continuous service status and there being no material adverse impact on the Company's business from any legal action by the founders' former employer. During the year ended September 30, 2015, the Milestone was achieved and vesting commenced. All shares are expected to be fully vested on May 8, 2018, which is the 3rd anniversary of the Milestone. As of September 30, 2017, the total unrecognized compensation cost related to this award that is expected to be recognized over a weighted-average period 0.7 years was immaterial.

The Company issued 52,865 shares of restricted common stock to a board member in March 2014 at a purchase price of \$0.40 per share. The shares vest over a 72-month period on a monthly pro-rata basis over the vesting period at the date of grant. Further, upon appointment to the board of directors, the vesting would be over a 36-month period on a monthly pro-rata basis over the vesting period beginning at date of appointment to the board of directors which occurred in July 2014. The agreement includes a repurchase option for the Company whereby, in the event of a voluntary or involuntary termination of the purchaser's continuous service, for any

reason, the Company has an irrevocable, exclusive option for a period of three months from such date to repurchase all or any portion of the unvested shares at the termination date at a value of the lesser of the original purchase price per share and the fair market value of the shares. All shares were initially subject to the repurchase option. As of September 30, 2017, all 52,865 shares of common stock had vested under this agreement.

In May 2016, the Company issued 320,170 shares of restricted common stock to employees. The purchase price was \$5.94 per share. The shares vest monthly over a period of 48 months from the date of issuance and the Company recognized \$0.5 million of compensation expense related to the restricted stock during the year ended September 30, 2017. As of September 30, 2017, there was \$1.2 million of total unrecognized compensation cost related to this issuance that is expected to be recognized over a weighted-average period of 2.7 years.

15. Stock option plan

In 2013, the Company established the 2013 Plan, which provides for the granting of stock options to employees, consultants and directors of the Company. Options granted under the 2013 Plan may be either incentive stock options, or ISOs, or nonqualified stock options, or NSOs. ISOs may be granted only to Company employees (including officers and directors who are also employees). NSOs may be granted to Company employees, consultants and directors. As of September 30, 2017, the Company has reserved 3,464,916 shares of common stock for issuance under the 2013 Plan.

The exercise price of an ISO and NSO shall not be less than 100% of the estimated fair value of the shares on the date of grant, respectively, as determined by the board of directors. The exercise price of an ISO granted to an employee who at the time of grant is a 10% shareholder shall not be less than 110% of the estimated fair value of the shares on the date of grant, respectively, as determined by the board of directors. Options granted under the 2013 Plan have a term of ten years and generally vest over a four-year period with 25% of the shares vesting on the first anniversary of the option and the remaining vesting ratably on a monthly basis over the remaining thirty-six months.

Activity under the 2013 Plan from during the years ended September 30, 2016 and September 30, 2017 is summarized below:

	Shares available	Options outstanding	Weighted average exercise price per share	Weighted average remaining contractual term	Aggregate intrinsic value
Outstanding at September 30, 2015	644,152	879,860	\$ 4.64	8.88	\$1,138,150
Additional shares authorized	333,246	—	—		
Stock options granted	(246,536)	246,536	5.94		
Stock options exercised	—	(39,460)	3.86		
Stock options forfeited	53,324	(53,324)	5.05		
Restricted shares granted	(320,170)	—	—		
Early exercised options repurchased	6,607	—	—		
Outstanding at September 30, 2016	470,623	1,033,612	\$ 4.93	8.81	\$1,343,301
Additional shares authorized	1,035,414	—	—		
Stock options granted	(857,082)	857,082	8.61		
Stock options exercised	—	(32,586)	5.54		
Stock options forfeited	38,384	(38,384)	5.54		
Outstanding at September 30, 2017	687,339	1,819,724	\$ 6.63	9.14	\$7,147,115
Vested or expected to vest and exercisable at September 30, 2017		1,819,724	\$ 6.63	9.14	\$7,147,115

The following table summarizes information about stock options outstanding at September 30, 2017:

Exercise price	Options outstanding		Options exercisable	
	Total outstanding	Weighted average remaining contractual life	Total exercisable	Weighted average exercise price
0.40	98,171	5.26	98,171	\$ 0.40
1.19	103,370	6.20	103,370	1.19
5.94	775,847	9.30	775,847	5.94
6.24	31,815	7.18	31,815	6.24
7.33	26,664	9.59	26,664	7.33
8.81	783,857	9.89	783,857	8.81
	1,819,724	9.14	1,819,724	\$ 6.63

Stock-based compensation

During the year ended September 30, 2016, the Company granted stock options to employees and non-employees to purchase 246,536 shares of common stock with a weighted-average grant date fair value of \$3.47. During the year ending September 30, 2017, the Company granted stock options to employees and non-employees to purchase 857,082 of common stock with a weighted average grant date fair value of \$6.63. The Company recognized stock-based compensation expense of \$0.9 million and \$1.9 million, for the years ended September 30, 2016 and 2017, respectively. As of September 30, 2017, there was \$6.7 million of total unrecognized compensation cost related to non-vested stock options under the 2013 Plan that is expected to be recognized over a weighted-average period of 3.9 years.

Total stock-based compensation expense recognized was as follows:

(in thousands)	Years ended September 30,	
	2016	2017
Cost of revenues	\$ 112	\$ 202
Research and development	261	575
Selling, general and administrative	484	1,114
Total stock-based compensation	\$ 857	\$ 1,891

The Company uses the Black-Scholes option pricing model to calculate the grant date fair value of a stock option. The Black-Scholes model requires various assumptions, including the fair value of the Company's common stock, expected term, expected dividend yield and expected volatility.

The expected volatility of the Company's stock options is estimated from the historical volatility of selected public companies with comparable characteristics to it, including similarity in size and lines of business. The expected term of stock options represents the period that the Company's stock-options are expected to be outstanding before being exercised. The risk-free interest rate is based on the implied yield currently available on U.S. treasury notes with terms approximately equal to the expected life of the option. The expected dividend rate is zero as the Company currently has no history or expectation of declaring cash dividends on the Company's common stock.

The fair value of options granted during the years ended September 30, 2016 and 2017, respectively, were calculated using the weighted average assumptions set forth below:

	Years ended September 30,	
	2016	2017
Expected term (years)	6.25	6.25
Expected volatility	64.4%	65.5%
Risk-free interest rate	1.44%	2.02%
Dividend yield	0%	0%

Shares subject to repurchase

The Company has a right of repurchase with respect to unvested shares issued upon early exercise of options at an amount equal to the original exercise price of each unvested share being repurchased. The Company's right to repurchase these shares lapses pursuant to the vesting schedule of the original grant, which is generally 25% on the first anniversary of the original grant and ratably on a monthly basis over the remaining 36 months. As of September 30, 2017, 44,698 shares remain subject to the Company's right of repurchase.

16. Net loss per share attributable to common stockholders and unaudited pro forma net loss per share

The following table sets forth the computation of the Company's basic and diluted net loss per share attributable to common stockholders:

(in thousands, except share and per share data)	Years ended September 30,	
	2016	2017
Numerator:		
Net loss attributable to common stockholders	\$ (44,088)	\$ (59,310)
Denominator:		
Weighted-average shares used in computing net loss per share, basic and diluted	1,869,631	2,422,243
Net loss per share attributable to common stockholders, basic and diluted	\$ (23.58)	\$ (24.49)

The potentially dilutive common shares that were excluded from the calculation of diluted net loss per share because their effect would have been antidilutive for the periods presented are as follows:

	Years ended September 30,	
	2016	2017
Shares subject to options to purchase common stock	1,033,612	1,819,724
Unvested restricted shares of common stock	759,374	513,766
Unvested shares of common stock issued upon early exercise of stock options	77,808	44,698
Shares subject to warrants to purchase redeemable convertible preferred stock	79,444	79,444
Shares of redeemable convertible preferred stock	11,563,565	14,658,940
Total	13,531,803	17,116,572

Unaudited pro forma loss per share

The table presents the calculation of basic and diluted pro forma net loss per share for the year ended September 30, 2017 (in thousands, except share and per share data):

Numerator:	
Net loss attributable to common stockholders, basic and diluted	\$ (59,310)
Add: Change in fair value of redeemable convertible preferred stock warrant liability	261
Net loss used in computing pro forma net loss per share, basic and diluted	<u>\$ (59,049)</u>
Denominator:	
Weighted-average shares used in computing net loss per share, basic and diluted	2,422,243
Add: Pro forma adjustments to reflect assumed conversion of redeemable convertible preferred stock	12,969,783
Weighted-average shares used in computing pro forma net loss per share, basic and diluted	<u>15,392,026</u>
Pro forma net loss per share, basic and diluted (unaudited)	<u>\$ (3.84)</u>

17. Geographic and product information

The table below sets forth revenues by geographic region, based on ship-to destinations. North America consists of Canada and Mexico; EMEA consists of Europe, Middle East, and Africa; and APAC consists of Japan, China, South Korea, Singapore, Malaysia and Australia.

(in thousands)	Years ended September 30,	
	2016	2017
United States	\$1,769	\$ 8,243
EMEA	459	2,023
APAC	41	274
North America	—	227
Total	<u>\$2,269</u>	<u>\$10,767</u>

The table below sets forth revenues by products.

(in thousands)	Years ended September 30,	
	2016	2017
Synthetic genes	\$1,087	\$ 8,122
Oligo pools	862	2,056
DNA libraries	320	517
NGS tools	—	72
Total	<u>\$2,269</u>	<u>\$10,767</u>

Long lived assets located in the United States are \$14.5 million and \$14.4 million as of September 30, 2016 and 2017. Long lived assets located outside of the United States were \$0.1 million and \$0.4 million as of September 30, 2016 and 2017.

18. Subsequent events

On October 20, 2017, the Company issued 141,212 shares of Series D redeemable convertible preferred stock for an aggregate purchase price of \$3.0 million.

On December 22, 2017, the Tax Cuts and Jobs Act of 2017, or Tax Act, was signed into law. The effect of the Tax Act will be recorded discretely as a component of the Company's provision for income taxes related to continuing operations in the period of enactment. The Tax Act reduced the corporate tax rate from 35% to 21% for tax years beginning after December 31, 2017. A blended rate will apply for non-calendar year companies for the fiscal periods that include the effective date of rate change. Changes in the deferred tax asset valuation allowance assessment due to the Tax Act will also be recorded as part of the Company's provision for income taxes related to continuing operations. The Tax Act repeals the Alternative Minimum Tax for tax years beginning after December 31, 2017. For net operating losses arising after December 31, 2017, utilization is limited to 80% of taxable income with an unlimited carryforward period. The Tax Act allows companies to expense 100% of the cost of qualified property placed in service after September 27, 2017 and before January 1, 2023, with normal depreciation rules applying after that period. Deductions for net interest expense are limited to 30% of adjusted taxable income. The Tax Act also introduces new international tax provisions, including a mandatory deemed repatriation tax and the implementation of a territorial system by providing a 100% dividends received deduction. The Tax Act also contains new provisions intended to prevent the erosion of the United States tax base. The Company is in the process of evaluating the impact of the Tax Act on its consolidated financial statements and expects the most significant impact to be a reduction of its deferred tax assets for net operating loss carryforwards offset by a corresponding reduction of the deferred tax asset valuation allowance.

On December 28, 2017, the Company issued 291,344 shares of Series D redeemable convertible preferred stock for an aggregate purchase price of \$6.2 million.

The Company has performed an evaluation of subsequent events through February 8, 2018, which is the date the audited annual consolidated financial statements were available for issuance. The Company has also evaluated subsequent events through October 17, 2018, for the effects of the reverse stock split described in Note 2.

19. Events subsequent to February 8, 2018 (unaudited)

On March 19, 2018 and May 29, 2018, the Company issued 2,353,544 and 941,417 shares of Series D redeemable convertible preferred stock for an aggregate purchase price of \$50.0 million and \$20.0 million, respectively.

On March 21, 2018, the Company entered into a new non-cancelable lease agreement to rent office space in South San Francisco, California for a period of 84 months. Total minimum lease payments under the lease agreement are \$26.6 million, with lease payments ranging from \$1.4 million to \$4.1 million per year from 2019 to 2026. In connection with the lease agreement, the Company entered into a letter of credit with a financial institution for \$0.6 million, which is collateralized by the Company's cash and cash equivalents.

On July 2, 2018 and July 3, 2018, the Company issued 517,778 and 47,070 shares of Series D redeemable convertible preferred stock for an aggregate purchase price of \$11.0 million and \$1.0 million, respectively.

* * * * *

Twist Bioscience Corporation

Condensed consolidated balance sheets (unaudited)

(In thousands, except share and per share amounts)	September 30, 2017	June 30, 2018	Pro forma June 30, 2018
Assets			
Current assets			
Cash and cash equivalents	\$ 31,227	\$ 90,900	\$ 90,900
Short-term investments	30,977	1,599	1,599
Accounts receivable, net	2,346	4,289	4,289
Inventory	1,827	4,253	4,253
Prepaid expenses and other current assets	1,492	2,735	2,735
Total current assets	\$ 67,869	\$ 103,776	\$ 103,776
Property and equipment, net	14,834	12,760	12,760
Goodwill	1,138	1,138	1,138
Intangible assets, net	920	763	763
Restricted cash, non-current	202	202	202
Other non-current assets	694	4,026	4,026
Total assets	\$ 85,657	\$ 122,665	\$ 122,665
Liabilities, Redeemable Convertible Preferred Stock and Stockholders' Equity (Deficit)			
Current liabilities			
Accounts payable	\$ 2,849	\$ 4,502	\$ 4,502
Accrued expenses	2,092	2,610	2,610
Accrued payroll	3,470	3,379	3,379
Current portion of long-term debt	—	1,667	1,667
Other current liabilities	1,066	5,930	5,930
Total current liabilities	\$ 9,477	\$ 18,088	\$ 18,088
Redeemable convertible preferred stock warrant liability	644	710	—
Long-term debt, net of current portion	9,154	7,868	7,868
Other non-current liabilities	107	253	253
Total liabilities	\$ 19,382	\$ 26,919	\$ 26,209
Commitments and contingencies (Note 6)			
Redeemable convertible preferred stock			
Series A redeemable convertible preferred stock, \$0.00001 par value—2,854,576 shares authorized as of September 30, 2017 and June 30, 2018; 2,817,723 shares issued and outstanding as of September 30, 2017 and June 30, 2018. No shares authorized, issued or outstanding, pro forma as of June 30, 2018 (Liquidation preference of \$9,111 as of September 30, 2017 and June 30, 2018)	\$ 9,141	\$ 9,141	\$ —
Series B redeemable convertible preferred stock, \$0.00001 par value—3,331,878 shares authorized as of September 30, 2017 and June 30, 2018; 3,315,645 shares issued and outstanding as of September 30, 2017 and June 30, 2018. No shares authorized, issued or outstanding, pro forma as of June 30, 2018 (Liquidation preference of \$26,000 as of September 30, 2017 and June 30, 2018)	25,900	25,900	—
Series C redeemable convertible preferred stock, \$0.00001 par value—2,510,354 shares authorized as of September 30, 2017 and June 30, 2018; 2,491,483 shares issued and outstanding as of September 30, 2017 and June 30, 2018. No shares authorized, issued or outstanding, pro forma as of June 30, 2018 (Liquidation preference of \$37,000 as of September 30, 2017 and June 30, 2018)	36,726	36,726	—
Series D redeemable convertible preferred stock, \$0.00001 par value—6,476,580 and 10,475,252 shares authorized as of September 30, 2017 and June 30, 2018, respectively; 6,034,089 and 9,761,606 shares issued and outstanding as of September 30, 2017 and June 30, 2018, respectively. No shares authorized, issued or outstanding, pro forma as of June 30, 2018. (Liquidation preference of \$128,193 and \$207,411 as of September 30, 2017 and June 30, 2018, respectively)	127,866	206,738	—
Total redeemable convertible preferred stock	\$ 199,633	\$ 278,505	\$ —
Stockholders' equity (deficit)			
Common stock, \$0.00001 par value—21,210,000 and 27,775,000 shares authorized at September 30, 2017 and June 30, 2018, respectively; 3,178,819 and 3,223,534 shares issued and outstanding at September 30, 2017 and June 30, 2018, respectively. 21,609,991 shares issued and outstanding at June 30, 2018 pro forma	\$ —	\$ —	\$ —
Additional paid-in capital	6,228	8,226	287,441
Accumulated other comprehensive income	33	68	68
Accumulated deficit	(139,619)	(191,053)	(191,053)
Total stockholders' equity (deficit)	\$ (133,358)	\$ (182,759)	\$ 96,456
Total liabilities, redeemable convertible preferred stock and stockholders' equity (deficit)	\$ 85,657	\$ 122,665	\$ 122,665

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

Twist Bioscience Corporation

Condensed consolidated statements of operations and comprehensive loss (unaudited)

(In thousands, except share and per share amounts)	Nine months ended June 30,	
	2017	2018
Revenues	\$ 7,301	\$ 17,020
Operating expenses:		
Cost of revenues	\$ 17,191	\$ 23,096
Research and development	14,318	14,282
Selling, general and administrative	17,651	30,497
Total operating expenses	\$ 49,160	\$ 67,875
Loss from operations	\$ (41,859)	\$ (50,855)
Interest income	225	590
Interest expense	(657)	(927)
Other income (expense), net	151	(76)
Loss before income taxes	\$ (42,140)	\$ (51,268)
Provision for income taxes	(161)	(166)
Net loss attributable to common stockholders	\$ (42,301)	\$ (51,434)
Other comprehensive loss:		
Change in unrealized loss on investments	\$ (25)	\$ —
Foreign currency translation adjustment	6	35
Comprehensive loss	\$ (42,320)	\$ (51,399)
Net loss per share attributable to common stockholders—basic and diluted	\$ (17.78)	\$ (18.92)
Weighted average shares used in computing net loss per share attributable to common stockholders—basic and diluted	2,379,217	2,719,051
Pro forma net loss per share—basic and diluted		\$ (2.74)
Pro forma weighted-average shares used in computing pro forma net loss per share—basic and diluted		18,780,785

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

Twist Bioscience Corporation

Condensed consolidated statements of cash flows (unaudited)

(in thousands)	Nine months ended	
	2017	June 30, 2018
Cash flows from operating activities		
Net loss attributable to common stockholders	\$ (42,301)	\$ (51,434)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation and amortization	3,774	4,398
Loss (Gain) on disposal of property and equipment	(113)	55
Stock-based compensation	1,027	1,875
Non-cash interest expense	235	150
Change in fair value of redeemable convertible preferred stock warrant liability	178	66
Amortization of debt discount	66	230
Changes in assets and liabilities, net of impact of business combination:		
Accounts receivable	(1,349)	(1,943)
Inventory	(583)	(2,426)
Prepaid expenses and other current assets	36	(796)
Other non-current assets	(253)	(1,452)
Accounts payable	62	1,539
Accrued expenses	(1,923)	518
Accrued payroll	482	(90)
Other liabilities	819	(158)
Net cash used in operating activities	(39,843)	(49,468)
Cash flows from investing activities		
Purchases of property and equipment	(3,255)	(2,641)
Proceeds from sale of property and equipment	521	17
Purchases of investments	(20,130)	(3,374)
Maturity of investments	27,325	32,900
Net cash provided by investing activities	4,461	26,902
Cash flows from financing activities		
Proceeds from issuance of common stock and exercise of stock options	18	291
Proceeds from issuance of Series D redeemable convertible preferred stock, net of issuance costs	65,152	83,873
Payments of deferred offering costs	—	(1,925)
Repayment of long-term debt	(2,430)	—
Net cash provided by financing activities	62,740	82,239
Net increase in cash and cash equivalents	27,358	59,673
Cash and cash equivalents at beginning of year	28,596	31,227
Cash and cash equivalents at end of period	\$ 55,954	\$ 90,900
Supplemental disclosure of cash flow information		
Interest paid	\$ 366	\$ 587
Income taxes paid	6	20
Non-cash investing and financing activities		
Property and equipment additions included in accrued liabilities and accounts payable	\$ 320	\$ —
Deferred offering costs included in accounts payable and accrued expenses	—	516

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

Twist Bioscience Corporation

Notes to condensed consolidated financial statements (unaudited)

1. The company

Twist Bioscience Corporation (the Company) was incorporated in the state of Delaware on February 4, 2013. The Company is a synthetic biology company that has developed a disruptive DNA synthesis platform. The Company's fiscal year ends September 30.

The Company has generated net losses in all periods since inception. As of June 30, 2018, the Company had an accumulated deficit of \$191.1 million and has not generated positive cash flows from operations since inception. Losses are expected to continue as the Company continues to invest in product development, manufacturing, and sales and marketing. Based on its recurring losses from operations incurred since inception, expectation of continuing operating losses for the foreseeable future, and need to raise additional capital to finance its future operations, the Company has concluded that there is substantial doubt about its ability to continue as a going concern within one year after the date that the unaudited condensed consolidated financial statements are issued.

The Company has raised multiple rounds of debt and equity financing, including an aggregate of \$78.9 million from the sale of preferred stock between October of 2017 and June of 2018. However, there can be no assurance that additional financing will be successful in raising additional capital or that such capital, if available, will be on terms which are acceptable to us.

If the Company is unable to obtain funding, the Company could be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect its business prospects, or the Company may be unable to continue operations. Failure to raise additional capital or generate sufficient cash flows from operations could have a material adverse effect on the Company's ability to achieve its intended business objectives. Although management continues to pursue these plans, there is no assurance that the Company will be successful in obtaining sufficient funding on terms acceptable to the Company to fund continuing operations, if at all.

The accompanying unaudited condensed consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty. Accordingly, the unaudited condensed consolidated financial statements have been prepared on a basis that assumes the Company will continue as a going concern and which contemplates the realization of assets and satisfaction of liabilities and commitments in the ordinary course of business.

2. Summary of significant accounting policies

Basis of presentation

The accompanying unaudited condensed consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (GAAP) for interim financial information. Certain information and disclosures normally included in the consolidated financial statements prepared in accordance with GAAP have been condensed or omitted. Accordingly, these unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and the related notes for the fiscal year ended September 30, 2017. The condensed consolidated financial statements are unaudited and have been prepared on a basis consistent with that used to prepare the audited annual consolidated financial statements and include, in the opinion of management, all adjustments, consisting of normal and recurring items, necessary for the fair statement of the condensed consolidated

financial statements. The condensed consolidated balance sheet as of September 30, 2017 was derived from the audited consolidated financial statements, but does not include all disclosures required by GAAP. The operating results for the nine months ended June 30, 2018 are not necessarily indicative of the results expected for the fiscal year ending September 30, 2018. The Company's unaudited condensed consolidated financial statements include its wholly-owned subsidiaries. All intercompany balances and accounts are eliminated in consolidation.

Use of estimates

The presentation of unaudited condensed consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities as of the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

Significant accounting policies

There have been no material changes in the accounting policies from those disclosed in the audited consolidated financial statements and the related notes.

Unaudited pro forma condensed consolidated balance sheet information

Immediately prior to the completion of the initial public offering (IPO) contemplated herein, all outstanding shares of convertible preferred stock will automatically convert into shares of common stock. The unaudited pro forma condensed consolidated balance sheet information at June 30, 2018 gives effect to the conversion of all outstanding shares of the Company's convertible preferred stock into 18,386,457 shares of common stock. It also gives effect to an automatic conversion of warrants to purchase 79,444 shares of redeemable convertible preferred stock into warrants to purchase the same number of shares of common stock, which results in the reclassification of the redeemable convertible preferred stock warrant liability to additional paid-in capital. The unaudited pro forma condensed consolidated balance sheet information does not give effect to the potential proceeds from the Company's contemplated initial public offering.

Unaudited pro forma net loss per share

Pro forma net loss per share, basic and diluted was computed to give effect to the conversion of the Series A, Series B, Series C and Series D convertible preferred stock using the as-if converted method into common shares as though the conversion had occurred as of the beginning of the period or the original date of issuance, if later. Also, the numerator has been adjusted to reverse the fair value adjustments related to the redeemable convertible preferred stock warrants as they will become common stock warrants and at such time will no longer require periodic revaluation.

Reverse stock split

In October 2018, the Company's stockholders approved a one-for-0.101 reverse stock split of its common and redeemable convertible preferred stock which was effected on October 16, 2018. The par value of the common stock and redeemable convertible preferred stock was not adjusted as a result of the reverse stock split. Accordingly, all share and per share amounts for all periods presented in the condensed consolidated financial statements and notes thereto have been adjusted retrospectively to reflect this reverse stock split.

Deferred offering costs

Deferred offering costs, which consist of direct incremental legal, consulting, banking and accounting fees relating to the Company's contemplated IPO, are capitalized and will be offset against proceeds upon the

consummation of the offering within stockholders' equity. In the event an anticipated offering is terminated, deferred offering costs will be expensed. As of September 30, 2017, there was no capitalized deferred offering costs on the consolidated balance sheets. As of June 30, 2018, there are \$2.4 million of deferred offering costs within other non-current assets on the unaudited condensed consolidated balance sheets.

Recent accounting pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers (Topic 606)*, which provides accounting guidance for all revenue arising from contracts with customers, and supersedes most current revenue recognition guidance. The core principle of the new standard is that a company should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented and the cumulative effect of applying the standard would be recognized at the earliest period shown, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized at the date of initial application. The Company adopted the new revenue standard, on October 1, 2017, using the full retrospective method.

In February 2016, the FASB issued new lease accounting guidance in ASU 2016-02, *Leases*. Under the new guidance, lessees will be required to recognize for all leases (with the exception of short-term leases) at the commencement date: (1) a lease liability, which is a lessee's obligation to make lease payments arising from a lease, measured on a discounted basis; and (2) a right-of-use asset, which is an asset that represents the lessee's right to use, or control the use of, a specified asset for the lease term. The new lease guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early application is permitted. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments*, which was intended to reduce diversity in practice in how certain cash receipts and payments are presented and classified in the statement of cash flows. The standard provides guidance in a number of situations including, among others, settlement of zero-coupon bonds, contingent consideration payments made after a business combination, proceeds from the settlement of insurance claims, and distributions received from equity method investees. The ASU also provides guidance for classifying cash receipts and payments that have aspects of more than one class of cash flows. The ASU is effective for fiscal years beginning after December 15, 2017, and interim period within those fiscal years, with early adoption permitted. The amendments in this update should be applied in retrospective transition for each period presented. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In November 2016, the FASB has issued ASU 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash*. This ASU applies to all entities that have restricted cash or restricted cash equivalents and are required to present a statement of cash flows. The ASU requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. As a result, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. This ASU is effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years with early adoption is permitted. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

Table of Contents

In January 2017, the FASB has issued ASU 2017-01, *Business Combinations (Topic 805): Clarifying the Definition of a Business*, clarifying the definition of a business. The ASU affects all companies and other reporting organizations that must determine whether they have acquired or sold a business. The definition of a business affects many areas of accounting including acquisitions, disposals, goodwill, and consolidation. The ASU is effective for annual periods beginning after December 15, 2017, including interim periods within those periods. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In January 2017, the FASB issued ASU 2017-04, *Intangibles — Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*. This ASU simplifies the subsequent measurement of goodwill. The ASU eliminates step 2 from the goodwill impairment test, including for reporting units with a zero or negative carrying amount that fail a qualitative test. An entity still has the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. This ASU should be applied on a prospective basis. This ASU is effective for annual or any interim goodwill impairment tests in fiscal years beginning after December 15, 2019. Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017. The Company has not yet determined whether it will early adopt this ASU.

In May 2017, the FASB issued ASU 2017-09, *Compensation — Stock Compensation (Topic 718): Scope of Modification Accounting*, which clarifies when to account for a change to the terms or conditions of a stock-based payment award as a modification. Under ASU 2017-09, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) changes as a result of the change in terms or conditions. This standard is effective for all entities for annual reporting periods beginning after December 15, 2017, including interim periods within that reporting period. Early adoption is permitted. The Company is evaluating the impact that this standard will have on its consolidated financial statements.

3. Fair value measurement

The following tables present information about the Company's financial assets and liabilities that have been measured at fair value on a recurring basis as of September 30, 2017 and June 30, 2018, and indicate the fair value hierarchy of the valuation inputs utilized to determine such fair value:

(in thousands)	Fair Value Measurement at September 30, 2017			
	Level 1	Level 2	Level 3	Total
Assets				
Cash and cash equivalents	\$ 3,793	\$ —	\$ —	\$ 3,793
Money market funds	21,494	—	—	21,494
Corporate bonds	—	1,707	—	1,707
Commercial paper	—	22,742	—	22,742
U.S. government treasury bonds	12,468	—	—	12,468
Total	\$ 37,755	\$ 24,449	\$ —	\$ 62,204
Liabilities				
Redeemable convertible preferred stock warrant liability	\$ —	\$ —	\$ 644	\$ 644

(in thousands)	Fair Value Measurement at June 30, 2018			
	Level 1	Level 2	Level 3	Total
Assets				
Cash and cash equivalents	\$58,711	\$ —	\$ —	\$58,711
Money market funds	32,189	—	—	32,189
Commercial paper	—	1,599	—	1,599
Total	<u>\$90,900</u>	<u>\$ 1,599</u>	<u>\$ —</u>	<u>\$92,499</u>

Liabilities

Redeemable convertible preferred stock warrant liability	\$ —	\$ —	\$ 710	\$ 710
--	------	------	--------	--------

As of September 30, 2017 and June 30, 2018, gross unrealized gains and unrealized losses for cash equivalents and short-term investments were not material, and the contractual maturity of all marketable securities were less than one year.

Redeemable convertible preferred stock warrants

The following table provides a reconciliation of beginning and ending balances of the Level 3 instruments during the nine months ended June 30, 2018:

(in thousands)	Series A	Series B	Series C	Series D	Total
Redeemable convertible preferred stock warrant liability:					
Fair value as of September 30, 2017	\$ 331	\$ 110	\$ 152	\$ 51	\$644
Changes in fair value recorded in other income (expense), net	43	16	2	5	66
Fair value as of June 30, 2018	<u>\$ 374</u>	<u>\$ 126</u>	<u>\$ 154</u>	<u>\$ 56</u>	<u>\$710</u>

4. Inventory

Inventory consists of the following:

(in thousands)	September 30, 2017	June 30, 2018
Raw Materials	\$ 1,243	\$ 3,105
Work-in-process	385	893
Finished Goods	199	255
	<u>\$ 1,827</u>	<u>\$ 4,253</u>

5. Goodwill and intangible assets

There were no changes to the carrying value of goodwill during the nine months ended June 30, 2018. Total amortization expense related to intangible assets was \$0.2 million for the nine months ended June 30, 2017 and 2018.

(in thousands, except for years)	September 30, 2017			
	Useful lives in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	6	\$ 1,220	\$ (305)	\$ 915
Tradenames & Trademarks	2	20	(15)	5
Total indefinite-lived intangible assets		\$ 1,240	\$ (320)	\$ 920

(in thousands, except for years)	June 30, 2018			
	Useful lives in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	6	\$ 1,220	\$ (457)	\$ 763
Tradenames & Trademarks	2	20	(20)	—
Total indefinite-lived intangible assets		\$ 1,240	\$ (477)	\$ 763

6. Commitments and contingencies

Litigation

In February 2016, a complaint was filed in the Superior Court of the State of California (County of Santa Clara), dated February 3, 2016 on behalf of Agilent Technologies, Inc., against the Company and its CEO alleging (i) breach of contract against the CEO, (ii) breach of duty of loyalty against the CEO, and (iii) misappropriation of trade secrets by the Company and the CEO. The Company believes that the complaint is without merit, and intends to vigorously defend itself. The Company is currently unable to predict the ultimate outcome of this matter or estimate a reasonably possible loss or range of loss, and no amounts have been accrued in the condensed consolidated financial statements.

Indemnifications

In the ordinary course of business, the Company enters into agreements that may include indemnification provisions. Pursuant to such agreements, the Company may indemnify, hold harmless and defend the indemnified parties for losses suffered or incurred by the indemnified party. Some of the provisions will limit losses to those arising from third-party actions. In some cases, the indemnification will continue after the termination of the agreement. The maximum potential amount of future payments the Company could be required to make under these provisions is not determinable. To date, the Company has not incurred material costs to defend lawsuits or settle claims related to these indemnification provisions. The Company has also entered into indemnification agreements with its directors and officers that may require it to indemnify its directors and officers against liabilities that may arise by reason of their status or service as directors or officers to the fullest extent permitted by corporate law. The Company also has directors' and officers' insurance.

Leases

In March 2018, the Company entered into a non-cancelable lease agreement to rent office space in South San Francisco for a period of 84 months. Total minimum lease payments under the lease agreement are

[Table of Contents](#)

\$26.6 million, with lease payments ranging from \$1.4 million to \$4.1 million per year from 2019 to 2026. In connection with the lease agreement, the Company entered into a letter of credit with a financial institution for \$0.6 million, which is collateralized by the Company's cash and cash equivalents.

7. Related party transactions

During the nine months ended June 30, 2017 and 2018, the Company purchased raw materials from a related party investor in the amount of \$1.3 million and \$1.8 million, respectively. Payable balances and receipts and receivable balances with the related party were immaterial as of June 30, 2018.

8. Income taxes

In determining its provisions for income taxes, the Company uses the annual estimated effective tax rate applied to the actual year-to-date profit or loss, adjusted for discrete items arising in that quarter. The Company's annual estimated effective tax rate differs from the U.S. federal statutory rate primarily as a result of state taxes, foreign taxes, and changes in the Company's valuation allowance against its deferred tax assets. For both the nine months ended June 30, 2017 and 2018, the Company recorded provisions for income taxes of \$0.2 million.

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 (Tax Act) was signed into law. The Tax Act includes significant changes to the U.S. corporate income tax system, including a permanent reduction in the corporate income tax rate from 35% to 21% effective January 1, 2018, as well as changes that could impact the tax treatment of foreign earnings. Additionally, the utilization of net operating losses generated in tax years beginning after December 31, 2017 will be limited to 80% of taxable income with an unlimited carryforward period. The Company re-measured certain deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future. The re-measurement of the deferred tax balance was offset by a corresponding change in the related valuation allowance. The Company calculated its best estimate of the impact of the Tax Act in the quarter ending December 31, 2017 in accordance with its understanding of the Tax Act and the Securities and Exchange Commission's guidance available in Staff Accounting Bulletin No. 118. Accordingly, the provisional amounts recorded by the Company may vary from the final amounts as the Company finalizes its analysis of the impact of the Tax Act.

9. Warrants

In connection with its long-term debt agreements, the Company issued warrants for its redeemable convertible preferred stock and common stock as follows:

(in thousands, except share and per share data)	Number of shares underlying warrants		Fair value	Issuance date	Expiration	Exercise price per share
	June 30, 2018					
Warrant date class/series:						
Series A	36,838	\$ 374		October 8, 2013	October 8, 2023	\$ 3.26
Series B	16,221	126		September 2, 2014	September 2, 2024	\$ 7.84
Series C	18,854	154		December 22, 2015	December 22, 2025	\$ 14.85
Series D	7,531	56		March 28, 2016	March 28, 2026	\$ 21.24
Total preferred stock warrants	79,444	\$ 710				
Common stock warrants	64,127	\$ 486		September 6, 2017	September 6, 2027	\$ 6.24

The fair value of the Company's warrants to purchase redeemable convertible preferred stock was derived from values as determined by management and approved by the board of directors. Management has determined

the fair value based primarily on analyses performed by the Company's third-party valuation specialists under a hybrid valuation method which incorporates the per share values calculated under the Option Pricing Method and the Probability-Weighted Expected Return Method weighted appropriately to arrive at a fair market value of the warrants. Valuations performed by third-party valuation specialists were done contemporaneously and used the methodologies, approaches, and assumptions consistent with the American Institute of Certified Public Accountants Accounting and Valuation Guide: *Valuation of Privately-Held-Company Equity Securities Issued as Compensation* and Company specific factors. There were no material changes in the assumptions used to determine the fair value of the Company's warrants to purchase redeemable convertible preferred stock during the nine months ended June 30, 2018.

10. Redeemable convertible preferred stock

Redeemable convertible preferred stock as of September 30, 2017 and June 30, 2018 consists of the following:

(in thousands, except share and per share data)				September 30, 2017	
Series	Shares authorized	Outstanding	Price per share	Liquidation amount	Proceeds, net*
A	2,854,576	2,817,723	\$ 3.26	\$ 9,111	\$ 9,141
B	3,331,878	3,315,645	7.84	26,000	25,900
C	2,510,354	2,491,483	14.85	37,000	36,726
D	6,476,580	6,034,089	21.24	128,193	127,866
	15,173,388	14,658,940		\$ 200,304	\$ 199,633

(in thousands, except share and per share data)				June 30, 2018	
Series	Shares authorized	Outstanding	Price per share	Liquidation amount	Proceeds, net*
A	2,854,576	2,817,723	\$ 3.26	\$ 9,111	\$ 9,141
B	3,331,878	3,315,645	7.84	26,000	25,900
C	2,510,354	2,491,483	14.85	37,000	36,726
D	10,475,252	9,761,606	21.24	207,411	206,738
	19,172,060	18,386,457		\$ 279,522	\$ 278,505

* Net of issuance costs.

11. Stock option plan

Activity under the 2013 Plan from during the nine months ended June 30, 2018 is summarized below:

	Shares available	Options outstanding	Weighted average exercise price per share	Weighted average remaining contractual term	Aggregate intrinsic value
Outstanding at September 30, 2017	687,339	1,819,724	\$ 6.63	9.14	\$7,147,115
Additional shares authorized	905,786	—	—		
Stock options granted	(820,732)	820,732	10.89		
Stock options exercised	—	(54,352)	5.25		
Stock options forfeited	162,080	(162,080)	7.62		
Early exercised options repurchased	9,636	—	—		
Outstanding at June 30, 2018	944,109	2,424,024	\$ 8.04	8.61	\$9,360,237
Vested or expected to vest and become exercisable at June 30, 2018		2,424,024	\$ 8.04	8.61	\$9,360,237

Stock-based compensation

Total stock-based compensation expense recognized was as follows:

(in thousands)	Nine months ended June 30,	
	2017	2018
Cost of revenues	\$ 95	\$ 275
Research and development	272	521
Selling, general and administrative	660	1,079
Total stock-based compensation	\$1,027	\$1,875

As of June 30, 2018, there was \$10.2 million of total unrecognized compensation cost related to non-vested stock options under the 2013 Plan that is expected to be recognized over a weighted-average period of 3.3 years.

12. Net loss per share attributable to common stockholders and unaudited pro forma net loss per share

The following table sets forth the computation of the Company's basic and diluted net loss per share attributable to common stockholders:

(in thousands, except share and per share data)	Nine months ended June 30,	
	2017	2018
Numerator:		
Net loss attributable to common stockholders	\$ (42,301)	\$ (51,434)
Denominator:		
Weighted-average shares used in computing net loss per share, basic and diluted	2,379,217	2,719,051
Net loss per share attributable to common stockholders, basic and diluted	\$ (17.78)	\$ (18.92)

Table of Contents

The potentially dilutive common shares that were excluded from the calculation of diluted net loss per share because their effect would have been antidilutive for the periods presented are as follows:

	Nine months ended June 30,	
	2017	2018
Shares subject to options to purchase common stock	1,050,181	2,424,024
Unvested restricted shares of common stock	533,777	146,745
Unvested shares of common stock issued upon early exercise of stock options	51,352	48,917
Shares subject to warrants to purchase redeemable convertible preferred stock	79,444	79,444
Shares subject to warrants to purchase common stock	—	64,127
Shares of redeemable convertible preferred stock	14,637,759	18,386,457
Total	16,352,513	21,149,714

Unaudited pro forma net loss per share

The table presents the calculation of basic and diluted pro forma net loss per share for the nine months ended June 30, 2018 (in thousands, except share and per share data):

Numerator:	
Net loss attributable to common stockholders, basic, and diluted	\$ (51,434)
Add: Change in fair value of redeemable convertible preferred stock warrant liability	66
Net loss used in computing pro forma net loss per share, basic and diluted	\$ (51,368)
Denominator:	
Weighted-average shares used in computing net loss per share, basic and diluted	2,719,051
Add: Pro forma adjustments to reflect assumed conversion of redeemable convertible preferred stock	16,061,734
Weighted-average shares used in computing pro forma net loss per share, basic and diluted	18,780,785
Pro forma net loss per share, basic and diluted	\$ (2.74)

13. Geographic, product and industry information

The table below sets forth revenues by geographic region, based on ship-to destinations. North America consists of Canada and Mexico; EMEA consists of Europe, Middle East, and Africa; and APAC consists of Japan, China, South Korea, Singapore, Malaysia and Australia.

(in thousands)	Nine months ended June 30,	
	2017	2018
United States	\$ 5,723	\$ 12,011
EMEA	1,342	4,116
APAC	105	740
North America	131	153
Total	\$ 7,301	\$ 17,020

Table of Contents

The table below sets forth revenues by products.

(in thousands)	Nine months ended June 30,	
	2017	2018
Synthetic genes	\$ 5,379	\$ 11,903
Oligo pools	1,512	2,146
DNA libraries	410	1,208
NGS tools	—	1,763
Total	\$ 7,301	\$ 17,020

The table below sets forth revenues by industry.

(in thousands)	Nine months ended June 30,	
	2017	2018
Industrial chemicals	\$ 4,561	\$ 9,474
Academic research	2,019	4,223
Healthcare	680	2,901
Agricultural	41	422
Total	\$ 7,301	\$ 17,020

Amounts presented in the table above related to revenue by industry have been revised to reflect the correction of an error in the classification of revenue between industrial chemicals and healthcare. For the nine months ended June 30, 2017 and 2018, revenue of \$0.7 million and \$2.9 million, respectively, has been re-classified from Industrial chemicals to healthcare compared to the amounts previously reported.

Long lived assets located in the United States were \$12.3 million as of June 30, 2018. Long lived assets located outside of the United States were \$0.5 million as of June 30, 2018.

14. Subsequent events

On July 2, 2018 and July 3, 2018, the Company issued 517,778 and 47,070 shares of Series D redeemable convertible preferred stock for an aggregate purchase price of \$11.0 million and \$1.0 million, respectively. The Company received \$5.0 million in advance on June 29, 2018 in connection with the issuance and had recorded it in other current liabilities as the receipt was refundable.

The Company has performed an evaluation of subsequent events through September 11, 2018, which is the date the unaudited interim condensed consolidated financial statements were available for issuance. The Company has also evaluated subsequent events through October 17, 2018, for the effects of the reverse stock split described in Note 2.

5,000,000 shares



Common stock

Prospectus

Joint book running managers

J.P. Morgan

Cowen

Co-managers

Allen & Company LLC

Baird

, 2018

Through and including , 2018 (the 25th day after the date of this prospectus), all dealers that buy, sell or trade in our common shares, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to the dealers' obligation to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

Part II

Information not required in prospectus

Item 13. Other expenses of issuance and distribution

The following table sets forth the costs and expenses, other than underwriting discounts and commissions, payable by us in connection with the sale of common stock being registered. All amounts are estimates except the Securities and Exchange Commission registration fee, the FINRA filing fee and the Nasdaq Global Market listing fee.

	Amount to be paid
Securities and Exchange Commission registration fee	\$ 12,544.00
FINRA filing fee	\$ 16,025.00
Initial Nasdaq Global Market listing fee	25,000.00
Printing and engraving expenses	87,766.00
Legal fees and expenses	2,223,267.00
Accounting fees and expenses	1,044,800.00
Blue Sky qualification fees and expenses	15,000.00
Transfer Agent and Registrar fees	4,000.00
Miscellaneous fees and expenses	35,000.00
Total	3,463,402.00

Item 14. Indemnification of directors and officers

Section 145 of the Delaware General Corporation Law, or the Delaware Law authorizes a court to award, or a corporation's Board of Directors to grant, indemnity to directors and officers in terms sufficiently broad to permit such indemnification under certain circumstances for liabilities (including reimbursement for expenses incurred) arising under the Securities Act of 1933, as amended, or the Securities Act. Article VII of our Amended and Restated Certificate of Incorporation (Exhibit 3.2 hereto) and Article VI of our Bylaws (Exhibit 3.3 hereto) provide for indemnification of our directors, officers, employees and other agents to the maximum extent permitted by Delaware Law. In addition, we have entered into Indemnification Agreements (Exhibit 10.1 hereto) with our officers and directors. These indemnification agreements also generally require us to advance any expenses incurred by the directors or officers as a result of any proceeding against them as to which they could be indemnified. In addition, we have purchased a policy of directors' and officers' liability insurance that insures our directors and officers against the cost of defense, settlement or payment of a judgment in some circumstances. The Underwriting Agreement (Exhibit 1.1) also provides for cross-indemnification among us, and the Underwriters with respect to certain matters, including matters arising under the Securities Act.

Item 15. Recent sales of unregistered securities

Since January 1, 2015, we have issued and sold the following unregistered securities:

- From February 4, 2015 to September 30, 2018, we issued stock options to certain of our service providers, executive officers and directors to purchase an aggregate of 3,155,503 shares of the Company's common stock under the 2013 Plan, with exercise prices ranging from \$0.00001 to \$11.89 per share. No consideration

[Table of Contents](#)

was received for such stock options. Such issuances were deemed to be exempt from registration under the Securities Act pursuant to benefit plans and contract relating to compensation as provided under Rule 701 promulgated under Section 3(b) of the Securities Act.

- On May 23, 2016, we issued an aggregate of 320,776 shares of common stock and stock purchase rights to certain of our service providers, executive officers and directors pursuant to exercises of then-outstanding stock purchase rights under the 2013 Plan, with a purchase price of \$5.95 per share. Such issuances were deemed to be exempt from registration under the Securities Act pursuant to benefit plans and contracts relating to compensation as provided under Rule 701 promulgated under Section 3(b) of the Securities Act.
- In May and June 2015, we sold an aggregate of 2,491,483 shares of our Series C convertible preferred stock at a purchase price of \$14.85 per share for an aggregate purchase price of approximately \$37 million to 28 investors, each of whom represented to us that it was an accredited investor. Such issuances were deemed to be exempt from registration under the Securities Act in reliance upon Regulation D promulgated under the Securities Act.
- From December 22, 2015 through September 6, 2017, we issued warrants to investors to purchase 64,127 shares of our common stock and 26,385 shares of our Series C and D convertible preferred stock, with exercise prices ranging from approximately \$6.24 per share to \$21.2446 per share. An additional warrant to purchase 64,126 shares of common stock at an exercise price of \$6.24 per share and would be exercisable upon the drawing down of additional loans under our amended and restated loan and security agreement with Silicon Valley Bank dated September 6, 2017. No consideration was received for such warrants. Such issuances were deemed to be exempt from registration under the Securities Act in reliance on Section 4(a)(2) of the Securities Act as by an issuer not involving a public offering.
- Between April and September 2016, we issued an aggregate of 403,009 shares of the Company's common stock in connection with our acquisition of Genome Compiler Corporation. This transaction was exempt from the registration requirements of the Securities Act in reliance upon Regulation D promulgated under the Securities Act.
- Between January 2016 and July 3, 2018, we sold an aggregate of 10,326,454 shares of our Series D convertible preferred stock at a purchase price of \$21.24 per share for an aggregate purchase price of approximately \$219.38 million to 78 investors, each of whom represented to us that it was an accredited investor and it intended to acquire the securities for investment only and not with a view to the distribution thereof. Such issuances were deemed to be exempt from registration under the Securities Act in reliance upon Regulation D promulgated under the Securities Act.

None of the foregoing transactions involved any underwriters, underwriting discounts or commissions or any public offering, and we believe each transaction was exempt from the registration requirements of the Securities Act as stated above. All recipients of the foregoing transactions either received adequate information about the Company or had access, through their relationships with the Company, to such information. Furthermore, the Company affixed appropriate legends to the share certificates and instruments issued in each foregoing transaction setting forth that the securities had not been registered and the applicable restrictions on transfer.

Item 16. Exhibits and financial statement schedules**(a) Exhibits.**

Number	Description
1.1*	Form of Underwriting Agreement.
3.1*	Amended and Restated Certificate of Incorporation of Twist Bioscience Corporation, as amended, as currently in effect.
3.2*	Form of Amended and Restated Certificate of Incorporation of Twist Bioscience Corporation, to be in effect upon the completion of this offering.
3.3#	Bylaws of Twist Bioscience Corporation, as currently in effect.
3.4*	Form of Amended and Restated Bylaws of Twist Bioscience Corporation, to be in effect upon the completion of this offering.
4.1*	Specimen Common Stock Certificate.
4.2	[Reserved]
4.3*	Amended and Restated Registration Rights Agreement by and among Twist Bioscience Corporation and certain holders of its capital stock, dated March 19, 2018, as amended.
4.4#	Warrant to Purchase Stock by and between Twist Bioscience Corporation and Silicon Valley Bank, dated October 8, 2013.
4.5#	Warrant to Purchase Stock by and between Twist Bioscience Corporation and Silicon Valley Bank, dated September 2, 2014.
4.6#	Warrant to Purchase Stock by and between Twist Bioscience Corporation and Silicon Valley Bank, dated December 22, 2015.
4.7#	Warrant to Purchase Stock by and between Twist Bioscience Corporation and Silicon Valley Bank, dated March 28, 2016.
4.8#	Warrant to Purchase Common Stock by and between Twist Bioscience Corporation and Life Science Loans II, LLC, dated September 6, 2017.
4.9#	Warrant to Purchase Common Stock by and between Twist Bioscience Corporation and Silicon Valley Bank, dated September 6, 2017.
5.1*	Opinion of Orrick, Herrington & Sutcliffe LLP.
10.1#+	2013 Stock Plan and forms of agreement thereunder.
10.2*+	2018 Equity Incentive Plan and forms of agreement thereunder.
10.3*+	2018 Employee Stock Purchase Plan.
10.4#+	Executive Incentive Bonus Plan.
10.5**+	Amended and Restated Employment Agreement by and between Twist Bioscience Corporation and Emily M. Leproust.
10.6**+	Amended and Restated Employment Agreement by and between Twist Bioscience Corporation and James Thorburn.
10.7**+	Amended and Restated Employment Agreement by and between Twist Bioscience Corporation and Mark Daniels.

Table of Contents

Number	Description
10.8*+	Form of Indemnification Agreement between Twist Bioscience Corporation and each of its Officers and Directors.
10.9#	Fourth Amended and Restated Loan and Security Agreement by and between Twist Bioscience Corporation, Silicon Valley Bank and certain other co-borrowers, dated September 6, 2017.
10.10#	Lease Agreement by and between Twist Bioscience Corporation and ARE—San Francisco No. 19, LLC, dated July 26, 2013.
10.10.1#	First Amendment to Lease by and between Twist Bioscience Corporation and ARE—San Francisco No. 19, LLC, dated August 7, 2013.
10.10.2#	Second Amendment to Lease by and between Twist Bioscience Corporation and ARE—San Francisco No. 19, LLC, dated May 19, 2015.
10.10.3#	Third Amendment to Lease by and between Twist Bioscience Corporation and ARE—San Francisco No. 19, LLC, dated September 23, 2015.
10.10.4#	Fourth Amendment to Lease by and between Twist Bioscience Corporation and ARE—San Francisco No. 19, LLC, dated January 6, 2016.
10.10.5#	Fifth Amendment to Lease by and between Twist Bioscience Corporation and ARE—San Francisco No. 19, LLC, dated April 12, 2016.
10.11#	Lease Agreement by and between Twist Bioscience Corporation and ARE—San Francisco No. 32, LLC, dated March 21, 2018.
10.12#	Sublease Agreement by and between Twist Bioscience Corporation and Blade Therapeutics, Inc., dated May 25, 2016.
10.13#†	Supply Agreement by and between Twist Bioscience Corporation and Ginkgo Bioworks, Inc., dated March 2, 2018.
10.14#†	End User Supply Agreement by and between Twist Bioscience Corporation and FUJIFILM Dimatix, Inc., dated November 5, 2015.
21.1#	List of Subsidiaries.
23.1*	Consent of PricewaterhouseCoopers LLP.
23.2*	Consent of Orrick, Herrington & Sutcliffe LLP (included in Exhibit 5.1).
24.1#	Power of Attorney (included in signature page).

* Filed herewith.

** To be filed by amendment.

+ Indicates a management or compensatory plan.

† Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment that has been separately filed with the Securities and Exchange Commission.

Previously filed.

(b) Financial statements schedules.

No financial statement schedules are provided because the information required to be set forth therein is not applicable or is shown in the consolidated financial statements or notes thereto.

Item 17. Undertakings

The undersigned registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreements certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act, and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer, or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

- (1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.
- (2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

Signatures

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of San Francisco, State of California on October 17, 2018.

TWIST BIOSCIENCE CORPORATION

By: /s/ Emily M. Leproust

Emily M. Leproust

President, Chief Executive Officer and Director

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Emily M. Leproust</u> Emily M. Leproust	President, Chief Executive Officer and Director (principal executive officer)	October 17, 2018
<u>/s/ James M. Thorburn</u> James M. Thorburn	Chief Financial Officer (principal financial officer and accounting officer)	October 17, 2018
<u>*</u> William Banyai	Director	October 17, 2018
<u>*</u> Robert Chess	Director	October 17, 2018
<u>*</u> Paul A. Conley	Director	October 17, 2018
<u>*</u> Keith Crandell	Director	October 17, 2018
<u>*</u> Frederick Craves	Director	October 17, 2018
<u>/s/ Jan Johannessen</u> Jan Johannessen	Director	October 17, 2018
<u>*</u> Xiaoying Mai	Director	October 17, 2018

[Table of Contents](#)

Signature	Title	Date
* Robert Ragusa	Director	October 17, 2018
*By /s/ Emily M. Leproust Emily M. Leproust As Attorney-in-Fact		October 17, 2018

TWIST BIOSCIENCE CORPORATION

[] Shares of Common Stock

Underwriting Agreement

, 2018

J. P. Morgan Securities LLC
Cowen and Company, LLC

As Representatives of the
several Underwriters listed
in Schedule 1 hereto

c/o J. P. Morgan Securities LLC
383 Madison Avenue
New York, New York 10179

c/o Cowen and Company, LLC
599 Lexington Avenue
New York, New York 10022

Ladies and Gentlemen:

Twist Bioscience Corporation, a Delaware corporation (the "Company"), proposes to issue and sell to the several underwriters listed in Schedule 1 hereto (the "Underwriters"), for whom you are acting as representatives (the "Representatives"), an aggregate of shares of common stock, par value \$0.00001 per share (the "Common Stock"), of the Company (the "Underwritten Shares") and, at the option of the Underwriters, up to an additional shares of Common Stock of the Company (the "Option Shares"). The Underwritten Shares and the Option Shares are herein referred to as the "Shares". The shares of Common Stock of the Company to be outstanding after giving effect to the sale of the Shares are referred to herein as the "Stock".

The Company hereby confirms its agreement with the several Underwriters concerning the purchase and sale of the Shares, as follows:

1. **Registration Statement.** The Company has prepared and filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended, and the rules and regulations of the Commission thereunder (collectively, the "Securities Act"), a registration statement on Form S-1 (File No. 333-227672), including a prospectus, relating to the Shares. Such registration statement, as amended at the time it became effective, including the information, if any, deemed pursuant to Rule 430A, 430B or 430C under the Securities Act to be part of the registration statement at the time of its effectiveness ("Rule 430 Information"), is referred to herein as the "Registration Statement"; and as used herein, the term "Preliminary Prospectus" means each prospectus included in such registration statement (and any amendments thereto) before effectiveness, any prospectus filed with the Commission pursuant to Rule 424(a) under the Securities Act and the prospectus included in the Registration Statement at the time of its effectiveness that omits Rule 430 Information, and the term "Prospectus" means the prospectus in the form first used (or made available upon request of purchasers pursuant to Rule 173 under the Securities Act) in connection with confirmation of sales of the Shares. If the Company has filed an abbreviated registration statement pursuant to Rule 462(b) under the Securities Act

(the "Rule 462 Registration Statement"), then any reference herein to the term "Registration Statement" shall be deemed to include such Rule 462 Registration Statement. Capitalized terms used but not defined herein shall have the meanings given to such terms in the Registration Statement and the Prospectus.

At or prior to the Applicable Time (as defined below), the Company had prepared the following information (collectively with the pricing information set forth on Annex A, the "Pricing Disclosure Package"): a Preliminary Prospectus dated _____, 2018 and each "free-writing prospectus" (as defined pursuant to Rule 405 under the Securities Act) listed on Annex A hereto.

"Applicable Time" means [_____] [A/P].M., New York City time, on _____, 2018.

2. Purchase of the Shares.

(a) The Company agrees to issue and sell the Underwritten Shares to the several Underwriters as provided in this underwriting agreement (this "Agreement"), and each Underwriter, on the basis of the representations, warranties and agreements set forth herein and subject to the conditions set forth herein, agrees, severally and not jointly, to purchase from the Company the respective number of Underwritten Shares set forth opposite such Underwriter's name in Schedule 1 hereto at a price per share (the "Purchase Price") of \$ _____.

In addition, the Company agrees to issue and sell the Option Shares to the several Underwriters as provided in this Agreement, and the Underwriters, on the basis of the representations, warranties and agreements set forth herein and subject to the conditions set forth herein, shall have the option to purchase, severally and not jointly, from the Company the Option Shares at the Purchase Price less an amount per share equal to any dividends or distributions declared by the Company and payable on the Underwritten Shares but not payable on the Option Shares.

If any Option Shares are to be purchased, the number of Option Shares to be purchased by each Underwriter shall be the number of Option Shares which bears the same ratio to the aggregate number of Option Shares being purchased as the number of Underwritten Shares set forth opposite the name of such Underwriter in Schedule 1 hereto (or such number increased as set forth in Section 10 hereof) bears to the aggregate number of Underwritten Shares being purchased from the Company by the several Underwriters, subject, however, to such adjustments to eliminate any fractional Shares as the Representatives in their sole discretion shall make.

The Underwriters may exercise the option to purchase Option Shares at any time in whole, or from time to time in part, on or before the thirtieth day following the date of the Prospectus, by written notice from the Representatives to the Company. Such notice shall set forth the aggregate number of Option Shares as to which the option is being exercised and the date and time when the Option Shares are to be delivered and paid for, which may be the same date and time as the Closing Date (as hereinafter defined) but shall not be earlier than the Closing Date nor later than the tenth full business day (as hereinafter defined) after the date of such notice (unless such time and date are postponed in accordance with the provisions of Section 10 hereof). Any such notice shall be given at least two business days prior to the date and time of delivery specified therein.

(b) The Company understands that the Underwriters intend to make a public offering of the Shares as soon after the effectiveness of this Agreement as in the judgment of the Representatives is advisable, and initially to offer the Shares on the terms set forth in the Pricing Disclosure Package. The Company acknowledges and agrees that the Underwriters may offer and sell Shares to or through any affiliate of an Underwriter.

(c) Payment for the Shares shall be made by wire transfer in immediately available funds to the account specified by the Company to the Representatives in the case of the Underwritten Shares, at the offices of Latham & Watkins LLP, counsel for the Underwriters, at 140 Scott Drive, Menlo Park, CA 94025 at 10:00 A.M., New York City time, on _____, 2018, or at such other time or place on the same or such other date, not later than the fifth business day thereafter, as the Representatives and the Company may agree upon in writing or, in the case of the Option Shares, on the date and at the time and place specified by the Representatives in the written notice of the Underwriters' election to purchase such Option Shares. The time and date of such payment for the Underwritten Shares is referred to herein as the "Closing Date", and the time and date for such payment for the Option Shares, if other than the Closing Date, is herein referred to as the "Additional Closing Date".

Payment for the Shares to be purchased on the Closing Date or the Additional Closing Date, as the case may be, shall be made against delivery to J.P. Morgan Securities LLC for the respective accounts of the several Underwriters of the Shares to be purchased on such date in definitive form registered in such names and in such denominations as J.P. Morgan Securities LLC shall request in writing not later than two full business days prior to the Closing Date or the Additional Closing Date, as the case may be, with any transfer taxes payable in connection with the sale of such Shares duly paid by the Company. Delivery of the Shares shall be made through the facilities of The Depository Trust Company ("DTC") unless the Representatives shall otherwise instruct. The certificates for the Shares will be made available for inspection and packaging by the Representatives at the office of DTC or its designated custodian not later than 1:00 P.M., New York City time, on the business day prior to the Closing Date or the Additional Closing Date, as the case may be.

(d) The Company acknowledges and agrees that the Underwriters are acting solely in the capacity of an arm's length contractual counterparty to the Company with respect to the offering of Shares contemplated hereby (including in connection with determining the terms of the offering) and not as a financial advisor or a fiduciary to, or an agent of, the Company or any other person. Additionally, neither the Representatives nor any other Underwriter is advising the Company or any other person as to any legal, tax, investment, accounting or regulatory matters in any jurisdiction. The Company shall consult with its own advisors concerning such matters and shall be responsible for making its own independent investigation and appraisal of the transactions contemplated hereby, and the Underwriters shall have no responsibility or liability to the Company with respect thereto. Any review by the Underwriters of the Company, the transactions contemplated hereby or other matters relating to such transactions will be performed solely for the benefit of the Underwriters and shall not be on behalf of the Company.

3. Representations and Warranties of the Company. The Company represents and warrants to each Underwriter that:

(a) *Preliminary Prospectus.* No order preventing or suspending the use of any Preliminary Prospectus has been issued by the Commission, and each Preliminary Prospectus included in the Pricing Disclosure Package, at the time of filing thereof, complied in all material respects with the Securities Act, and no Preliminary Prospectus, at the time of filing thereof, contained any untrue statement of a material fact or omitted to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in any Preliminary Prospectus, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(b) *Pricing Disclosure Package.* The Pricing Disclosure Package as of the Applicable Time did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in such Pricing Disclosure Package, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof. No statement of material fact included in the Prospectus has been omitted from the Pricing Disclosure Package and no statement of material fact included in the Pricing Disclosure Package that is required to be included in the Prospectus has been omitted therefrom.

(c) *Issuer Free Writing Prospectus.* Other than the Registration Statement, the Preliminary Prospectus and the Prospectus, the Company (including its agents and representatives, other than the Underwriters in their capacity as such) has not prepared, used, authorized, approved or referred to and will not prepare, use, authorize, approve or refer to any “written communication” (as defined in Rule 405 under the Securities Act) that constitutes an offer to sell or solicitation of an offer to buy the Shares (each such communication by the Company or its agents and representatives (other than a communication referred to in clause (i) below) an “Issuer Free Writing Prospectus”) other than (i) any document not constituting a prospectus pursuant to Section 2(a)(10)(a) of the Securities Act or Rule 134 under the Securities Act or (ii) the documents listed on Annex A hereto, each electronic road show and any other written communications approved in writing in advance by the Representatives, such approval not to be unreasonably withheld or delayed. Each such Issuer Free Writing Prospectus, if any, complied in all material respects with the Securities Act, has been or will be (within the time period specified in Rule 433 under the Securities Act) filed in accordance with the Securities Act (to the extent required thereby) and does not conflict with the information contained in the Registration Statement or the Pricing Disclosure Package, and, when taken together with any other Issuer Free Writing Prospectus and the Preliminary Prospectus, in each case, accompanying, or delivered prior to delivery of, such Issuer Free Writing Prospectus, did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in each such Issuer Free Writing Prospectus or Preliminary Prospectus in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in such Issuer Free Writing Prospectus or Preliminary Prospectus; it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(d) *Emerging Growth Company.* From the time of initial confidential submission of the Registration Statement to the Commission (or, if earlier, the first date on which the Company engaged directly or through any person authorized to act on its behalf in any Testing-the-Waters Communication (as defined below)) through the date hereof, the Company has been and is an “emerging growth company,” as defined in Section 2(a) of the Securities Act (an “Emerging Growth Company”). “Testing-the-Waters Communication” means any oral or written communication with potential investors undertaken in reliance on Section 5(d) of the Securities Act.

(e) *Testing-the-Waters Materials.* The Company (i) has not alone engaged in any Testing-the-Waters Communications other than Testing-the-Waters Communications with the consent of the Representatives with entities that are qualified institutional buyers within the meaning of Rule 144A under the Securities Act or institutions that are accredited investors within the meaning of Rule 501 under the Securities Act and (ii) has not authorized anyone other than the Representatives to engage in Testing-the-Waters Communications. The Company reconfirms that the Representatives have been authorized to act on its behalf in undertaking Testing-the-Waters Communications by virtue of a writing substantially in the form of Exhibit A hereto. The Company has not distributed or approved for distribution any Written Testing-the-Waters Communications [other than those listed on Annex B hereto]. “Written Testing-the-Waters Communication” means any Testing-the-Waters Communication that is a written communication within the meaning of Rule 405 under the Securities Act. Any individual Written Testing-the-Waters Communication does not conflict with the information contained in the Registration Statement or the Pricing Disclosure Package, complied in all material respects with the Securities Act, and when taken together with the Pricing Disclosure Package as of the Applicable Time, did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(f) *Registration Statement and Prospectus.* The Registration Statement has been declared effective by the Commission. No order suspending the effectiveness of the Registration Statement has been issued by the Commission, and no proceeding for that purpose or pursuant to Section 8A of the Securities Act against the Company or related to the offering of the Shares has been initiated or, to the knowledge of the Company, threatened by the Commission; as of the applicable effective date of the Registration Statement and any post-effective amendment thereto, the Registration Statement and any such post-effective amendment complied and will comply in all material respects with the applicable requirements of the Securities Act, and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary in order to make the statements therein not misleading; and as of the date of the Prospectus and any amendment or supplement thereto and as of the Closing Date and as of the Additional Closing Date, as the case may be, the Prospectus complied and will comply in all material respects with the Securities Act and will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in the Registration Statement and the Prospectus and any amendment or supplement thereto, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(g) *Financial Statements.* The financial statements (including the related notes thereto) of the Company and its consolidated subsidiaries included in the Registration Statement, the Pricing Disclosure Package and the Prospectus comply in all material respects with the applicable requirements of the Securities Act and present fairly, in all material respects, the financial position of the Company and its consolidated subsidiaries as of the dates indicated and the results of their operations and the changes in their cash flows for the periods specified; such financial statements have been prepared in conformity with generally accepted accounting principles (“GAAP”) in the United States applied on a consistent basis throughout the periods covered thereby, and any supporting schedules included in the Registration Statement present

fairly, in all material respects, the information required to be stated therein; and the other financial information included in the Registration Statement, the Pricing Disclosure Package and the Prospectus has been derived from the accounting records of the Company and its consolidated subsidiaries and presents fairly, in all material respects, the information shown thereby; and the *pro forma* financial information and the related notes thereto included in the Registration Statement, the Pricing Disclosure Package and the Prospectus have been prepared in accordance with the applicable requirements of the Securities Act and the assumptions underlying such *pro forma* financial information are reasonable and are set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus. All disclosures contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus regarding “non-GAAP financial measures” (as such term is defined by the rules and regulations of the Commission) comply with Regulation G of the Securities Exchange Act of 1934, as amended (the “Exchange Act”) and Item 10 of Regulation S-K of the Securities Act, to the extent applicable.

(h) *No Material Adverse Change.* Subsequent to the respective dates as of which information is given in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (i) there has not been any change in the capital stock (other than the issuance of shares of Common Stock upon exercise of stock options and warrants described as outstanding in, and the grant of options and awards under existing equity incentive plans described in, the Registration Statement, the Pricing Disclosure Package and the Prospectus), short-term debt or long-term debt of the Company or any of its subsidiaries, or any dividend or distribution of any kind declared, set aside for payment, paid or made by the Company on any class of capital stock, or any material adverse change, or any development that would reasonably be expected to result in a prospective material adverse change, in or affecting the business, properties, management, financial position, stockholders’ equity, results of operations or prospects of the Company and its subsidiaries taken as a whole; (ii) neither the Company nor any of its subsidiaries has entered into any transaction or agreement (whether or not in the ordinary course of business) that is material to the Company and its subsidiaries taken as a whole or incurred any liability or obligation, direct or contingent, that is material to the Company and its subsidiaries taken as a whole; and (iii) neither the Company nor any of its subsidiaries has sustained any loss or interference with its business that is material to the Company and its subsidiaries taken as a whole and that is either from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor disturbance or dispute or any action, order or decree of any court or arbitrator or governmental or regulatory authority, except in each case as otherwise disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(i) *Organization and Good Standing.* The Company and each of its subsidiaries have been duly organized and are validly existing and in good standing under the laws of their respective jurisdictions of organization, are duly qualified to do business and are in good standing in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification, and have all power and authority necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to be so qualified or in good standing or have such power or authority would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the business, properties, management, financial position, stockholders’ equity, results of operations or prospects of the Company and its subsidiaries taken as a whole or on the performance by the Company of its obligations under this Agreement (a “Material Adverse Effect”). The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21 to the Registration Statement.

(j) *Capitalization.* The Company has an authorized capitalization as set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus under the heading “Capitalization” and “Description of capital stock” (except for subsequent issuances, if any, pursuant to this Agreement, pursuant to reservations, agreements, or Company Stock Plans (as defined below), or pursuant to the exercise of convertible securities or options referred to in the Prospectus); all the outstanding shares of capital stock of the Company have been duly and validly authorized and issued and are fully paid and non-assessable and are not subject to any pre-emptive or similar rights; except as described in or expressly contemplated by the Pricing Disclosure Package and the Prospectus, there are no outstanding rights (including, without limitation, pre-emptive rights that have not been duly waived or satisfied), warrants or options to acquire, or instruments convertible into or exchangeable for, any shares of capital stock or other equity interest in the Company or any of its subsidiaries, or any contract, commitment, agreement, understanding or arrangement of any kind relating to the issuance of any capital stock of the Company or any such subsidiary, any such convertible or exchangeable securities or any such rights, warrants or options; the capital stock of the Company conforms in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus; and all the outstanding shares of capital stock or other equity interests of each subsidiary owned, directly or indirectly, by the Company have been duly and validly authorized and issued, are fully paid and non-assessable (except, in the case of any foreign subsidiary, for directors’ qualifying shares) and are owned directly or indirectly by the Company, free and clear of any lien, charge, encumbrance, security interest, restriction on voting or transfer or any other claim of any third party, except as otherwise described in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(k) *Stock Options.* With respect to the stock options (the “Stock Options”) granted pursuant to the stock-based compensation plans of the Company and its subsidiaries (the “Company Stock Plans”), (i) each Stock Option intended to qualify as an “incentive stock option” under Section 422 of the Internal Revenue Code of 1986, as amended (the “Code”) so qualifies, (ii) each grant of a Stock Option was duly authorized no later than the date on which the grant of such Stock Option was by its terms to be effective (the “Grant Date”) by all necessary corporate action, including, as applicable, approval by the board of directors of the Company (or a duly constituted and authorized committee thereof) and any required stockholder approval by the necessary number of votes or written consents and the award agreement governing such grant (if any) was duly executed and delivered by each party thereto, (iii) each such grant was made in accordance with the terms of the Company Stock Plans, and (iv) each such grant was properly accounted for in accordance with GAAP in the financial statements (including the related notes) of the Company. Each Company Stock Plan is accurately described in all material respects in the Registration Statement, the Pricing Disclosure Package and the Prospectus. The Company has not knowingly granted, and there is no and has been no policy or practice of the Company of granting, Stock Options prior to, or otherwise coordinating the grant of Stock Options with, the release or other public announcement of material information regarding the Company or its subsidiaries or their results of operations or prospects.

(l) *Due Authorization.* The Company has full right, power and authority to execute and deliver this Agreement and to perform its obligations hereunder; and all action required to be taken for the due and proper authorization, execution and delivery by it of this Agreement and the consummation by it of the transactions contemplated hereby has been duly and validly taken.

(m) *Underwriting Agreement.* This Agreement has been duly authorized, executed and delivered by the Company.

(n) *The Shares.* The Shares to be issued and sold by the Company hereunder have been duly authorized by the Company and, when issued and delivered and paid for as provided herein, will be duly and validly issued, will be fully paid and nonassessable and will conform to the descriptions thereof in the Registration Statement, the Pricing Disclosure Package and the Prospectus. The issuance of the Shares is not subject to any preemptive or other similar rights to purchase or subscribe for any securities of the Company.

(o) *Listing.* The Shares have been approved for listing on the Nasdaq Global Market (the “Exchange”), subject to notice of issuance.

(p) *Description of the Underwriting Agreement.* This Agreement conforms in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(q) *No Violation or Default.* Neither the Company nor any of its subsidiaries is (i) in violation of its charter or by-laws or similar organizational documents; (ii) in default, and no event has occurred that, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any property or asset of the Company or any of its subsidiaries is subject; or (iii) in violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (ii) and (iii) above, for any such default or violation that would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(r) *No Conflicts.* The execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement or the Pricing Disclosure Package and the Prospectus will not (i) conflict with or result in a breach or violation of any of the terms or provisions of, or constitute a default under, result in the termination, modification or acceleration of, or result in the creation or imposition of any lien, charge or encumbrance upon any property, right or asset of the Company or any of its subsidiaries pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any property, right or asset of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the charter or by-laws or similar organizational documents of the Company or any of its subsidiaries or (iii) result in the violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (i) and (iii) above, for any such conflict, breach, violation, default, lien, charge or encumbrance that would not, individually or in the aggregate, have a Material Adverse Effect.

(s) *No Integration.* Neither the Company nor any of its affiliates has, prior to the date hereof, made any offer or sale of any securities that would be integrated with the offer and sale of the Shares contemplated by this Agreement pursuant to the Securities Act or the interpretations thereof by the Commission.

(t) *No Consents Required.* No consent, filing, approval, authorization, order, license, registration or qualification of or with any court or arbitrator or governmental or regulatory authority is required for the execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares by the Company and the consummation by the

Company of the transactions contemplated by this Agreement, except for (i) the registration of the Shares under the Securities Act and (ii) such consents, approvals, authorizations, orders and registrations or qualifications as may be required by the Exchange and under applicable state securities laws in connection with the purchase and distribution of the Shares by the Underwriters, (iii) the filing of an amended and restated certificate of incorporation of the Company with the Secretary of State of the State of Delaware, and (iv) those that have already been obtained.

(u) *Legal Proceedings.* Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no legal, governmental or regulatory investigations, actions, demands, claims, suits, arbitrations, inquiries or proceedings (“Actions”) pending to which the Company or any of its subsidiaries is a party or to which any property of the Company or any of its subsidiaries is the subject that, individually or in the aggregate, if determined adversely to the Company or any of its subsidiaries, could reasonably be expected to have a Material Adverse Effect or have a Material Adverse Effect on the power or ability of the Company to perform its obligations under this Agreement or to consummate the transactions contemplated hereby; no such Actions are, to the knowledge of the Company, threatened or contemplated by any governmental or regulatory authority or threatened by others; and (i) there are no current or pending Actions that are required under the Securities Act to be described in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so described in the Registration Statement, the Pricing Disclosure Package and the Prospectus and (ii) there are no statutes, regulations or contracts or other documents that are required under the Securities Act to be filed as exhibits to the Registration Statement or described in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so filed as exhibits to the Registration Statement or described in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(v) *Independent Accountants.* PricewaterhouseCoopers LLP, who have certified certain financial statements of the Company and its subsidiaries, is an independent registered public accounting firm with respect to the Company and its subsidiaries within the applicable rules and regulations adopted by the Commission and the Public Company Accounting Oversight Board (United States) and as required by the Securities Act.

(w) *Title to Real and Personal Property.* The Company and its subsidiaries have good and marketable title to, or have valid rights to lease or otherwise use, all items of real and personal property that are material to the respective businesses of the Company and its subsidiaries, in each case free and clear of all liens, encumbrances, claims and defects and imperfections of title except those that (i) do not materially interfere with the use made and proposed to be made of such property by the Company and its subsidiaries or (ii) could not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect.

(x) *Intellectual Property.* Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company and its subsidiaries own, or have obtained valid and enforceable licenses for, or other rights to use on reasonable terms, the inventions, patent applications, patents, trademarks (both registered and unregistered), trade names, copyrights, know-how (including trade secrets, and other unpatented and/or unpatentable proprietary information), software, domain names and other intellectual property rights, including registrations and applications for registration thereof (collectively, the “Intellectual Property”) described in the Registration Statement, the Pricing Disclosure Package and the Prospectus as being owned or licensed by them; to the Company’s knowledge and except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company and its subsidiaries

own, or have obtained valid and enforceable licenses for, or other rights to use, all Intellectual Property used in, or necessary for the conduct of, their respective businesses as currently conducted or as proposed to be conducted and as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus; except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no pending or, to the knowledge of the Company, threatened action, suit, proceeding or claim by others that the Company infringes, misappropriates or otherwise violates, or would, upon the commercialization of any product or service described in the Registration Statement, the Pricing Disclosure Package or the Prospectus, infringe or otherwise misappropriate or violate, any Intellectual Property rights of others, and the Company is unaware of any facts which could form a reasonable basis for any successful claim; and none of the technology employed by the Company has been obtained or is being used by the Company in violation of any contractual obligation binding on the Company or, to the Company's knowledge, upon any of its officers, directors or employees, and the Company is not aware of any facts that it believes would form a reasonable basis for a successful challenge that any of its employees are in or have ever been in violation of any term of any employment contract, patent disclosure agreement, invention assignment agreement, non-competition agreement, non-solicitation agreement, nondisclosure agreement or any restrictive covenant to or with a former employer where such violation relates to such employee's breach of a confidentiality obligation, obligation to assign to the Company Intellectual Property, or obligation not to use third party Intellectual Property or other proprietary rights on behalf of the Company. To the Company's knowledge, there are no third parties who have established rights to any Intellectual Property described in the Registration Statement, the Pricing Disclosure Package and the Prospectus as exclusively owned or exclusively licensed by the Company, except for licenses granted in writing by the Company or its subsidiaries to any third-parties ("Exclusive Intellectual Property"); except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others challenging the Company's ownership or rights in or to any Exclusive Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for a successful claim; none of the Exclusive Intellectual Property has been adjudged invalid or unenforceable in whole or in part, and there is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others challenging the validity, enforceability or scope of any Exclusive Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for a successful claim; to the Company's knowledge, there is no patent or patent application that contains claims that dominate, may dominate or interfere (as such term is described in 35 U.S.C. §135 and 37 C.F.R. 41.100 to 41.208) with the issued or pending claims of any of the Intellectual Property; and to the Company's knowledge, there is no prior art material to any patent or patent application of the Exclusive Intellectual Property that may render any U.S. patent held by the Company invalid or any U.S. patent application held by the Company unpatentable has not been disclosed to the U.S. Patent and Trademark Office.

(y) *Regulatory Matters.* The Company has operated and currently is in compliance with all applicable rules and regulations of the FDA, except where the failure to so operate or be in compliance would not reasonably be expected to have a Material Adverse Effect. The Company has operated and currently is in compliance with all applicable rules, regulations and policies of the U.S. Federal Select Agents Program administered by the Centers for Disease Control and Prevention and the Animal and Plant Health Inspection Service, except where the failure to so operate or be in compliance would not reasonably be expected to have a Material Adverse Effect.

(z) *No Undisclosed Relationships.* No relationship, direct or indirect, exists between or among the Company or any of its subsidiaries, on the one hand, and the directors, officers, stockholders, customers, suppliers or other affiliates of the Company or any of its subsidiaries, on

the other, that is required by the Securities Act to be described in each of the Registration Statement and the Prospectus and that is not so described in such documents and in the Pricing Disclosure Package.

(aa) *Investment Company Act.* The Company is not and, after giving effect to the offering and sale of the Shares and the application of the proceeds thereof received by the Company as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, will not be required to register as an “investment company” or an entity “controlled” by an “investment company” within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder.

(bb) *Taxes.* The Company and its subsidiaries have paid all federal, state, local and foreign taxes and filed all tax returns required to be paid or filed through the date hereof (after giving effect to any valid extensions with respect to the filing of tax returns), except where the failure to pay or file would not reasonably be expected to have, individually or in the aggregate, a Material Adverse Effect; and except as otherwise disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no tax deficiency that has been, or could reasonably be expected to be, asserted against the Company or any of its subsidiaries or any of their respective properties or assets and which would reasonably be expected to have, individually or in the aggregate, a Material Adverse Effect.

(cc) *Licenses and Permits.* The Company and its subsidiaries possess, all licenses, certificates, permits and other authorizations issued by, and have made all declarations and filings with, the appropriate federal, state, local or foreign governmental or regulatory authorities that are necessary for the ownership or lease of their respective properties or the conduct of their respective businesses as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, except where the failure to possess or make the same would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any of its subsidiaries has received notice of any revocation or modification of any such license, certificate, permit or authorization or has any reason to believe that any such license, certificate, permit or authorization will not be renewed in the ordinary course. To the Company’s knowledge, no party granting any such licenses has taken any action to limit, suspend or revoke the same.

(dd) *No Labor Disputes.* No labor disturbance by or dispute with employees of the Company or any of its subsidiaries exists or, to the knowledge of the Company, is contemplated or threatened, and the Company is not aware of any existing or imminent labor disturbance by, or dispute with, the employees of any of its or its subsidiaries’ principal suppliers, contractors or customers, except as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(ee) *Certain Environmental Matters.* (i) The Company and its subsidiaries (x) are in compliance with all, and have not violated any, applicable federal, state, local and foreign laws, rules, regulations, requirements, decisions, judgments, decrees, orders and the common law relating to pollution or the protection of human health or safety, the environment, natural resources, hazardous or toxic substances or wastes, pollutants or contaminants (collectively, “Environmental Laws”); (y) have received and are in compliance with all permits, licenses, certificates or other authorizations or approvals required of them under any Environmental Laws

to conduct their respective businesses; and (z) have not received notice of any actual or potential liability under or relating to, or any actual or potential violation of, any Environmental Laws, including for the investigation or remediation of any disposal or release of hazardous or toxic substances or wastes, pollutants or contaminants, and have no knowledge of any event or condition that would reasonably be expected to result in any such notice, and (ii) there are no costs or liabilities associated with Environmental Laws of or relating to the Company or its subsidiaries, except in the case of each of (i) and (ii) above, for any such matter as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and (iii) except as described in each of the Pricing Disclosure Package and the Prospectus, (x) there is no proceeding that is pending, or that is known to be contemplated, against the Company or any of its subsidiaries under any Environmental Laws in which a governmental entity is also a party, other than such proceeding regarding which it is reasonably believed no monetary sanctions of \$100,000 or more will be imposed, (y) the Company and its subsidiaries are not aware of any facts or issues regarding compliance with Environmental Laws, or liabilities or other obligations under Environmental Laws or concerning hazardous or toxic substances or wastes, pollutants or contaminants, that could reasonably be expected to have a material effect on the capital expenditures, earnings or competitive position of the Company and its subsidiaries, and (z) none of the Company or its subsidiaries anticipates material capital expenditures relating to any Environmental Laws.

(ff) *Compliance with ERISA.* (i) Each employee benefit plan, within the meaning of Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended (“ERISA”), for which the Company or any member of its “Controlled Group” (defined as any entity, whether or not incorporated, that is under common control with the Company within the meaning of Section 4001(a)(14) of ERISA or any entity that would be regarded as a single employer with the Company under Section 414(b),(c),(m) or (o) of Code) would have any liability (each, a “Plan”) has been maintained in compliance with its terms and the requirements of any applicable statutes, orders, rules and regulations, including but not limited to ERISA and the Code; (ii) no prohibited transaction, within the meaning of Section 406 of ERISA or Section 4975 of the Code, has occurred with respect to any Plan, excluding transactions effected pursuant to a statutory or administrative exemption; (iii) for each Plan that is subject to the funding rules of Section 412 of the Code or Section 302 of ERISA, no Plan has failed (whether or not waived), or is reasonably expected to fail, to satisfy the minimum funding standards (within the meaning of Section 302 of ERISA or Section 412 of the Code) applicable to such Plan; (iv) no Plan is, or is reasonably expected to be, in “at risk status” (within the meaning of Section 303(i) of ERISA) and no Plan that is a “multiemployer plan” within the meaning of Section 4001(a)(3) of ERISA is in “endangered status” or “critical status” (within the meaning of Sections 304 and 305 of ERISA) (v) the fair market value of the assets of each Plan exceeds the present value of all benefits accrued under such Plan (determined based on those assumptions used to fund such Plan); (vi) no “reportable event” (within the meaning of Section 4043(c) of ERISA and the regulations promulgated thereunder) has occurred or is reasonably expected to occur; (vii) each Plan that is intended to be qualified under Section 401(a) of the Code is so qualified, and nothing has occurred, whether by action or by failure to act, which would cause the loss of such qualification; (viii) neither the Company nor any member of the Controlled Group has incurred, nor reasonably expects to incur, any liability under Title IV of ERISA (other than contributions to the Plan or premiums to the Pension Benefit Guarantee Corporation, in the ordinary course and without default) in respect of a Plan (including a “multiemployer plan” within the meaning of Section 4001(a)(3) of ERISA); and (ix) none of the following events has occurred or is reasonably likely to occur: (A) a material increase in the aggregate amount of contributions required to be made to all Plans by the Company or its Controlled Group affiliates in the current fiscal year of the Company and its Controlled Group affiliates compared to the amount of such contributions made

in the Company's and its Controlled Group affiliates' most recently completed fiscal year; or (B) a material increase in the Company and its subsidiaries' "accumulated post-retirement benefit obligations" (within the meaning of Accounting Standards Codification Topic 715-60) compared to the amount of such obligations in the Company and its subsidiaries' most recently completed fiscal year, except in each case with respect to the events or conditions set forth in (i) through (ix) hereof, as would not, individually or in the aggregate, have a Material Adverse Effect.

(gg) *Disclosure Controls.* The Company (on a consolidated basis with its subsidiaries) maintains an effective system of "disclosure controls and procedures" (as defined in Rule 13a-15(e) of the Exchange Act) that complies with the applicable requirements of the Exchange Act and that has been designed to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management as appropriate to allow timely decisions regarding required disclosure.

(hh) *Accounting Controls.* The Company (on a consolidated basis with its subsidiaries) maintains systems of "internal control over financial reporting" (as defined in Rule 13a-15(f) of the Exchange Act) that comply with the applicable requirements of the Exchange Act and have been designed by, or under the supervision of, their respective principal executive and principal financial officers, or persons performing similar functions, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP. The Company and its subsidiaries maintain internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed in accordance with management's general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset accountability; (iii) access to assets is permitted only in accordance with management's general or specific authorization; and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no material weaknesses in the Company's internal controls. The Company's auditors and the Audit Committee of the Board of Directors of the Company have been advised of: (i) all significant deficiencies and material weaknesses in the design or operation of internal controls over financial reporting which have adversely affected or are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information; and (ii) any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal controls over financial reporting.

(ii) *Insurance.* The Company and its subsidiaries have insurance covering their respective properties, operations, personnel and businesses, including business interruption insurance, which insurance is in amounts and insures against such losses and risks as are generally maintained by companies engaged in the same or similar businesses and at the same or a similar stage of development, except where the failure to maintain such insurance could not reasonably be expected to have a Material Adverse Effect; and neither the Company nor any of its subsidiaries has (i) received written notice from any insurer or agent of such insurer that capital improvements or other expenditures are required or necessary to be made in order to continue such insurance or (ii) any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage at reasonable cost from similar insurers as may be necessary to continue its business.

(jj) *No Unlawful Payments.* Neither the Company nor any of its subsidiaries nor any director, officer or employee of the Company or any of its subsidiaries nor, to the knowledge of the Company, any agent, affiliate or other person associated with or acting on behalf of the Company or any of its subsidiaries has (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity; (ii) made or taken an act in furtherance of an offer, promise or authorization of any direct or indirect unlawful payment or benefit to any foreign or domestic government official or employee, including of any government-owned or controlled entity or of a public international organization, or any person acting in an official capacity for or on behalf of any of the foregoing, or any political party or party official or candidate for political office; (iii) violated or is in violation of any provision of the Foreign Corrupt Practices Act of 1977, as amended, or any applicable law or regulation implementing the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, or committed an offence under the Bribery Act 2010 of the United Kingdom or any other applicable anti-bribery or anti-corruption law; or (iv) made, offered, agreed, requested or taken an act in furtherance of any unlawful bribe or other unlawful benefit, including, without limitation, any rebate, payoff, influence payment, kickback or other unlawful or improper payment or benefit. The Company and its subsidiaries have instituted, maintained and enforced, and will continue to maintain and enforce policies and procedures designed to promote and ensure compliance with all applicable anti-bribery and anti-corruption laws.

(kk) *Compliance with Anti-Money Laundering Laws.* The operations of the Company and its subsidiaries are and have been conducted at all times in compliance with applicable financial recordkeeping and reporting requirements, including those of the Currency and Foreign Transactions Reporting Act of 1970, as amended, the applicable money laundering statutes of all jurisdictions where the Company or any of its subsidiaries conducts business, the rules and regulations thereunder and any related or similar rules, regulations or guidelines issued, administered or enforced by any governmental agency (collectively, the “Anti-Money Laundering Laws”) and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(ll) *No Conflicts with Sanctions Laws.* Neither the Company nor any of its subsidiaries, directors, officers, or employees, nor, to the knowledge of the Company, any agent, affiliate or other person associated with or acting on behalf of the Company or any of its subsidiaries is currently the subject or the target of any sanctions administered or enforced by the U.S. government, (including, without limitation, the Office of Foreign Assets Control of the U.S. Department of the Treasury (“OFAC”) or the U.S. Department of State and including, without limitation, the designation as a “specially designated national” or “blocked person”), the United Nations Security Council (“UNSC”), the European Union, Her Majesty’s Treasury (“HMT”) or other relevant sanctions authority (collectively, “Sanctions”), nor is the Company or any of its subsidiaries located, organized or resident in a country or territory that is the subject or target of Sanctions, including, without limitation, Cuba, Iran, North Korea, Sudan, Syria and Crimea (each, a “Sanctioned Country”); and the Company will not directly or indirectly use the proceeds of the offering of the Shares hereunder, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other person or entity (i) to fund or facilitate any activities of or business with any person that, at the time of such funding or facilitation, is the subject or target of Sanctions, (ii) to fund or facilitate any activities of or business in any Sanctioned Country or (iii) in any other manner that will result in a violation by any person (including any person participating in the transaction, whether as underwriter, advisor, investor or otherwise) of Sanctions. For the past five years, the Company and its subsidiaries have not knowingly engaged

in and are not now knowingly engaged in any dealings or transactions with any person that at the time of the dealing or transaction is or was the subject or the target of Sanctions or with any Sanctioned Country.

(mm) *No Restrictions on Subsidiaries.* Subject to any restrictions under any applicable laws, no subsidiary of the Company is currently prohibited, directly or indirectly, under any agreement or other instrument to which it is a party or is subject, from paying any dividends to the Company, from making any other distribution on such subsidiary's capital stock, from repaying to the Company any loans or advances to such subsidiary from the Company or from transferring any of such subsidiary's properties or assets to the Company or any other subsidiary of the Company, except as otherwise described in the Registration Statement, the Pricing Disclosure Package or the Prospectus.

(nn) *No Broker's Fees.* Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against any of them or any Underwriter for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Shares.

(oo) *No Registration Rights.* Except as set forth in the Prospectus, the Registration Statement or the Pricing Disclosure Package, no person has the right to require the Company or any of its subsidiaries to register any securities for sale under the Securities Act by reason of the filing of the Registration Statement with the Commission or the issuance and sale of the Shares.

(pp) *No Stabilization.* The Company has not taken, directly or indirectly, any action designed to or that could reasonably be expected to cause or result in any stabilization or manipulation of the price of the Shares.

(qq) *Margin Rules.* The application of the proceeds received by the Company from the issuance, sale and delivery of the Shares as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus will not violate Regulation T, U or X of the Board of Governors of the Federal Reserve System or any other regulation of such Board of Governors.

(rr) *Forward-Looking Statements.* No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) included in any of the Registration Statement, the Pricing Disclosure Package or the Prospectus has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(ss) *Statistical and Market Data.* Nothing has come to the attention of the Company that has caused the Company to believe that the statistical and market-related data included in the Registration Statement, the Pricing Disclosure Package and the Prospectus is not based on or derived from sources that are reliable and accurate in all material respects.

(tt) *Sarbanes-Oxley Act.* There is and has been no failure on the part of the Company or any of the Company's directors or officers, in their capacities as such, to comply with any provision of the Sarbanes-Oxley Act of 2002, as amended, and the rules and regulations promulgated in connection therewith (the "Sarbanes-Oxley Act"), applicable as of the effective date of the Registration Statement, including Section 402 related to loans.

(uu) *Status under the Securities Act.* At the time of filing the Registration Statement and any post-effective amendment thereto, at the earliest time thereafter that the Company or any offering participant made a *bona fide* offer (within the meaning of Rule 164(h)(2) under the Securities Act) of the Shares and at the date hereof, the Company was not and is not an "ineligible issuer," as defined in Rule 405 under the Securities Act.

(vv) *No Ratings*. There are (and prior to the Closing Date, will be) no debt securities or preferred stock issued or guaranteed by the Company or any of its subsidiaries that are rated by a “nationally recognized statistical rating organization”, as such term is defined under Section 3(a)(62) under the Exchange Act.

4. Further Agreements of the Company. The Company covenants and agrees with each Underwriter that:

(a) *Required Filings*. The Company will file the final Prospectus with the Commission within the time periods specified by Rule 424(b) and Rule 430A, 430B or 430C under the Securities Act, will file any Issuer Free Writing Prospectus to the extent required by Rule 433 under the Securities Act; and the Company will use its best efforts to furnish copies of the Prospectus and each Issuer Free Writing Prospectus (to the extent not previously delivered) to the Underwriters in New York City prior to 10:00 A.M., New York City time, on the business day next succeeding the date of this Agreement in such quantities as the Representatives may reasonably request.

(b) *Delivery of Copies*. The Company will deliver, upon request and without charge, (i) to the Representatives, three signed copies of the Registration Statement as originally filed and each amendment thereto, in each case including all exhibits and consents filed therewith; and (ii) to each Underwriter (A) a conformed copy of the Registration Statement as originally filed and each amendment thereto (without exhibits) and (B) during the Prospectus Delivery Period (as defined below), as many copies of the Prospectus (including all amendments and supplements thereto and each Issuer Free Writing Prospectus) as the Representatives may reasonably request. As used herein, the term “Prospectus Delivery Period” means such period of time after the first date of the public offering of the Shares as in the opinion of counsel for the Underwriters a prospectus relating to the Shares is required by law to be delivered (or required to be delivered but for Rule 172 under the Securities Act) in connection with sales of the Shares by any Underwriter or dealer.

(c) *Amendments or Supplements, Issuer Free Writing Prospectuses*. Before preparing, using, authorizing, approving, referring to or filing any Issuer Free Writing Prospectus, and before filing any amendment or supplement to the Registration Statement or the Prospectus, the Company will furnish to the Representatives and counsel for the Underwriters a copy of the proposed Issuer Free Writing Prospectus, amendment or supplement for review and will not prepare, use, authorize, approve, refer to or file any such Issuer Free Writing Prospectus or file any such proposed amendment or supplement to which the Representatives reasonably object upon advice of counsel.

(d) *Notice to the Representatives*. The Company will advise the Representatives promptly, and confirm such advice in writing (which may be by email), (i) when the Registration Statement has become effective; (ii) when any amendment to the Registration Statement has been filed or becomes effective; (iii) when any supplement to the Prospectus, any Issuer Free Writing Prospectus, any Written Testing-the-Waters Communication or any amendment to the Prospectus has been filed or distributed; (iv) of any request by the Commission for any amendment to the Registration Statement or any amendment or supplement to the Prospectus or the receipt of any comments from the Commission relating to the Registration Statement or any other request by the Commission for any additional information including, but not limited to, any request for

information concerning any Testing-the-Waters Communication; (v) of the issuance by the Commission of any order suspending the effectiveness of the Registration Statement or preventing or suspending the use of any Preliminary Prospectus, any of the Pricing Disclosure Package, the Prospectus or any Written Testing-the-Waters Communication or the initiation or to the knowledge of the Company, threatening of any proceeding for that purpose or pursuant to Section 8A of the Securities Act; (vi) of the occurrence of any event or development within the Prospectus Delivery Period as a result of which the Prospectus, any of the Pricing Disclosure Package, any Issuer Free Writing Prospectus or any Written Testing-the-Waters Communication as then amended or supplemented would include any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Prospectus, the Pricing Disclosure Package, any such Issuer Free Writing Prospectus or any Written Testing-the-Waters Communication is delivered to a purchaser, not misleading; and (vii) of the receipt by the Company of any notice with respect to any suspension of the qualification of the Shares for offer and sale in any jurisdiction or the initiation or, to the Company's knowledge, threatening of any proceeding for such purpose; and the Company will use its reasonable best efforts to prevent the issuance of any such order suspending the effectiveness of the Registration Statement, preventing or suspending the use of any Preliminary Prospectus, any of the Pricing Disclosure Package, the Prospectus or any Written Testing-the-Waters Communication or suspending any such qualification of the Shares and, if any such order is issued, will obtain as soon as possible the withdrawal thereof.

(e) *Ongoing Compliance.* (1) If during the Prospectus Delivery Period (i) any event or development shall occur or condition shall exist as a result of which the Prospectus as then amended or supplemented would include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Prospectus is delivered to a purchaser, not misleading or (ii) it is necessary to amend or supplement the Prospectus to comply with law, the Company will promptly notify the Underwriters thereof and forthwith prepare and, subject to paragraph (c) above, file with the Commission and furnish to the Underwriters and to such dealers as the Representatives may designate such amendments or supplements to the Prospectus as may be necessary so that the statements in the Prospectus as so amended or supplemented will not, in the light of the circumstances existing when the Prospectus is delivered to a purchaser, be misleading or so that the Prospectus will comply with law and (2) if at any time prior to the Closing Date (i) any event or development shall occur or condition shall exist as a result of which the Pricing Disclosure Package as then amended or supplemented would include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Pricing Disclosure Package is delivered to a purchaser, not misleading or (ii) it is necessary to amend or supplement the Pricing Disclosure Package to comply with law, the Company will promptly notify the Underwriters thereof and forthwith prepare and, subject to paragraph (c) above, file with the Commission (to the extent required) and furnish to the Underwriters and to such dealers as the Representatives may designate, such amendments or supplements to the Pricing Disclosure Package as may be necessary so that the statements in the Pricing Disclosure Package as so amended or supplemented will not, in the light of the circumstances existing when the Pricing Disclosure Package is delivered to a purchaser, be misleading or so that the Pricing Disclosure Package will comply with law.

(f) *Blue Sky Compliance.* The Company will qualify the Shares for offer and sale under the securities or Blue Sky laws of such jurisdictions as the Representatives shall reasonably request and will continue such qualifications in effect so long as required for distribution of the Shares; provided that the Company shall not be required to (i) qualify as a foreign corporation or

other entity or as a dealer in securities in any such jurisdiction where it would not otherwise be required to so qualify, (ii) file any general consent to service of process in any such jurisdiction or (iii) subject itself to taxation with regards to doing business in any such jurisdiction if it is not otherwise so subject.

(g) *Earnings Statement.* The Company will make generally available to its security holders and the Representatives as soon as reasonably practicable an earnings statement that satisfies the provisions of Section 11(a) of the Securities Act and Rule 158 of the Commission promulgated thereunder covering a period of at least twelve months beginning with the first fiscal quarter of the Company occurring after the “effective date” (as defined in Rule 158) of the Registration Statement; provided that the Company will be deemed to have furnished such statements to its security holders and the Representatives to the extent they are filed on the Commission’s Electronic Data Gathering Analysis and Retrieval system (“EDGAR”) or any successor system..

(h) *Clear Market.* For a period of 180 days after the date of the Prospectus, the Company will not (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, or file with the Commission a registration statement under the Securities Act relating to, any shares of Stock or any securities convertible into or exercisable or exchangeable for Stock, or publicly disclose the intention to make any offer, sale, pledge, disposition or filing, or (ii) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Stock or any such other securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Stock or such other securities, in cash or otherwise, without the prior written consent of the Representatives, other than (a) the Shares to be sold hereunder, (b) any shares of Stock of the Company issued upon the exercise of options granted under Company Stock Plans, (c) the grant or issuance by the Company of employee, consultant, or director stock options or restricted stock in the ordinary course of business under the Company Stock Plans described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (d) shares registered on Form S-8 relating to the Company Stock Plans described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (e) the issuance of securities in connection with the acquisition by the Company or any of its subsidiaries of the securities, businesses, property or other assets of another person or entity or pursuant to any employee benefit plan assumed by the Company in connection with any such acquisition, or (f) the issuance of securities in connection with joint ventures, commercial relationships, or other strategic transactions; provided that, (x) in the case of clauses (e) and (f), the aggregate number of shares issued in all such acquisitions and transactions taken together does not exceed 10.0% of the Company’s outstanding common stock following the offering of Common Stock contemplated by this Agreement and (y) each person to whom such shares or securities are issued or granted pursuant to clauses (b), (c), (d), (e) and (f) during the 180-day restriction period described above executes or has executed a “lock-up” agreement in the form of Exhibit A hereto.

If the Representatives, in their sole discretion, agree to release or waive the restrictions set forth above or in a lock-up letter described in Section 6(m) hereof for an officer or director of the Company and provide the Company with notice of the impending release or waiver substantially in the form of Exhibit B hereto at least three business days before the effective date of the release or waiver, the Company agrees to announce the impending release or waiver by a press release substantially in the form of Exhibit C hereto through a major news service at least two business days before the effective date of the release or waiver.

(i) *Use of Proceeds.* The Company will apply the net proceeds from the sale of the Shares as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus under the heading “Use of proceeds”.

(j) *No Stabilization.* The Company will not take, directly or indirectly, any action designed to or that could reasonably be expected to cause or result in any stabilization or manipulation of the price of the Stock.

(k) *Exchange Listing.* The Company will use its reasonable best efforts to list, subject to notice of issuance, the Shares on the Exchange.

(l) *Reports.* For a period of two years from the date of this Agreement, so long as the Shares are outstanding, the Company will furnish to the Representatives, as soon as they are available, copies of all reports or other communications (financial or other) furnished to holders of the Shares, and copies of any reports and financial statements furnished to or filed with the Commission or any national securities exchange or automatic quotation system; *provided* the Company will be deemed to have furnished such reports and financial statements to the Representatives to the extent they are filed on EDGAR or any successor system.

(m) *Record Retention.* The Company will, pursuant to reasonable procedures developed in good faith, retain copies of each Issuer Free Writing Prospectus that is not filed with the Commission in accordance with Rule 433 under the Securities Act.

(n) *Filings.* The Company will file with the Commission such reports as may be required by Rule 463 under the Securities Act.

(o) *Emerging Growth Company.* The Company will promptly notify the Representatives if the Company ceases to be an Emerging Growth Company at any time prior to the completion of the distribution of Shares within the meaning of the Securities Act.

5. Certain Agreements of the Underwriters. Each Underwriter hereby represents and agrees that:

(a) It has not used, authorized use of, referred to or participated in the planning for use of, and will not use any “free writing prospectus”, as defined in Rule 405 under the Securities Act (which term includes use of any written information furnished to the Commission by the Company and not incorporated by reference into the Registration Statement and any press release issued by the Company) other than (i) a free writing prospectus that contains no “issuer information” (as defined in Rule 433(h)(2) under the Securities Act) that was not included (including through incorporation by reference) in the Preliminary Prospectus or a previously filed Issuer Free Writing Prospectus, (ii) any Issuer Free Writing Prospectus listed on Annex A or prepared pursuant to Section 3(c) or Section 4(c) above (including any electronic road show), or (iii) any free writing prospectus prepared by such underwriter and approved by the Company in advance in writing (each such free writing prospectus referred to in clauses (i) or (iii), an “Underwriter Free Writing Prospectus”).

(b) It has not and will not, without the prior written consent of the Company, use any free writing prospectus that contains the final terms of the Shares unless such terms have previously been included in a free writing prospectus filed with the Commission; *provided* that Underwriters may use a term sheet substantially in the form of Annex C hereto without the consent of the Company; *provided further* that any Underwriter using such term sheet shall notify the Company, and provide a copy of such term sheet to the Company, prior to, or substantially concurrently with, the first use of such term sheet.

(c) It is not subject to any pending proceeding under Section 8A of the Securities Act with respect to the offering (and will promptly notify the Company if any such proceeding against it is initiated during the Prospectus Delivery Period).

6. Conditions of Underwriters' Obligations. The obligation of each Underwriter to purchase the Underwritten Shares on the Closing Date or the Option Shares on the Additional Closing Date, as the case may be, as provided herein is subject to the performance by the Company of its covenants and other obligations hereunder and to the following additional conditions:

(a) *Registration Compliance; No Stop Order.* No order suspending the effectiveness of the Registration Statement shall be in effect, and no proceeding for such purpose or pursuant to Section 8A under the Securities Act shall be pending before or threatened by the Commission; the Prospectus and each Issuer Free Writing Prospectus shall have been timely filed with the Commission under the Securities Act (in the case of an Issuer Free Writing Prospectus, to the extent required by Rule 433 under the Securities Act) and in accordance with Section 4(a) hereof; and all requests by the Commission for additional information shall have been complied with to the reasonable satisfaction of the Representatives.

(b) *Representations and Warranties.* The representations and warranties of the Company contained herein shall be true and correct on the date hereof and on and as of the Closing Date or the Additional Closing Date, as the case may be; and the statements of the Company and its officers made in any certificates delivered pursuant to this Agreement shall be true and correct on and as of the Closing Date or the Additional Closing Date, as the case may be.

(c) *No Material Adverse Change.* No event or condition of a type described in Section 3(h) hereof shall have occurred or shall exist, which event or condition is not described in the Pricing Disclosure Package (excluding any amendment or supplement thereto) and the Prospectus (excluding any amendment or supplement thereto) and the effect of which in the judgment of the Representatives makes it impracticable or inadvisable to proceed with the offering, sale or delivery of the Shares on the Closing Date or the Additional Closing Date, as the case may be, on the terms and in the manner contemplated by this Agreement, the Pricing Disclosure Package and the Prospectus.

(d) *Officer's Certificate.* The Representatives shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, (x) a certificate on behalf of the Company of the chief executive officer and the chief financial officer of the Company (i) confirming that such officers have carefully reviewed the Registration Statement, the Pricing Disclosure Package and the Prospectus and, to the knowledge of such officers, the representations set forth in Sections 3(b) and 3(d) hereof are true and correct, (ii) confirming that the other representations and warranties of the Company in this Agreement are true and correct and that the Company has complied with all agreements and satisfied all conditions on its part to be performed or satisfied hereunder at or prior to the Closing Date or the Additional Closing Date, as the case may be, and (iii) to the effect set forth in paragraphs (a) and (c) above.

(e) *Comfort Letters.*

(i) On the date of this Agreement and on the Closing Date or the Additional Closing Date, as the case may be, PricewaterhouseCoopers LLP shall have furnished to the

Representatives, at the request of the Company, letters, dated the respective dates of delivery thereof and addressed to the Underwriters and the Board of Directors of the Company, in form and substance reasonably satisfactory to the Representatives, containing statements and information of the type customarily included in accountants' "comfort letters" to underwriters with respect to the financial statements and certain financial information contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus; provided, that the letter delivered on the Closing Date or the Additional Closing Date, as the case may be, shall use a "cut-off" date no more than three business days prior to such Closing Date or such Additional Closing Date, as the case may be.

(ii) On the date of this Agreement and on the Closing Date or the Additional Closing Date, as the case may be, the Company shall have furnished to the Representatives a certificate, dated the respective dates of delivery thereof and addressed to the Underwriters, of its chief financial officer with respect to certain financial data contained in the Pricing Disclosure Package and the Prospectus, providing "management comfort" with respect to such information, in form and substance reasonably satisfactory to the Representatives.

(f) *Opinion and 10b-5 Statement of Counsel for the Company.* Orrick, Herrington & Sutcliffe, LLP, counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their written opinion and 10b-5 statement, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives.

(g) *Statement of Litigation Counsel for the Company.* Quinn Emanuel Urquhart & Sullivan, LLP, litigation counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their 10b-5 statement, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives.

(h) *Opinion of Intellectual Property Counsel for the Company.* Wilson Sonsini Goodrich & Rosati, P.C., intellectual property counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their written opinion, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives.

(i) *Opinion and 10b-5 Statement of Counsel for the Underwriters.* The Representatives shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, an opinion and 10b-5 statement, addressed to the Underwriters, of Latham & Watkins LLP, counsel for the Underwriters, with respect to such matters as the Representatives may reasonably request, and such counsel shall have received such documents and information as they may reasonably request to enable them to pass upon such matters.

(j) *No Legal Impediment to Issuance.* No action shall have been taken and no statute, rule, regulation or order shall have been enacted, adopted or issued by any federal, state or foreign governmental or regulatory authority that would, as of the Closing Date or the Additional Closing Date, as the case may be, prevent the issuance or sale of the Shares; and no injunction or order of any federal, state or foreign court shall have been issued that would, as of the Closing Date or the Additional Closing Date, as the case may be, prevent the issuance or sale of the Shares.

(k) *Good Standing.* The Representatives shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, satisfactory evidence of the good standing of the Company and its subsidiaries in their respective jurisdictions of organization and their good standing in such other jurisdictions as the Representatives may reasonably request, in each case in writing or any standard form of telecommunication from the appropriate governmental authorities of such jurisdictions.

(l) *Exchange Listing.* The Shares to be delivered on the Closing Date or Additional Closing Date, as the case may be, shall have been approved for listing on the Exchange, subject to official notice of issuance.

(m) *Lock-up Agreements.* The “lock-up” agreements, each substantially in the form of Exhibit D hereto, between you and certain shareholders and the officers and directors of the Company relating to sales and certain other dispositions of shares of Stock or certain other securities, delivered to you on or before the date hereof, shall be full force and effect on the Closing Date or Additional Closing Date, as the case may be.

(n) *Additional Documents.* On or prior to the Closing Date or the Additional Closing Date, as the case may be, the Company shall have furnished to the Representatives such further certificates and documents as the Representatives may reasonably request.

All opinions, letters, certificates and evidence mentioned above or elsewhere in this Agreement shall be deemed to be in compliance with the provisions hereof only if they are in form and substance reasonably satisfactory to counsel for the Underwriters.

7. Indemnification and Contribution.

(a) *Indemnification of the Underwriters.* The Company agrees to indemnify and hold harmless each Underwriter, its affiliates, directors and officers and each person, if any, who controls such Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, from and against any and all losses, claims, damages and liabilities (including, without limitation, legal fees and other expenses incurred in connection with any suit, action or proceeding or any claim asserted, as such fees and expenses are incurred), joint or several, that arise out of, or are based upon, (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement or caused by any omission or alleged omission to state therein a material fact required to be stated therein or necessary in order to make the statements therein, not misleading, or (ii) any untrue statement or alleged untrue statement of a material fact contained in the Prospectus (or any amendment or supplement thereto), any Issuer Free Writing Prospectus, any “issuer information” filed or required to be filed pursuant to Rule 433(d) under the Securities Act, any Written Testing-the-Waters Communication, any road show as defined in Rule 433(h) under the Securities Act (a “road show”) or any Pricing Disclosure Package (including any Pricing Disclosure Package that has subsequently been amended), or caused by any omission or alleged omission to state therein a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading, in each case except insofar as such losses, claims, damages or liabilities arise out of, or are based upon, any untrue statement or omission or alleged untrue statement or omission made in reliance upon and in conformity with any information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use therein, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in subsection (b) below.

(b) *Indemnification of the Company.* Each Underwriter agrees, severally and not jointly, to indemnify and hold harmless the Company, its directors, its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act to the same extent as the indemnity set forth in paragraph (a) above, but only with respect to any losses, claims, damages or liabilities that arise out of, or are based upon, any untrue statement or omission or alleged untrue statement or omission made in reliance upon and in conformity with any information relating to such Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in the Registration Statement, the Prospectus (or any amendment or supplement thereto), any Issuer Free Writing Prospectus, any Written Testing-the-Waters Communication, any road show or any Pricing Disclosure Package (including any Pricing Disclosure Package that has subsequently been amended), it being understood and agreed upon that the only such information furnished by any Underwriter consists of the following information in the Prospectus furnished on behalf of each Underwriter: the concession and reallowance figures appearing in the [third] paragraph under the caption "Underwriting" and the information contained in the [seventh, thirteenth and fourteenth] paragraphs under the caption "Underwriting".

(c) *Notice and Procedures.* If any suit, action, proceeding (including any governmental or regulatory investigation), claim or demand shall be brought or asserted against any person in respect of which indemnification may be sought pursuant to either paragraph (a) or (b) above, such person (the "Indemnified Person") shall promptly notify the person against whom such indemnification may be sought (the "Indemnifying Person") in writing; provided that the failure to notify the Indemnifying Person shall not relieve it from any liability that it may have under paragraph (a) or (b) above except to the extent that it has been materially prejudiced (through the forfeiture of substantive rights or defenses) by such failure; and provided, further, that the failure to notify the Indemnifying Person shall not relieve it from any liability that it may have to an Indemnified Person otherwise than under paragraph (a) or (b) above. If any such proceeding shall be brought or asserted against an Indemnified Person and it shall have notified the Indemnifying Person thereof, the Indemnifying Person shall retain counsel reasonably satisfactory to the Indemnified Person (who shall not, without the consent of the Indemnified Person, be counsel to the Indemnifying Person) to represent the Indemnified Person and any others entitled to indemnification pursuant to this Section that the Indemnifying Person may designate in such proceeding and shall pay the reasonable and documented fees and expenses in such proceeding and shall pay the reasonable and documented fees and expenses of such counsel related to such proceeding, as incurred. In any such proceeding, any Indemnified Person shall have the right to retain its own counsel, but the fees and expenses of such counsel shall be at the expense of such Indemnified Person unless (i) the Indemnifying Person and the Indemnified Person shall have mutually agreed to the contrary; (ii) the Indemnifying Person has failed within a reasonable time to retain counsel reasonably satisfactory to the Indemnified Person; (iii) the Indemnified Person shall have reasonably concluded that there may be legal defenses available to it that are different from or in addition to those available to the Indemnifying Person; or (iv) the named parties in any such proceeding (including any impleaded parties) include both the Indemnifying Person and the Indemnified Person and representation of both parties by the same counsel would be inappropriate due to actual or potential differing interests between them. It is understood and agreed that the Indemnifying Person shall not, in connection with any proceeding or related proceeding in the same jurisdiction, be liable for the fees and expenses of more than one separate firm (in addition to any local counsel) for all Indemnified Persons, and that all such fees and expenses shall be paid or reimbursed as they are incurred Any such separate firm for any Underwriter, its affiliates, directors and officers and any control persons of such Underwriter shall be designated in writing by the Representatives and any such separate firm for the Company, its directors, its officers who signed the Registration Statement and any control persons of the Company shall be designated in writing by the Company. The Indemnifying Person shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the Indemnifying

Person agrees to indemnify each Indemnified Person from and against any loss or liability by reason of such settlement or judgment. Notwithstanding the foregoing sentence, if at any time an Indemnified Person shall have requested that an Indemnifying Person reimburse the Indemnified Person for fees and expenses of counsel as contemplated by this paragraph, the Indemnifying Person shall be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into more than 30 days after receipt by the Indemnifying Person of such request and (ii) the Indemnifying Person shall not have reimbursed the Indemnified Person in accordance with such request prior to the date of such settlement. No Indemnifying Person shall, without the written consent of the Indemnified Person (which consent shall not be unreasonably withheld or delayed), effect any settlement of any pending or threatened proceeding in respect of which any Indemnified Person is or could have been a party and indemnification could have been sought hereunder by such Indemnified Person, unless such settlement (x) includes an unconditional release of such Indemnified Person, in form and substance reasonably satisfactory to such Indemnified Person, from all liability on claims that are the subject matter of such proceeding and (y) does not include any statement as to or any admission of fault, culpability or a failure to act by or on behalf of any Indemnified Person.

(d) *Contribution.* If the indemnification provided for in paragraphs (a) and (b) above is unavailable to an Indemnified Person or insufficient in respect of any losses, claims, damages or liabilities referred to therein, then each Indemnifying Person under such paragraph, in lieu of indemnifying such Indemnified Person thereunder, shall contribute to the amount paid or payable by such Indemnified Person as a result of such losses, claims, damages or liabilities (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, on the one hand, and the Underwriters on the other, from the offering of the Shares or (ii) if the allocation provided by clause (i) is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) but also the relative fault of the Company, on the one hand, and the Underwriters on the other, in connection with the statements or omissions that resulted in such losses, claims, damages or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Underwriters on the other, shall be deemed to be in the same respective proportions as the net proceeds (before deducting expenses) received by the Company from the sale of the Shares and the total underwriting discounts and commissions received by the Underwriters in connection therewith, in each case as set forth in the table on the cover of the Prospectus, bear to the aggregate initial public offering price of the Shares. The relative fault of the Company, on the one hand, and the Underwriters on the other, shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or by the Underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

(e) *Limitation on Liability.* The Company and the Underwriters agree that it would not be just and equitable if contribution pursuant to paragraph (d) above were determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation that does not take account of the equitable considerations referred to in paragraph (d) above. The amount paid or payable by an Indemnified Person as a result of the losses, claims, damages and liabilities referred to in paragraph (d) above shall be deemed to include, subject to the limitations set forth above, any legal or other expenses incurred by such Indemnified Person in connection with any such action or claim. Notwithstanding the provisions of paragraphs (d) and (e), in no event shall an Underwriter be required to contribute any amount in excess of the amount by which the total underwriting discounts and commissions received by such Underwriter with respect to the offering of the Shares exceeds the amount of any damages that such Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations to contribute pursuant to paragraphs (d) and (e) are several in proportion to their respective purchase obligations hereunder and not joint.

(f) *Non-Exclusive Remedies.* The remedies provided for in this Section 7 are not exclusive and shall not limit any rights or remedies which may otherwise be available to any Indemnified Person at law or in equity.

8. Effectiveness of Agreement. This Agreement shall become effective as of the date first written above.

9. Termination. This Agreement may be terminated in the absolute discretion of the Representatives, by notice to the Company, if after the execution and delivery of this Agreement and on or prior to the Closing Date or, in the case of the Option Shares, prior to the Additional Closing Date (i) trading generally shall have been suspended or materially limited on or by any of the New York Stock Exchange or The NASDAQ Stock Market; (ii) trading of any securities issued or guaranteed by the Company shall have been suspended on any exchange or in any over-the-counter market; (iii) a general moratorium on commercial banking activities shall have been declared by federal or New York State authorities; or (iv) there shall have occurred any outbreak or escalation of hostilities or declaration by the United States of war or any change in financial markets or any calamity or crisis, either within or outside the United States, that, in the judgment of the Representatives, is material and adverse and makes it impracticable or inadvisable to proceed with the offering, sale or delivery of the Shares on the Closing Date or the Additional Closing Date, as the case may be, on the terms and in the manner contemplated by this Agreement, the Pricing Disclosure Package and the Prospectus.

10. Defaulting Underwriter.

(a) If, on the Closing Date or the Additional Closing Date, as the case may be, any Underwriter defaults on its obligation to purchase the Shares that it has agreed to purchase hereunder on such date, the non-defaulting Underwriters may in their discretion arrange for the purchase of such Shares by other persons satisfactory to the Company on the terms contained in this Agreement. If, within 36 hours after any such default by any Underwriter, the non-defaulting Underwriters do not arrange for the purchase of such Shares, then the Company shall be entitled to a further period of 36 hours within which to procure other persons satisfactory to the non-defaulting Underwriters to purchase such Shares on such terms. If other persons become obligated or agree to purchase the Shares of a defaulting Underwriter, either the non-defaulting Underwriters or the Company may postpone the Closing Date or the Additional Closing Date, as the case may be, for up to five full business days in order to effect any changes that in the opinion of counsel for the Company or counsel for the Underwriters may be necessary in the Registration Statement and the Prospectus or in any other document or arrangement, and the Company agrees to promptly prepare any amendment or supplement to the Registration Statement and the Prospectus that effects any such changes. As used in this Agreement, the term "Underwriter" includes, for all purposes of this Agreement unless the context otherwise requires, any person not listed in Schedule 1 hereto that, pursuant to this Section 10, purchases Shares that a defaulting Underwriter agreed but failed to purchase.

(b) If, after giving effect to any arrangements for the purchase of the Shares of a defaulting Underwriter or Underwriters by the non-defaulting Underwriters and the Company as provided in paragraph (a) above, the aggregate number of Shares that remain unpurchased on the Closing Date or the Additional Closing Date, as the case may be, does not exceed one-eleventh of the aggregate number of Shares to be purchased on such date, then the Company shall have the right to require each non-defaulting Underwriter to purchase the number of Shares that such Underwriter agreed to purchase hereunder on such date plus such Underwriter's pro rata share (based on the number of Shares that such Underwriter agreed to purchase on such date) of the Shares of such defaulting Underwriter or Underwriters for which such arrangements have not been made.

(c) If, after giving effect to any arrangements for the purchase of the Shares of a defaulting Underwriter or Underwriters by the non-defaulting Underwriters and the Company as provided in paragraph (a) above, the aggregate number of Shares that remain unpurchased on the Closing Date or the Additional Closing Date, as the case may be, exceeds one-eleventh of the aggregate amount of Shares to be purchased on such date, or if the Company shall not exercise the right described in paragraph (b) above, then this Agreement or, with respect to any Additional Closing Date, the obligation of the Underwriters to purchase Shares on the Additional Closing Date shall terminate without liability on the part of the non-defaulting Underwriters. Any termination of this Agreement pursuant to this Section 10 shall be without liability on the part of the Company, except that the Company will continue to be liable for the payment of expenses as set forth in Section 11 hereof and except that the provisions of Section 7 hereof shall not terminate and shall remain in effect.

(d) Nothing contained herein shall relieve a defaulting Underwriter of any liability it may have to the Company or any non-defaulting Underwriter for damages caused by its default.

11. Payment of Expenses.

(a) Whether or not the transactions contemplated by this Agreement are consummated or this Agreement is terminated, the Company will pay or cause to be paid all costs and expenses actually incurred and incident to the performance of its obligations hereunder, including without limitation, (i) the costs incident to the authorization, issuance, sale, preparation and delivery of the Shares and any taxes payable in that connection; (ii) the costs incident to the preparation, printing and filing under the Securities Act of the Registration Statement, the Preliminary Prospectus, any Issuer Free Writing Prospectus, any Pricing Disclosure Package and the Prospectus (including all exhibits, amendments and supplements thereto) and the distribution thereof; (iii) the fees and expenses of the Company's counsel and independent accountants; (iv) the fees and expenses incurred in connection with the registration or qualification and determination of eligibility for investment of the Shares under the laws of such jurisdictions as the Representatives may designate and the preparation, printing and distribution of a Blue Sky Memorandum and any "Canadian Wrapper" (including the related fees and expenses of counsel for the Underwriters up to a maximum of \$15,000); (v) the cost of preparing stock certificates; (vi) the costs and charges of any transfer agent and any registrar; (vii) all expenses and application fees incurred in connection with any filing with, and clearance of the offering by, FINRA (including the related fees and expenses of counsel for the Underwriters up to a maximum of \$40,000); (viii) all expenses incurred by the Company in connection with any "road show" presentation to potential investors (provided that the cost of any chartered plane to be or used in connection with any "road show" presentation to potential investors will be paid 50% by the Company and 50% by the Underwriters); and (ix) all expenses and application fees related to the listing of the Shares on the Exchange. It is understood, however, that except as provided in this Section 11 or Section 7 hereof, the Underwriters will pay their own costs and expenses, including the fees of their counsel, stock transfer taxes on the resale of any of the Shares owned by them, any advertising expenses connected with any offers they may make and all travel (except as set forth in clause (viii) above), lodging and other expenses of the Underwriters or any of their employees incurred by them in connection with any "road show" presentation to potential investors.

(b) If (i) this Agreement is terminated pursuant to Section 9, (ii) the Company for any reason fails to tender the Shares for delivery to the Underwriters or (iii) the Underwriters decline to purchase the Shares for any reason permitted under this Agreement, the Company agrees to reimburse the Underwriters for all out-of-pocket costs and expenses (including the fees and expenses of their counsel) actually and reasonably incurred by the Underwriters in connection with this Agreement and the offering contemplated hereby.

12. Persons Entitled to Benefit of Agreement. This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and the officers and directors and any controlling persons referred to herein, and the affiliates of each Underwriter referred to in Section 7 hereof. Nothing in this Agreement is intended or shall be construed to give any other person any legal or equitable right, remedy or claim under or in respect of this Agreement or any provision contained herein. No purchaser of Shares from any Underwriter shall be deemed to be a successor merely by reason of such purchase.

13. Survival. The respective indemnities, rights of contribution, representations, warranties and agreements of the Company and the Underwriters contained in this Agreement or made by or on behalf of the Company or the Underwriters pursuant to this Agreement or any certificate delivered pursuant hereto shall survive the delivery of and payment for the Shares and shall remain in full force and effect, regardless of any termination of this Agreement or any investigation made by or on behalf of the Company or the Underwriters.

14. Certain Defined Terms. For purposes of this Agreement, (a) except where otherwise expressly provided, the term “affiliate” has the meaning set forth in Rule 405 under the Securities Act; (b) the term “business day” means any day other than a day on which banks are permitted or required to be closed in New York City; (c) the term “subsidiary” has the meaning set forth in Rule 405 under the Securities Act; and (d) the term “significant subsidiary” has the meaning set forth in Rule 1-02 of Regulation S-X under the Exchange Act.

15. Compliance with USA Patriot Act. In accordance with the requirements of the USA Patriot Act (Title III of Pub. L. 107-56 (signed into law October 26, 2001)), the Underwriters are required to obtain, verify and record information that identifies their respective clients, including the Company, which information may include the name and address of their respective clients, as well as other information that will allow the Underwriters to properly identify their respective clients.

16. Miscellaneous.

(a) Notices. All notices and other communications hereunder shall be in writing and shall be deemed to have been duly given if mailed or transmitted and confirmed by any standard form of telecommunication. Notices to the Underwriters shall be given to the Representatives c/o J. P. Morgan Securities LLC, 383 Madison Avenue, New York, New York 10179 (fax: (212) 622-8358); Attention Equity Syndicate Desk; and c/o Cowen and Company, LLC, Attention: Head of Equity Capital Markets, Fax 646-562-1249 with a copy to the General Counsel, Fax 646-562-1124; with copy (which shall not constitute notice) to Latham & Watkins LLP, 140 Scott Drive, Menlo Park, CA 94025, Attention: Brian J. Cuneo and B. Shayne Kennedy; email: brian.cuneo@lw.com and shayne.kennedy@lw.com. Notices to the Company shall be given to it at Twist Bioscience Corporation, 455 Mission Bay Boulevard South, San Francisco, CA 94158; Attention: Mark Daniels, General Counsel; email: mdaniels@twistbioscience.com; with copy to Orrick, Herrington & Sutcliffe, LLP, 1000 Marsh Road, Menlo Park, CA 94025; Attention: John Bautista and Peter Lamb; email: jbautista@orrick.com and plamb@orrick.com.

(b) Governing Law. This Agreement and any claim, controversy or dispute arising under or related to this Agreement shall be governed by and construed in accordance with the laws of the State of New York.

(c) *Waiver of Jury Trial.* Each of the parties hereto hereby waives any right to trial by jury in any suit or proceeding arising out of or relating to this Agreement.

(d) *Counterparts.* This Agreement may be signed in counterparts (which may include counterparts delivered by any standard form of telecommunication), each of which shall be an original and all of which together shall constitute one and the same instrument.

(e) *Amendments or Waivers.* No amendment or waiver of any provision of this Agreement, nor any consent or approval to any departure therefrom, shall in any event be effective unless the same shall be in writing and signed by the parties hereto.

(f) *Headings.* The headings herein are included for convenience of reference only and are not intended to be part of, or to affect the meaning or interpretation of, this Agreement.

If the foregoing is in accordance with your understanding, please indicate your acceptance of this Agreement by signing in the space provided below.

Very truly yours,

TWIST BIOSCIENCE CORPORATION

By: _____
Name:
Title:

Accepted: As of the date first written above

J. P. MORGAN SECURITIES LLC
COWEN AND COMPANY, LLC

For themselves and on behalf of the
several Underwriters listed
in Schedule 1 hereto.

J. P. MORGAN SECURITIES LLC

By: _____
Authorized Signatory

COWEN AND COMPANY, LLC

By: _____
Authorized Signatory

[Signature Page to Underwriting Agreement]

Underwriter
J. P. Morgan Securities LLC
Cowen and Company, LLC
Allen & Company LLC
Robert W. Baird & Co. Incorporated

Number of Shares

Total

=====

a. Pricing Disclosure Package

[List each Issuer Free Writing Prospectus to be included in the Pricing Disclosure Package]

b. Pricing Information Provided Orally by Underwriters

[Set out key information included in script that will be used by Underwriters to confirm sales]

Written Testing-the-Waters Communications

[None]

Twist Bioscience Corporation

Pricing Term Sheet

None.

J.P. MORGAN SECURITIES LLC
COWEN AND COMPANY, LLC

As Representatives of
the several Underwriters listed in
Schedule 1 to the Underwriting
Agreement referred to below

c/o J.P. Morgan Securities LLC
383 Madison Avenue
New York, NY 10179

c/o Cowen and Company, LLC
599 Lexington Avenue
New York, NY 10022

Re: Twist Bioscience Corporation — Public Offering

Ladies and Gentlemen:

The undersigned understands that you, as Representatives of the several Underwriters, propose to enter into an underwriting agreement (the “Underwriting Agreement”) with Twist Bioscience Corporation, a Delaware corporation (the “Company”), providing for the public offering (the “Public Offering”) by the several Underwriters named in Schedule 1 to the Underwriting Agreement (the “Underwriters”), of common stock, \$0.00001 per share par value, of the Company (the “Securities”).

In consideration of the Underwriters’ agreement to purchase and make the Public Offering of the Securities, and for other good and valuable consideration, the receipt of which is hereby acknowledged, the undersigned hereby agrees that, without the prior written consent of the Representatives on behalf of the Underwriters, the undersigned will not, during the period beginning on the date of this letter agreement (this “Letter Agreement”) and ending on, but including, the 180th day after the date of the prospectus relating to the Public Offering (the “Prospectus”) (such period, the “Restricted Period”), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock, \$0.00001 per share par value, of the Company (the “Common Stock”) or any securities convertible into or exercisable or exchangeable for Common Stock (including without limitation, Common Stock or such other securities which may be deemed to be beneficially owned by the undersigned in accordance with the rules and regulations of the Securities and Exchange Commission and securities which may be issued upon exercise of a stock option or warrant, collectively the “Undersigned’s Shares”), or publicly disclose the intention to make any offer, sale, pledge or disposition thereof, (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Undersigned’s Shares, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of Common Stock or such other securities, in cash or

otherwise or (3) make any demand for or exercise any right with respect to the registration of any shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock without the prior written consent of the Representatives, in each case other than (A) any Securities to be sold by the undersigned pursuant to the Underwriting Agreement, (B) transfers of the Undersigned's Shares as a bona fide gift or gifts, (C) transfers or dispositions of the Undersigned's Shares to any trust for the direct or indirect benefit of the undersigned or the immediate family of the undersigned, (D) transfers or dispositions of the Undersigned's Shares to any corporation, partnership, limited liability company or other entity all of the beneficial ownership interests of which are held by the undersigned or the immediate family of the undersigned, (E) transfers or dispositions of the Undersigned's Shares by will, other testamentary document or intestate succession to the legal representative, heir, beneficiary or a member of the immediate family of the undersigned, (F) distributions of the Undersigned's Shares to partners, members or stockholders of the undersigned, (G) transfers to the undersigned's affiliates or to any investment fund or other entity controlled or managed by, controlling or managing, or under common control with, the undersigned, and (H) transfers pursuant to a *bona fide* third party tender offer, merger, consolidation or other similar transaction made to all holders of the Common Stock and involving a Change of Control of the Company, provided that in the event that the tender offer, merger, consolidation or other such transaction is not completed, the Common Stock owned by the undersigned shall remain subject to the restrictions contained in this Lock-Up Agreement; provided that in the case of any transfer or distribution pursuant to clause (B), (C), (D), (E), (F) or (G), each transferee, donee or distributee shall execute and deliver to the Representatives a lock-up letter in the form of this Letter Agreement; and provided, further, that in the case of any transfer, disposition or distribution pursuant to clause (B), (C), (D), (E), (F) or (G), no filing by any party (donor, donee, transferor or transferee) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or other public announcement shall be required or shall be made voluntarily in connection with such transfer or distribution (other than a filing on a Form 5 after the expiration of the Restricted Period referred to above and any such filing shall clearly indicate in the footnotes thereto that the filing relates to the circumstances described in (B), (C), (D), (E), (F) or (G), above, as the case may be, or the filing of a required Schedule 13F or 13G) and any such transfer or distribution shall not involve a disposition for value. If the undersigned is an officer or director of the Company, the undersigned further agrees that the foregoing provisions shall be equally applicable to any Company-directed Securities the undersigned may purchase in the Public Offering. For purposes of this Letter Agreement, "immediate family" shall mean any relationship by blood, marriage or adoption, not more remote than first cousin. For purposes of this Letter Agreement, "Change of Control" shall mean the consummation of any bona fide third party tender offer, merger, consolidation or other similar transaction the result of which is that any "person" (as defined in Section 13(d)(3) of the Exchange Act), or group of persons, becomes the beneficial owner (as defined in Rules 13d-3 and 13d-5 of the Exchange Act) of more than 50% of total voting power of the voting stock of the Company. The undersigned now has, and, except as contemplated by clause (A), (B), (C), (D), (E), (F), (G) or (H) above, for the duration of this Letter Agreement will have, good and marketable title to the Undersigned's Shares, free and clear of all liens, encumbrances, and claims whatsoever, other than any charitable pledge of the Undersigned's Shares that by its terms could not result in any transfer, disposition or distribution of such shares during the Restricted Period.

Furthermore, notwithstanding the restrictions imposed by this Letter Agreement, the undersigned may, without the prior written consent of the Representatives (i) exercise any outstanding warrant, or any option to purchase shares of Common Stock granted under any stock incentive plan or stock purchase plan of the Company, provided that the underlying shares of Common Stock shall continue to be subject to the restrictions on transfer set forth in this Letter Agreement, (ii) establish a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of Common Stock, provided that such plan does not provide for any transfers of Common Stock during the Restricted Period, and provided, further, that no filing under the Exchange Act or other public announcement shall be required or shall be made voluntarily in connection therewith during the Restricted Period, (iii) transfer or dispose of shares of Common Stock acquired in the Public Offering or on the open market following the Public Offering, provided that

no filing under the Exchange Act or other public announcement shall be required or shall be made voluntarily in connection with such transfer or disposition during the Restricted Period (other than a required filing on a Schedule 13F or 13G), (iv) transfer or surrender to the Company shares of Common Stock pursuant to any contractual arrangement that provides the Company with an option to repurchase such shares of Common Stock in connection with the termination of the undersigned's employment or other service relationship with the Company, or pursuant to a right of first refusal with respect to transfers of such shares of Common Stock or other securities, or on a cashless or "net exercise" basis or to cover tax withholding obligations of the undersigned in connection with the vesting or exercise of such shares of Common Stock or other securities, provided that any filing under Section 16 of the Exchange Act shall clearly indicate in the footnotes thereto that the filing relates to the circumstances described in this clause (iv) above and no other public announcement shall be required or shall be made voluntarily in connection with such transfer or surrender, and (v) transfer or dispose of Common Stock by operation of law pursuant to a qualified domestic order or in connection with a divorce settlement or other court order, provided that the recipient of such shares of Common Stock shall execute and deliver to the Representatives a lock-up letter in the form of this Letter Agreement, provided, further that any filing under Section 16 of the Exchange Act shall clearly indicate in the footnotes thereto that the filing relates to the circumstances described in this clause (v) above and no other public announcement shall be required or shall be made voluntarily in connection with such transfer or disposition.

If the undersigned is an officer or director of the Company, (i) the Representatives on behalf of the Underwriters agree that, at least three business days before the effective date of any release or waiver of the foregoing restrictions in connection with a transfer of shares of Common Stock, the Representatives on behalf of the Underwriters will notify the Company of the impending release or waiver, and (ii) the Company will agree in the Underwriting Agreement to announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by the Representatives on behalf of the Underwriters hereunder to any such officer or director shall only be effective at least two business days after the publication date of such press release. The provisions of this paragraph will not apply if (a) the release or waiver is effected solely to permit a transfer not for consideration and (b) the transferee has agreed in writing to be bound by the same terms described in this Letter Agreement to the extent and for the duration that such terms remain in effect at the time of the transfer.

In furtherance of the foregoing, the Company, and any duly appointed transfer agent for the registration or transfer of the securities described herein, are hereby authorized to decline to make any transfer of securities if such transfer would constitute a violation or breach of this Letter Agreement.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Letter Agreement. All authority herein conferred or agreed to be conferred and any obligations of the undersigned shall be binding upon the successors, assigns, heirs or personal representatives of the undersigned.

The undersigned understands that, if either the Representatives, on the one hand, or the Company, on the other hand, informs the other, prior to the execution of the Underwriting Agreement, that it has determined not to proceed with the Public Offering, or if the Underwriting Agreement does not become effective by June 30, 2019, or if the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Common Stock to be sold thereunder, the undersigned shall be released from all obligations under this Letter Agreement. The undersigned understands that the Underwriters are entering into the Underwriting Agreement and proceeding with the Public Offering in reliance upon this Letter Agreement.

This Letter Agreement and any claim, controversy or dispute arising under or related to this Letter Agreement shall be governed by and construed in accordance with the laws of the State of New York.

(Signature Page Follows)

Very truly yours,

IF AN INDIVIDUAL:

By: _____
(duly authorized signature)

Name: _____
(please print full name)

Address: _____

E-mail: _____

IF AN ENTITY:

(please print complete name of entity)

By: _____
(duly authorized signature)

Name: _____
(please print full name)

Title: _____
(please print full title)

Address: _____

E-mail: _____

[Signature Page to Lock-up Agreement]

Form of Waiver of Lock-up

Twist Bioscience Corporation
Public Offering of Common Stock

, 20

[Name and Address of
Officer or Director
Requesting Waiver]

Dear Mr./Ms. [Name]:

This letter is being delivered to you in connection with the offering by Twist Bioscience Corporation (the "Company") of shares of common stock, \$0.00001 par value (the "Common Stock"), of the Company and the lock-up letter dated , 201 (the "Lock-up Letter"), executed by you in connection with such offering, and your request for a [waiver] [release] dated , 201 , with respect to shares of Common Stock (the "Shares").

J.P. Morgan Securities LLC and Cowen and Company, LLC hereby agree to [waive] [release] the transfer restrictions set forth in the Lock-up Letter, but only with respect to the Shares, effective , 201 ; provided, however, that such [waiver] [release] is conditioned on the Company announcing the impending [waiver] [release] by press release through a major news service at least two business days before effectiveness of such [waiver] [release]. This letter will serve as notice to the Company of the impending [waiver] [release].

Except as expressly [waived] [released] hereby, the Lock-up Letter shall remain in full force and effect.

Yours very truly,

[Signature of J.P. Morgan Securities LLC Representative]

[Name of J.P. Morgan Securities LLC Representative]

[Signature of Cowen and Company, LLC Representative]

[Name of Cowen and Company, LLC Representative]

cc: Company

Form of Press Release

Twist Bioscience Corporation
[Date]

Twist Bioscience Corporation (the “Company”) announced today that J.P. Morgan Securities LLC and Cowen and Company, LLC, the joint book-running managers in the Company’s recent public sale of _____ shares of common stock, are [waiving] [releasing] a lock-up restriction with respect to _____ shares of the Company’s common stock held by [certain officers or directors] [an officer or director] of the Company. The [waiver] [release] will take effect on _____, 201____, and the shares may be sold on or after such date.

This press release is not an offer for sale of the securities in the United States or in any other jurisdiction where such offer is prohibited, and such securities may not be offered or sold in the United States absent registration or an exemption from registration under the United States Securities Act of 1933, as amended.

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
TWIST BIOSCIENCE CORPORATION

Twist Bioscience Corporation, a corporation organized and existing under the General Corporation Law of the State of Delaware (the "Corporation"), DOES HEREBY CERTIFY:

FIRST: The original Certificate of Incorporation of the Corporation was filed with the Secretary of State of Delaware on February 4, 2013 under the name "Twist Bioscience Corporation".

SECOND: The Amended and Restated Certificate of Incorporation of the Corporation in the form attached hereto as Exhibit A has been duly adopted in accordance with the provisions of Sections 228, 242 and 245 of the General Corporation Law of the State of Delaware by the directors and stockholders of the Corporation.

THIRD: The Amended and Restated Certificate of Incorporation so adopted reads in full as set forth in Exhibit A attached hereto and is hereby incorporated herein by this reference.

IN WITNESS WHEREOF, the Corporation has caused this Certificate to be signed by the Chief Executive Officer this 16th day of October, 2018.

TWIST BIOSCIENCE CORPORATION

By: /s/ Emily Leproust

Name: Emily Leproust

Its: Chief Executive Officer

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
TWIST BIOSCIENCE CORPORATION

ARTICLE I

The name of the Corporation is Twist Bioscience Corporation.

ARTICLE II

The address of the Corporation's registered office in the State of Delaware is 3500 S. DuPont Hwy, in the City of Dover, County of Kent, Zip Code 19901. The name of its registered agent at such address is Incorporating Services, Ltd. The name of its registered agent at such address is Incorporating Services, Ltd.

ARTICLE III

The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the Delaware General Corporation Law.

ARTICLE IV

Effective immediately upon the filing of this Amended and Restated Certificate of Incorporation (the "Effective Time"), (i) each one (1) share of the Corporation's Common Stock then outstanding, with a par value of \$0.00001 per share, shall be and hereby is automatically converted and reconstituted into 0.101 fully paid and nonassessable shares of Common Stock, par value of \$0.00001 per share, (ii) each one (1) share of the Corporation's Series A Preferred Stock then outstanding, with a par value of \$0.00001 per share, shall be and hereby is automatically converted and reconstituted into 0.101 fully paid and nonassessable shares of Series A Preferred Stock, par value of \$0.00001 per share, (iii) each one (1) share of the Corporation's Series B Preferred Stock then outstanding, with a par value of \$0.00001 per share, shall be and hereby is automatically converted and reconstituted into 0.101 fully paid and nonassessable shares of Series B Preferred Stock, par value of \$0.00001 per share, (iv) each one (1) share of the Corporation's Series C Preferred Stock then outstanding, with a par value of \$0.00001 per share, shall be and hereby is automatically converted and reconstituted into 0.101 fully paid and nonassessable shares of Series C Preferred Stock, par value of \$0.00001 per share, and (v) each one (1) share of the Corporation's Series D Preferred Stock, with a par value of \$0.00001 per share, shall be and hereby is automatically converted and reconstituted into 0.101 fully paid and nonassessable shares of Series D Preferred Stock, par value of \$0.00001 per share, in each case without any action on the part of the holders of such shares (the "Reverse Stock Split"). No fractional shares shall be issued upon the Reverse Stock Split of any share or shares of the Common Stock, Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock or Series D Preferred Stock, and the number of shares of Common Stock, Series A Preferred Stock, Series B Preferred

Stock, Series C Preferred Stock and Series D Preferred Stock, as applicable, to be issued as a result of the Reverse Stock Split shall be rounded down to the nearest whole share. Whether or not fractional shares would have been issuable (but for the preceding sentence) upon the Reverse Stock Split shall be determined on the basis of the total number of shares represented by each stock certificate of the Corporation. In lieu of issuing fractional shares upon the Reverse Stock Split, the Corporation shall pay holders the fair market value, as of the effective date of the filing of this Amended and Restated Certificate of Incorporation (this "Restated Certificate") as determined by the Corporation's Board of Directors, of the fractional shares that would be issued upon the Reverse Stock Split but for the second sentence of this paragraph. Each outstanding stock certificate of the Corporation which, immediately prior to the Effective Time, represents one or more shares of the Corporation's capital stock shall thereafter be deemed to represent the appropriate number of shares of the Corporation's capital stock, taking into account the Reverse Stock Split, until such stock certificate is exchanged for a new stock certificate, or the shares are placed in book position, reflecting the appropriate number of shares resulting from the Reverse Stock Split. All share amounts, amounts per share and per share numbers set forth in this Restated Certificate have been appropriately adjusted to reflect the Reverse Stock Split.

The total number of shares of capital stock which the Corporation shall have authority to issue is 46,947,060, of which (i) 19,172,060 shares shall be preferred stock, par value \$0.00001 per share (the "Preferred Stock"), and (ii) 27,775,000 shares shall be common stock, par value \$0.00001 per share (the "Common Stock").

The voting powers, designations, preferences, powers and relative, participating, optional or other special rights, and the qualifications, limitations or restrictions of each class of capital stock of the Corporation, shall be as provided in this Article IV.

A. PREFERRED STOCK

1. Designation.

The Preferred Stock authorized by this Amended and Restated Certificate of Incorporation shall be divided into series as provided herein. A total of 2,854,576 shares of the Corporation's Preferred Stock shall be designated as a series known as Series A Preferred Stock, par value \$0.00001 per share (the "Series A Preferred Stock"), a total of 3,331,878 shares of the Corporation's Preferred Stock shall be designated as a series known as Series B Preferred Stock, par value \$0.00001 per share (the "Series B Preferred Stock"), a total of 2,510,354 shares of the Corporation's Preferred Stock shall be designated as a series known as Series C Preferred Stock, par value \$0.00001 per share (the "Series C Preferred Stock") and a total of 10,475,252 shares of the Corporation's Preferred Stock shall be designated as a series known as Series D Preferred Stock, par value \$0.00001 per share (the "Series D Preferred Stock").

2. Voting.

(a) Election of Series A Director. The holders of outstanding shares of Series A Preferred Stock shall, voting together as a series, be entitled to elect one (1) Director of the Corporation (the "Series A Director"). Except as provided in Section A.2(a)(iv) below, such Director shall be elected by a plurality vote, with the elected candidate being the candidate receiving the greatest number of affirmative votes (with each holder of Series A Preferred Stock entitled to cast one vote for or against each candidate with respect to each share of Series A Preferred Stock held by such holder) of the then outstanding shares of Series A Preferred Stock, with votes cast against such candidate and votes withheld having no legal effect. The election of such Director shall occur (i) at the annual meeting of

holders of capital stock, (ii) at any special meeting of holders of capital stock if such meeting is called for the purpose of electing directors, (iii) at any special meeting of holders of Series A Preferred Stock called by holders of not less than 66% of the then outstanding shares of Series A Preferred Stock (a “Series A Supermajority Interest”) or (iv) by the written consent of holders of a Series A Supermajority Interest. If at any time when any share of Series A Preferred Stock is outstanding any such Series A Director should cease to be a Director for any reason, the vacancy shall only be filled by the vote or written consent of the holders of the then outstanding shares of Series A Preferred Stock, voting together as a separate series, in the manner and on the basis specified above or as otherwise provided by law. The holders of outstanding shares of Series A Preferred Stock shall also be entitled to vote in the election of all other Directors of the Corporation together with holders of all other shares of the Corporation’s outstanding capital stock entitled to vote thereon, voting as a single class, with each outstanding share of Series A Preferred Stock entitled to the number of votes specified in Section A.2(e) hereof. The holders of outstanding shares of Series A Preferred Stock may, in their sole discretion, determine not to elect one or more Series A Directors as provided herein from time to time, and during any such period the Board of Directors shall not be deemed unduly constituted solely as a result of such vacancy.

(b) Election of Series B Director. The holders of outstanding shares of Series B Preferred Stock shall, voting together as a series, be entitled to elect one (1) Director of the Corporation (the “Series B Director”). Except as provided in Section A.2(b)(iv) below, such Director shall be elected by a plurality vote, with the elected candidate being the candidate receiving the greatest number of affirmative votes (with each holder of Series B Preferred Stock entitled to cast one vote for or against each candidate with respect to each share of Series B Preferred Stock held by such holder) of the then outstanding shares of Series B Preferred Stock, with votes cast against such candidates and votes withheld having no legal effect. The election of such Director shall occur (i) at the annual meeting of holders of capital stock, (ii) at any special meeting of holders of capital stock if such meeting is called for the purpose of electing directors, (iii) at any special meeting of holders of Series B Preferred Stock called by holders of not less than a majority of the then outstanding shares of Series B Preferred Stock (a “Series B Majority Interest”) or (iv) by the written consent of holders of a Series B Majority Interest. If at any time when any share of Series B Preferred Stock is outstanding any such Series B Director should cease to be a Director for any reason, the vacancy shall only be filled by the vote or written consent of the holders of the then outstanding shares of Series B Preferred Stock, voting together as a separate series, in the manner and on the basis specified above or as otherwise provided by law. The holders of outstanding shares of Series B Preferred Stock shall also be entitled to vote in the election of all other Directors of the Corporation together with holders of all other shares of the Corporation’s outstanding capital stock entitled to vote thereon, voting as a single class, with each outstanding share of Series B Preferred Stock entitled to the number of votes specified in Section A.2(e) hereof. The holders of outstanding shares of Series B Preferred Stock may, in their sole discretion, determine not to elect a Series B Director as provided herein from time to time, and during any such period the Board of Directors shall not be deemed unduly constituted solely as a result of such vacancy.

(c) Election of Series C Director. The holders of outstanding shares of Series C Preferred Stock shall, voting together as a series, be entitled to elect one (1) Director of the Corporation (the “Series C Director”). Except as provided in Section A.2(c)(iv) below, such Director shall be elected by a plurality vote, with the elected candidate being the candidate receiving the greatest number of affirmative votes (with each holder of Series C Preferred Stock entitled to cast one vote for or against each candidate with respect to each share of Series C Preferred Stock held by such holder) of the then outstanding shares of Series C Preferred Stock, with votes cast against such candidates and votes withheld having no legal effect. The election of such Director shall occur (i) at the annual meeting of holders of capital stock, (ii) at any special meeting of holders of capital stock if such meeting is called for the purpose of electing directors, (iii) at any special meeting of holders of Series C Preferred Stock called by holders of not less than a majority of the then outstanding shares of Series C Preferred Stock or (iv) by

the written consent of holders of not less than a majority of the then outstanding shares of Series C Preferred Stock. If at any time when any share of Series C Preferred Stock is outstanding any such Series C Director should cease to be a Director for any reason, the vacancy shall only be filled by the vote or written consent of the holders of the then outstanding shares of Series C Preferred Stock, voting together as a separate series, in the manner and on the basis specified above or as otherwise provided by law; provided, however, for administrative convenience the initial Series C Director may also be appointed by the Board of Directors in connection with the initial issuance of the Series C Preferred Stock without a separate action by holders of Series C Preferred Stock. The holders of outstanding shares of Series C Preferred Stock shall also be entitled to vote in the election of all other Directors of the Corporation together with holders of all other shares of the Corporation's outstanding capital stock entitled to vote thereon, voting as a single class, with each outstanding share of Series C Preferred Stock entitled to the number of votes specified in Section A.2(e) hereof. The holders of outstanding shares of Series C Preferred Stock may, in their sole discretion, determine not to elect a Series C Director as provided herein from time to time, and during any such period the Board of Directors shall not be deemed unduly constituted solely as a result of such vacancy.

(d) Election of Series D Directors. The holders of outstanding shares of Series D Preferred Stock shall, voting together as a series, be entitled to elect two (2) Directors of the Corporation (each, a "Series D Director" and, together with the Series A Director, the Series B Director and the Series C Director, the "Preferred Directors"). Except as provided in Section A.2(d)(iv) below, each such Director shall be elected by a plurality vote, with the elected candidate being the candidate receiving the greatest number of affirmative votes (with each holder of Series D Preferred Stock entitled to cast one vote for or against each candidate with respect to each share of Series D Preferred Stock held by such holder) of the then outstanding shares of Series D Preferred Stock, with votes cast against such candidates and votes withheld having no legal effect. The election of each such Director shall occur (i) at the annual meeting of holders of capital stock, (ii) at any special meeting of holders of capital stock if such meeting is called for the purpose of electing directors, (iii) at any special meeting of holders of Series D Preferred Stock called by holders of not less than a majority of the then outstanding shares of Series D Preferred Stock or (iv) by the written consent of holders of not less than a majority of the then outstanding shares of Series D Preferred Stock. If at any time when any share of Series D Preferred Stock is outstanding any such Series D Director should cease to be a Director for any reason, the vacancy shall only be filled by the vote or written consent of the holders of the then outstanding shares of Series D Preferred Stock, voting together as a separate series, in the manner and on the basis specified above or as otherwise provided by law; provided, however, for administrative convenience each initial Series D Director may also be appointed by the Board of Directors in connection with the initial issuance of the Series D Preferred Stock or in connection with the first issuance of the Series D Preferred Stock following the filing of this Restated Certificate without a separate action by holders of Series D Preferred Stock. The holders of outstanding shares of Series D Preferred Stock shall also be entitled to vote in the election of all other Directors of the Corporation together with holders of all other shares of the Corporation's outstanding capital stock entitled to vote thereon, voting as a single class, with each outstanding share of Series D Preferred Stock entitled to the number of votes specified in Section A.2(e) hereof. The holders of outstanding shares of Series D Preferred Stock may, in their sole discretion, determine not to elect one or more Series D Directors as provided herein from time to time, and during any such period the Board of Directors shall not be deemed unduly constituted solely as a result of such vacancy.

(e) Voting Generally. Each outstanding share of Preferred Stock shall be entitled to a number of votes equal to the number of shares of Common Stock into which such share of Preferred Stock is then convertible pursuant to Section A.6 hereof as of the record date for the vote or written consent of stockholders, if applicable. Each holder of outstanding shares of Preferred Stock shall be entitled to notice of any stockholders' meeting in accordance with the by-laws of the Corporation and shall vote with holders of the Common Stock, voting together as a single class, upon all matters submitted to a vote of stockholders, excluding those matters required to be submitted to a class or series vote pursuant to the terms hereof (including, without limitation, Section A.8) or by law.

3. Dividends. The holders of shares of Series D Preferred Stock shall be entitled to receive, when, as and if declared by the Board of Directors out of funds legally available therefor, noncumulative dividends at the rate of eight percent (8%) per share of the Series D Original Issue Price (as defined herein) per annum (as adjusted for stock dividends, stock splits, combinations, recapitalizations or the like with respect to such share) on each share of Series D Preferred Stock then held by such holder calculated from the date of original issuance applicable to the Series D Preferred Stock (the "Series D Closing Date"). After the foregoing dividends on the Series D Preferred Stock shall have been paid, then the Corporation may declare and distribute in such year dividends among the holders of shares of Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock, who shall be entitled to receive, when, as and if declared by the Board of Directors out of funds legally available therefor, on a pari passu basis, noncumulative dividends at the rate of (A) eight percent (8%) per share of the Series A Original Issue Price (as herein defined) per annum (as adjusted for subsequent stock dividends, stock splits, combinations, recapitalizations or the like with respect to such share) on each share of Series A Preferred Stock then held by such holder, (B) eight percent (8%) per share of the Series B Original Issue Price (as herein defined) per annum (as adjusted for subsequent stock dividends, stock splits, combinations, recapitalizations or the like with respect to such share) on each share of Series B Preferred Stock then held by such holder and (C) eight percent (8%) per share of the Series C Original Issue Price (as herein defined) per annum (as adjusted for subsequent stock dividends, stock splits, combinations, recapitalizations or the like with respect to such share) on each share of Series C Preferred Stock then held by such holder in each case calculated from the date of original issuance applicable to such share (together with the Series D Closing Date, as applicable, the "Closing Date"). After the foregoing dividends on the Series D Preferred Stock, Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock shall have been paid, then the Corporation may (when, as and if declared by the Board of Directors) declare and distribute in such year dividends among the holders of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock, Series D Preferred Stock and the holders of Common Stock pro rata based on the number of shares of Common Stock held by each, determined on an as-if-converted basis (assuming full conversion of all Preferred Stock) as of the record date with respect to the declaration of such dividends. For the avoidance of doubt, (i) the holders of Series D Preferred Stock shall participate in any distribution or dividend declared or paid to any series of Preferred Stock ranking junior to the Series D Preferred Stock on the basis of the number of shares of Common Stock into which it is then convertible and (ii) the holders of Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock shall participate in any distribution or dividend declared or paid to any series of Preferred Stock ranking junior to the Series A Preferred Stock, Series B Preferred Stock or Series C Preferred Stock on the basis of the number of shares of Common Stock into which it is then convertible.

4. Liquidation; Merger, etc.

(a) Preferred Stock Liquidation Preference. Upon any liquidation, dissolution or winding up of the Corporation and its subsidiaries, whether voluntary or involuntary (a "Liquidation Event"), each holder of Series D Preferred Stock shall be entitled to be paid in cash before any amount shall have been paid or distributed to the holders of the Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock, Common Stock or any other capital stock ranking on liquidation junior to the Series D Preferred stock, an amount per share equal to the greater of (i) (A) \$21.2446 (the "Series D Original Issue Price"), plus (B) an amount equal to all accrued and declared but unpaid dividends on such share of Series D Preferred Stock (such amount to be adjusted appropriately for stock splits, stock dividends, combinations, recapitalizations and the like occurring after the Effective Time) and (ii) the amount payable on such shares of Series D

Preferred Stock had such shares of Series D Preferred Stock been converted to shares of Common Stock immediately prior to such Liquidation Event (the “Series D Preference Amount”). If the amounts available for distribution by the Corporation to holders of Series D Preferred Stock upon a Liquidation Event are not sufficient to pay the Series D Preference Amount due to such holders, such holders of Series D Preferred Stock shall share ratably in any distribution in connection with such Liquidation Event. Upon the completion of the distribution of the Series D Preference Amount described above, the remaining assets and funds of the Corporation available for distribution to its stockholders shall be distributed to each holder of outstanding shares of Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock, who shall be entitled to be paid in cash, on a pari passu basis based on the relative Initial Preference Amount (as defined below) of each such series, before any amount shall be paid or distributed to the holders of the Common Stock or any other capital stock ranking on liquidation junior to such Preferred Stock (the Common Stock and such other capital stock being referred to collectively as, “Junior Stock”), an amount per share equal to (i) (A) \$3.2574 in the case of Series A Preferred Stock (the “Series A Original Issue Price”), plus (B) an amount equal to all accrued and declared but unpaid dividends on such share of Preferred Stock (such amount to be adjusted appropriately for stock splits, stock dividends, combinations, recapitalizations and the like occurring after the Effective Time) (the “Series A Preference Amount”), (ii) (A) \$7.8416 in the case of Series B Preferred Stock (the “Series B Original Issue Price”), plus (B) an amount equal to all accrued and declared but unpaid dividends on such share of Preferred Stock (such amount to be adjusted appropriately for stock splits, stock dividends, combinations, recapitalizations and the like occurring after the Effective Time) (the “Series B Preference Amount”), and (iii) (A) \$14.8505 in the case of Series C Preferred Stock (the “Series C Original Issue Price”), plus (B) an amount equal to all accrued and declared but unpaid dividends on such share of Preferred Stock (such amount to be adjusted appropriately for stock splits, stock dividends, combinations, recapitalizations and the like occurring after the Effective Time) (the “Series C Preference Amount” and, together with the Series A Preference Amount and the Series B Preference Amount, the “Initial Preference Amount”). If the amounts available for distribution by the Corporation to holders of Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock upon a Liquidation Event are not sufficient to pay the Initial Preference Amount due to such holders, such holders of Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock shall share ratably in any distribution in connection with such Liquidation Event in proportion to the full respective Initial Preference Amounts to which they are entitled. Upon the completion of the distribution of the Series D Preference Amount and the Initial Preference Amount described above, the remaining assets and funds of the Corporation available for distribution to its stockholders shall be distributed among the holders of Junior Stock pro rata based on the number of shares of Common Stock held by each (assuming conversion of all such Junior Stock that is not Common Stock into Common Stock). Notwithstanding the above, for purposes of determining the amount each holder of shares of Preferred Stock is entitled to receive with respect to a Liquidation Event, each such holder of shares of Preferred Stock shall be deemed to have converted (regardless of whether such holder actually converted) such holder’s shares of such series into shares of Common Stock immediately prior to the Liquidation Event if, as a result of an actual conversion, such holder would receive, in the aggregate, an amount greater than the amount that would be distributed to such holder if such holder did not convert such series of Preferred Stock into shares of Common Stock. If any such holder shall be deemed to have converted shares of Preferred Stock into Common Stock pursuant to this paragraph, then such holder shall not be entitled to receive any distribution that would otherwise be made to holders of Preferred Stock that have not converted (or have not been deemed to have converted) into shares of Common Stock.

(b) Deemed Liquidation Events. Subject to Section A.7(e), each of the following events shall be treated as a Liquidation Event: (i) any merger or consolidation of the Corporation into or with another business entity (except one in which (A) the holders of capital stock of the Corporation immediately prior to such merger or consolidation continue to hold at least a majority of the voting power of the capital stock of the surviving business entity, (B) a merger or consolidation effected exclusively for tax purposes or for the purpose of changing the domicile of the Corporation or (C) a transaction in which the holders of capital stock of the Corporation immediately prior to the transaction have sufficient rights (by law or contract) to elect or designate 50% or more of the directors of the surviving or acquiring entity following the transaction (as appropriately adjusted for any disparate

director voting rights)) (a “Change of Control Transaction”) (ii) any sale of all or substantially all of the assets of the Corporation (an “Asset Sale”), (iii) a sale or exclusive license of all or substantially all of the Corporation’s intellectual property (together with any Asset Sale, each a “Disposition”) or (iv) the closing of a transfer (whether by merger, consolidation or otherwise) in one transaction or series of related transactions, to a person or group of affiliated persons (other than an underwriter of the Corporation’s securities), of the Corporation’s securities if after such closing, such person or group of affiliated persons would hold 50% or more of the outstanding voting stock of the Corporation (or the surviving or acquiring entity) (a “Stockholder Transfer”). All consideration payable to the stockholders of the Corporation in connection with any such Change of Control Transaction, or all consideration payable to the Corporation and distributable to its stockholders, together with all other available assets of the Corporation (net of obligations owed by the Corporation that are senior to the Preferred Stock), in connection with any Disposition, or in connection with any Stockholder Transfer, shall be, as applicable, paid by the purchaser to the holders of, or distributed by the Corporation in redemption (out of funds legally available therefor) of, the Series A Preferred Stock, the Series B Preferred Stock, the Series C Preferred Stock, the Series D Preferred Stock and any Junior Stock in accordance with the preferences and priorities set forth in Section A.4(a) above, with such preferences and priorities specifically intended to be applicable in any such Change of Control Transaction, Disposition or Stockholder Transfer, as if any such transaction were a Liquidation Event. In furtherance of the foregoing, the Corporation shall take such actions as are necessary to give effect to the provisions of this Section A.4(b), including without limitation, (i) in the case of a Change of Control Transaction, causing the definitive agreement relating to such Change of Control Transaction to provide for a rate at which the shares of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock are converted into or exchanged for cash, new securities or other property which gives effect to the preferences and priorities set forth in Section A.4(a) above, or (ii) in the case of a Disposition, redeeming the Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock and giving effect to the rights, preferences and privileges in connection with such redemption. The Corporation shall promptly provide to the holders of shares of Preferred Stock such information concerning the terms of such Change of Control Transaction or Disposition, and the value of the assets of the Corporation as may reasonably be requested by the holders of Preferred Stock. The amount deemed distributed to the holders of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock upon any such transaction shall be the cash or the value of the property, rights or securities distributed to such holders by the Corporation or the acquiring person, firm or other entity, as applicable. Notwithstanding the foregoing, the treatment of any transaction or series of related transactions as a Liquidation Event may be waived by the vote or written consent of the holders of at least a majority of the Corporation’s outstanding Preferred Stock voting together as a single class on an as-converted basis (a “Preferred Majority Interest”) and the consent of the holders of not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted basis.

(c) Valuation of Securities or Other Non-Cash Consideration. For purposes of valuing any securities or other noncash consideration to be delivered to the holders of the Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock in connection with any transaction to which Section A.4(b) is applicable, the following shall apply:

(i) If any such securities are traded on a nationally recognized securities exchange or inter dealer quotation system, the value shall be deemed to be the average of the closing prices of such securities on such exchange or system over the 30 day period ending three (3) trading days prior to the closing;

(ii) If any such securities are traded over the counter, the value shall be deemed to be the average of the closing bid prices of such securities over the 30 day period ending three (3) trading days prior to the closing; and

(iii) If there is no active public market for such securities or other noncash consideration, the value shall be the fair market value thereof, as mutually determined in good faith by the Corporation and the holders of not less than a Preferred Majority Interest, provided that if the Corporation and the holders of a Preferred Majority Interest are unable to reach agreement on such fair market value, then by independent appraisal by a mutually agreed to investment banker, the fees of which shall be paid by the Corporation.

(d) Allocation. In the event of a Liquidation Event pursuant to Section A.4(b), if any portion of the consideration payable to the stockholders of the Corporation is placed into escrow and/or is payable to the stockholders of the Corporation subject to contingencies, the definitive agreement relating to such Liquidation Event shall provide that (i) the portion of such consideration that is not placed in escrow and not subject to any contingencies, up to a maximum amount equal to the amount payable to the holders of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock pursuant to clauses (A) and (B) of Section A.4(a) in connection with such Liquidation Event (such amount, the “Initial Consideration”) shall be allocated among the holders of capital stock of the Corporation in accordance with Section A.4(a) as if the Initial Consideration were the only consideration payable in connection with such Liquidation Event and (ii) any additional consideration which is or becomes payable to the stockholders of the Corporation upon release from escrow or satisfaction of contingencies shall be allocated among the holders of capital stock of the Corporation in accordance with Section A.4(a) after taking into account the previous payment of the Initial Consideration as part of the same transaction.

5. Redemption. The Preferred Stock is not mandatorily redeemable.

6. Conversion. Shares of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock shall be converted into Common Stock in accordance with the following:

(a) Voluntary Conversion. The holders of shares of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock may convert such shares into Common Stock at any time after the date of issuance of such shares of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock as follows:

(i) Upon the written election of the holder thereof and without payment of any additional consideration, each outstanding share of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock held by such holder may be converted into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing (A) the Series A Original Issue Price (as adjusted for any stock splits, stock dividends, combinations, subdivisions, recapitalizations or the like with respect to the Series A Preferred Stock) in the case of the Series A Preferred Stock, the Series B Original Issue Price (as adjusted for any stock splits, stock dividends, combinations, subdivisions, recapitalizations or the like with respect to the Series B Preferred Stock) in the case of the Series B Preferred Stock, the Series C Original Issue Price (as adjusted for any stock splits, stock dividends, combinations, subdivisions, recapitalizations or the like with respect to the Series C Preferred Stock) in the case of the Series C Preferred Stock, and the Series D Original

Issue Price (as adjusted for any stock splits, stock dividends, combinations, subdivisions, recapitalizations or the like with respect to the Series D Preferred Stock) in the case of the Series D Preferred Stock, by (B) the Conversion Price at the time in effect for such Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock (such quotient, the “Conversion Rate”), as applicable. The initial “Conversion Price” per share shall be the Series A Original Issue Price in the case of the Series A Preferred Stock, the Series B Original Issue Price in the case of the Series B Preferred Stock, the Series C Original Issue Price in the case of the Series C Preferred Stock and the Series D Original Issue Price in the case of the Series D Preferred Stock, in each case subject to adjustment as set forth in Section A.7. Any election by a holder of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock or Series D Preferred Stock pursuant to this Section A.6(a)(i) shall be made by written notice to the Corporation, and such notice may be given at any time and from time to time after the Closing Date applicable to such shares and through and including the day which is five (5) days prior to the closing of any transaction contemplated by Section A.4(b).

(ii) Upon the written election of the holders of at least sixty percent (60%) of the then outstanding shares of Preferred Stock, voting together as a class on an as-converted to Common Stock basis, and the written election of the holders of not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted to Common Stock basis, and without the payment of any additional consideration, all of the then outstanding shares of Preferred Stock shall be converted into fully paid and nonassessable shares of Common Stock at the Conversion Rate applicable to such shares. Any election by the requisite holders of Preferred Stock pursuant to this Section A.6(a)(ii) shall be made by written notice to the Corporation, and such notice may be given at any time after the Closing Date applicable to such shares through and including the date which is five (5) days prior to the closing of any transaction contemplated by Section A.4(b). Upon such election, all holders of Preferred Stock shall be deemed to have elected to voluntarily convert all outstanding shares of Preferred Stock into shares of Common Stock pursuant to this Section A.6(a)(ii) and such election shall bind all holders of Preferred Stock.

(b) Automatic Conversion. Each share of Preferred Stock shall automatically be converted, without the payment of any additional consideration, into fully paid and nonassessable shares of Common Stock at the Conversion Rate applicable to such shares as of, and in all cases subject to, the closing of the Corporation’s first underwritten public offering on a firm commitment basis by a nationally recognized investment banking organization or organizations pursuant to an effective registration statement under the Securities Act of 1933, as amended (the “Securities Act”), covering the offer and sale of Common Stock (i) with respect to which the per share public offering price (prior to underwriting commissions and expenses) is not less than \$26.24 (as adjusted for stock splits, stock dividends, reclassification and the like occurring after the Effective Time), (ii) with respect to which the Corporation receives aggregate net proceeds attributable to sales for the account of the Corporation (before deduction of underwriting discounts and commissions) of not less than \$40,000,000 and (iii) with respect to which such Common Stock is listed for trading on either the New York Stock Exchange or the NASDAQ Global or Global Select Markets (a “QPO”). If a closing of a QPO occurs, all outstanding shares of Preferred Stock shall be deemed to have been converted into shares of Common Stock immediately prior to such closing.

(c) Procedure for Conversion.

(i) Voluntary Conversion. Upon election to convert pursuant to Section A.6(a)(i) or (ii), the relevant holder or holders of the applicable series of Preferred Stock shall surrender the certificate or certificates representing the shares of the Preferred Stock being converted to the Corporation, duly assigned or endorsed for transfer to the Corporation (or accompanied by duly executed stock powers relating thereto) or shall deliver an affidavit of loss to the Corporation, at its principal executive office or such other place as the Corporation may from time to time designate by notice to the holders of the Preferred Stock. Upon surrender of such certificate(s) or delivery of an affidavit of loss, the Corporation shall issue and send by hand delivery, by courier or by first class mail (postage prepaid) to the holder thereof or to such holder's designee, at the address designated by such holder, certificates for the number of shares of Common Stock to which such holder shall be entitled upon conversion. The issuance of certificates for Common Stock upon conversion of such Preferred Stock shall be deemed effective as of the date of surrender of such Preferred Stock certificates or delivery of such affidavit of loss and will be made without charge to the holders of such shares for any issuance tax in respect thereof or other costs incurred by the Corporation in connection with such conversion and the related issuance of such stock.

(ii) Automatic Conversion. As of the closing of a QPO (the "Automatic Conversion Date"), all outstanding shares of Preferred Stock shall be converted into shares of Common Stock without any further action by the holders of such shares and whether or not the certificates representing such shares of Preferred Stock are surrendered to the Corporation. On the Automatic Conversion Date, all rights with respect to the shares of Preferred Stock so converted shall terminate, except any of the rights of the holders thereof upon surrender of their certificate or certificates therefor or delivery of an affidavit of loss thereof to receive certificates for the number of shares of Common Stock into which such shares of Preferred Stock have been converted. If so required by the Corporation, certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or by his, her or its attorney duly authorized in writing. Upon surrender of such certificates or affidavit of loss, the Corporation shall issue and deliver to such holder, promptly (and in any event in such time as is sufficient to enable such holder to participate in such QPO) at such office and in its name as shown on such surrendered certificate or certificates, a certificate or certificates for the number of shares of Common Stock into which the shares of the Preferred Stock surrendered are convertible on the Automatic Conversion Date.

(d) Reservation of Stock Issuable Upon Conversion. The Corporation shall at all times reserve and keep available out of its authorized but unissued shares of Common Stock, solely for the purpose of effecting the conversion of the shares of Preferred Stock, such number of its shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding shares of Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all outstanding shares of Preferred Stock, the Corporation will take such corporate action as may be necessary to increase the number of its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purpose, and to reserve the appropriate number of shares of Common Stock for issuance upon such conversion.

(e) No Closing of Transfer Books. The Corporation shall not close its books against the transfer of shares of Preferred Stock in any manner that would interfere with the timely conversion of any shares of Preferred Stock.

7. Adjustments.

(a) Adjustments to the Conversion Price. If the Corporation should issue, at any time after the date upon which any shares of Series D Preferred Stock were first issued (the "Filing Date"), any Additional Stock (as defined below) without consideration or for a consideration per share less than the Conversion Price for the Series A Preferred Stock, the Series B Preferred Stock, the Series C Preferred Stock or the Series D Preferred Stock in effect immediately prior to the issuance of such Additional Stock (as adjusted for stock splits, stock dividends, reclassification and the like), then for each series for which such consideration per share is less than its Conversion Price in effect immediately prior to each such issuance, the Conversion Price in effect immediately prior to each such issuance for each such series shall automatically be adjusted as set forth in this Section A.7(a), unless otherwise provided in this Section A.7(a). For purposes of this Section A.7(a), "Additional Stock" shall mean any shares of Common Stock issued (or deemed to have been issued pursuant to Section A.7(a)(ii)) by the Corporation after the Filing Date, other than the Excluded Shares (as defined below).

(i) Adjustment Formula. Whenever the Conversion Price is adjusted pursuant to this Section A.7(a), the new Conversion Price for such series shall be determined by multiplying the Conversion Price (calculated to the nearest one-thousandth of a cent) for such series then in effect by a fraction, (x) the numerator of which shall be the number of shares of Common Stock outstanding immediately prior to such issuance (the "Outstanding Common") plus the number of shares of Common Stock that the aggregate consideration received by the Corporation for such issuance would purchase at such Conversion Price; and (y) the denominator of which shall be the number of shares of Outstanding Common plus the number of shares of such Additional Stock. For purposes of the foregoing calculation, the term "Outstanding Common" shall include shares of Common Stock deemed issued pursuant to Section A.7(a)(ii) below.

(ii) Deemed Issuances of Common Stock. In the case of the issuance of securities or rights convertible into, or entitling the holder thereof to receive directly or indirectly, additional shares of Common Stock (the "Common Stock Equivalents"), the following provisions shall apply for all purposes of this Section A.7(a):

(1) The aggregate maximum number of shares of Common Stock deliverable upon conversion, exchange or exercise (assuming the satisfaction of any conditions to convertibility, exchangeability or exercisability, including, without limitation, the passage of time, but without taking into account potential antidilution adjustments) of any Common Stock Equivalents and subsequent conversion, exchange or exercise thereof shall be deemed to have been issued at the time such securities were issued or such Common Stock Equivalents were issued and for a consideration equal to the consideration, if any, received by the Corporation for any such securities and related Common Stock Equivalents (excluding any cash received on account of accrued interest or accrued dividends), plus the minimum additional consideration, if any, to be received by the Corporation (without taking into account potential antidilution adjustments) upon the conversion, exchange or exercise of any Common Stock Equivalents (the consideration in each case to be determined in the manner provided in Section A.7(a)(vi) below).

(2) In the event of any change in the number of shares of Common Stock deliverable or in the consideration payable to the Corporation upon conversion, exchange or exercise of any Common Stock Equivalents, other than a change resulting from the antidilution provisions thereof, the Conversion Price of any series of Preferred Stock, to the extent in any way affected by or computed using such Common Stock Equivalents, shall be recomputed to reflect such change, but no further adjustment shall be made for the actual issuance of Common Stock or any payment of such consideration upon the conversion, exchange or exercise of such Common Stock Equivalents.

(3) Upon the termination or expiration of the convertibility, exchangeability or exercisability of any Common Stock Equivalents, the Conversion Price of any series of Preferred Stock, to the extent in any way affected by or computed using such Common Stock Equivalents, shall be recomputed to reflect the issuance of only the number of shares of Common Stock (and Common Stock Equivalents that remain convertible, exchangeable or exercisable) actually issued upon the conversion, exchange or exercise of such Common Stock Equivalents.

(4) The number of shares of Common Stock deemed issued and the consideration deemed paid therefor pursuant to this Section A.7(a) shall be appropriately adjusted to reflect any change, termination or expiration of the type described in either Section A.7(a)(ii)(2) Article I(A)1(a)(i)(A)(2) above or Section A.7(a)(ii)(3) above.

(iii) Stock Splits and Dividends. In the event the Corporation should at any time after the filing date of this Restated Certificate fix a record date for the effectuation of a split or subdivision of the outstanding shares of Common Stock or the determination of holders of Common Stock entitled to receive a dividend or other distribution payable in additional shares of Common Stock or Common Stock Equivalents without payment of any consideration by such holder for the additional shares of Common Stock or the Common Stock Equivalents (including the additional shares of Common Stock issuable upon conversion or exercise thereof), then, as of such record date (or the date of such dividend distribution, split or subdivision if no record date is fixed), the Conversion Price of each series of Preferred Stock that is convertible into Common Stock shall be appropriately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding and those issuable with respect to such Common Stock Equivalents with the number of shares issuable with respect to Common Stock Equivalents determined from time to time in the manner provided for deemed issuances in Section A.7(a)(ii).

(iv) Reverse Stock Splits. If the number of shares of Common Stock outstanding at any time after the filing date of this Restated Certificate is decreased by a combination of the outstanding shares of Common Stock, then, following the record date of such combination (or the date of such combination if no record date is fixed), the Conversion Price for each series of Preferred Stock that is convertible into Common Stock shall be appropriately increased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be decreased in proportion to such decrease in outstanding shares.

(v) Other Dividends and Distributions. If the Corporation, at any time or from time to time after the Filing Date, shall declare or make, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities or other property of the Corporation other than shares of Common Stock, then and in each such event provision shall be made so that the holders of the outstanding shares of Preferred Stock shall receive upon conversion thereof, in addition to the number of shares of Common Stock receivable thereupon, the amount of such other securities of the Corporation or the value of such other property that they would have received had the Preferred Stock been converted into Common Stock on the date of such event and had such holders thereafter, during the period from the date of

such event to and including the conversion date, retained such securities or other property receivable by them during such period giving application to all adjustments called for during such period under Section A.7 with respect to the rights of the holders of the outstanding shares of Preferred Stock; and, provided, further, however, that no such adjustment shall be made if the holders of Preferred Stock simultaneously receive a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

(vi) Consideration for Stock. In the case of the issuance of Common Stock for cash, the consideration shall be deemed to be the amount of cash paid therefor before deducting any reasonable discounts, commissions or other expenses allowed, paid or incurred by the Corporation for any underwriting or otherwise in connection with the issuance and sale thereof. In the case of the issuance of the Common Stock for a consideration in whole or in part other than cash, the consideration other than cash shall be deemed to be the fair value thereof as determined by the Board of Directors irrespective of any accounting treatment.

(vii) No Fractional Shares and Notices as to Adjustments.

(1) No fractional shares shall be issued upon the conversion of any share or shares of Preferred Stock, and the number of shares of Common Stock to be issued shall be rounded down to the nearest whole share. The number of shares issuable upon such conversion shall be determined on the basis of the total number of shares of Preferred Stock the holder is at the time converting into Common Stock and the number of shares of Common Stock issuable upon such aggregate conversion. If the conversion would result in any fractional share, the Corporation shall, in lieu of issuing any such fractional share, pay the holder thereof an amount in cash equal to the fair market value of such fractional share on the date of conversion, as determined in good faith by the Board of Directors.

(2) Upon the occurrence of each adjustment or readjustment of the Conversion Price of Preferred Stock pursuant to this Section A.7(a), the Corporation, at its expense, shall promptly compute such adjustment or readjustment in accordance with the terms hereof and prepare and furnish to each holder of such Preferred Stock a notice setting forth such adjustment or readjustment and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, upon the written request at any time of any holder of such Preferred Stock, furnish or cause to be furnished to such holder a notice setting forth in reasonable detail (A) such adjustment and readjustment, (B) the Conversion Price for such series of Preferred Stock at the time in effect and (C) the number of shares of Common Stock and the amount, if any, of other property which at the time would be received upon the conversion of a share of such series of Preferred Stock. All such calculations shall be made to the nearest cent or to the nearest one hundredth (1/100) of a share as the case may be.

(viii) Record Date. In the event of any taking by the Corporation of a record of the holders of any class of securities for the purpose of determining the holders thereof who are entitled to receive any dividend (other than a cash dividend) or other distribution, any right to subscribe for, purchase or otherwise acquire any shares of stock of any class or any other securities or property, or to receive any other right, the Corporation shall mail to each holder of Preferred Stock, at least 10 days prior to the date specified therein, a notice specifying the date on which any such record is to be taken for the purpose of such dividend, distribution or right, and the amount and character of such dividend, distribution or right.

(ix) Treasury Shares. The number of shares of Common Stock outstanding at any given time shall not include shares owned or held by or for the account of the Corporation; provided, that the disposition of any such shares shall be considered an issuance or sale of Common Stock for the purpose of this Section A.7.

(b) Certain Issues of Common Stock Excepted. Anything herein to the contrary notwithstanding, the Corporation shall not be required to make any adjustment of the Conversion Price in the case of the issuance from and after the Filing Date of (i) 2,854,576 shares of Common Stock upon conversion of shares of Series A Preferred Stock, (ii) 3,331,878 shares of Common Stock upon conversion of shares of Series B Preferred Stock, (iii) 2,510,354 shares of Common Stock upon conversion of shares of Series C Preferred Stock, (iv) 10,475,252 shares of Common Stock upon conversion of shares of Series D Preferred Stock, (v) up to 4,475,862 shares of Common Stock or options therefor, including, for avoidance of doubt, any options that have been exercised or forfeited, to directors, officers, employees or consultants of the Corporation in connection with their service as directors of the Corporation, their employment by the Corporation or their retention as consultants by the Corporation, in each case authorized by the Board of Directors and issued pursuant to the Amended and Restated 2013 Stock Plan, (vi) securities issued or issuable as part of the consideration payable in the acquisition of another entity by the Corporation by merger, purchase of all or substantially all of the assets of such entity, stock purchase or other reorganization of such entity, in each case as authorized by the Board of Directors, including at least two of the Preferred Directors, (vii) securities issued or issuable to a bank or other financial institution (not to exceed two percent (2%) of all outstanding securities) to secure a lending or equipment leasing transaction, in each case as authorized by the Board of Directors, including at least two of the Preferred Directors, (viii) securities issued or issuable to a business partner to advance strategic business objectives, as authorized by the Board of Directors, including at least two of the Preferred Directors, (ix) securities issued pursuant to stock splits, stock dividends or similar transactions, (x) securities issuable upon conversion, exchange or exercise of convertible, exchangeable or exercisable securities outstanding as of the Filing Date including, without limitation, warrants, notes or options, (xi) Common Stock issued or issuable in a public offering or (xii) securities issued or issuable in any other transaction for which exemption from these price-based antidilution provisions is approved before or after issuance of the securities by the affirmative vote of a Preferred Majority Interest and the affirmative vote of the holders of not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted basis ("Excluded Shares").

(c) Subdivision or Combination of Common Stock. In case the Corporation shall at any time after the Filing Date subdivide its outstanding shares of Common Stock into a greater number of shares (by any stock split, stock dividend or otherwise), the Conversion Price in effect immediately prior to such subdivision shall be proportionately reduced, and, conversely, in case the Corporation shall at any time after the Filing Date combine its outstanding shares of Common Stock into a smaller number of shares (by any reverse stock split or otherwise), the Conversion Price in effect immediately prior to such combination shall be proportionately increased. In the case of any such subdivision, no further adjustment shall be made pursuant to Section A.7(a)(iii) by reason thereof.

(d) Reorganization or Reclassification. If any capital reorganization or reclassification of the capital stock of the Corporation shall be effected in such a way that holders of Common Stock shall be entitled to receive stock, securities or assets with respect to or in exchange for Common Stock, then, as a condition of such reorganization or reclassification, lawful and adequate provisions shall be made whereby each holder of a share or shares of Preferred Stock shall thereupon

have the right to receive, upon the basis and upon the terms and conditions specified herein and in lieu of the shares of Common Stock immediately theretofore receivable upon the conversion of such share or shares of Preferred Stock, as the case may be, such shares of stock, securities or assets as may be issued or payable with respect to or in exchange for a number of outstanding shares of such Common Stock equal to the number of shares of such Common Stock immediately theretofore receivable upon such conversion had such reorganization or reclassification not taken place, and in any such case appropriate provisions shall be made with respect to the rights and interests of such holder to the end that the provisions hereof (including, without limitation, provisions for adjustments of the Conversion Price) shall thereafter be applicable, as nearly as may be, in relation to any shares of stock, securities or assets thereafter deliverable upon the exercise of such conversion rights.

(e) Mergers, Dispositions and Change of Control Transactions. Upon the election of the holders of not less than a Preferred Majority Interest and the holders of not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted basis made in connection with any Disposition or any Change of Control Transaction, each share of Preferred Stock shall remain outstanding and shall thereafter be convertible (or shall be converted into a security which shall be convertible) into the kind and amount of securities or other property to which a holder of the number of shares of Common Stock of the Corporation deliverable upon conversion of such share of Preferred Stock would have been entitled upon such Disposition or Change of Control Transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors) shall be made in the application of the provisions set forth in Section A.7 with respect to the rights and interests thereafter of the holders of the Preferred Stock, to the end that the provisions set forth in Section A.7 (including provisions with respect to changes in and other adjustments of the Conversion Price) shall thereafter be applicable, as nearly as possible, in relation to any securities or other property thereafter deliverable upon the conversion of the Preferred Stock. Any election by the holders of not less than a Preferred Majority Interest and not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted basis pursuant to this Section A.7(e) shall be made by written notice to the Corporation and the other holders of Preferred Stock at least five (5) days prior to the closing of the relevant transaction. Upon the election of such holders of not less than a Preferred Majority Interest and not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted basis hereunder, all holders of Preferred Stock shall be deemed to have elected to so participate in such Disposition or Change of Control Transaction as provided in this Section A.7(e) and such election shall bind all holders of Preferred Stock. Nothing contained in this Section A.7(e) shall amend or modify the rights contained in other sections of this Restated Certificate, including without limitation the liquidation rights of the Preferred Stock contained in Section A.4 or the conversion rights of the Preferred Stock contained in Section A.6.

8. Covenants.

(a) For so long as any shares of Preferred Stock remain outstanding as of the applicable date, the Corporation shall not (in any case, by merger, consolidation, operation of law or otherwise), without first having provided written notice of such proposed action to each holder of outstanding shares of Preferred Stock and having obtained the affirmative vote or written consent of the holders of not less than a Preferred Majority Interest:

(i) apply any of its assets to the redemption, retirement, purchase or other acquisition of its capital stock, directly or indirectly, through subsidiaries or otherwise, except for the repurchase of the Excluded Shares described in Section A.7(b)(v) above upon termination of employment or service of the holder of such Excluded Shares, or pursuant to the exercise of contractual rights of first refusal and approved by the Board, including at least two of the Preferred Directors;

(ii) reclassify any capital stock in a manner that adversely affects the designations, preferences, powers and/or the relative, participating, optional or other special rights, or the restrictions provided for the benefit of, the Series A Preferred Stock, the Series B Preferred Stock, the Series C Preferred Stock, or the Series D Preferred Stock;

(iii) authorize, create or issue, or obligate itself to issue, any equity or debt security of the Corporation (including, without limitation, the creation (by reclassification or otherwise) of any new class or series of shares having rights, preferences or privileges senior to or on a parity with any series of Preferred Stock authorized by this Restated Certificate), or permit any subsidiary of the Corporation to issue such securities to any person or entity other than the Corporation;

(iv) amend, waive, alter or repeal (whether by merger, consolidation, operation of law, or otherwise) any provision of, or add any provision to, this Restated Certificate (including, without limitation, increasing the total number of shares of Preferred Stock that the Corporation shall have the authority to issue) or the by-laws of the Corporation as in effect on the Closing Date; provided that any such amendment, waiver, alteration or repeal of this Restated Certificate or the by-laws of the Corporation pursuant to this Section 8(a)(iv) shall require the additional consent of the holders of not less than sixty percent (60%) of the then outstanding shares of Series C Preferred Stock and Series D Preferred Stock voting together as a single class on an as-converted basis;

(v) effect any Liquidation Event, or any other event described in Section A.4(b) hereof;

(vi) increase or decrease to the authorized size of the Board of Directors;

(vii) take any action that results in the appointment or removal of the Chief Executive Officer;

(viii) pay or declare any dividend or distribution on any shares of the Corporation's capital stock;

(ix) incur indebtedness (e.g., any borrowings, loans or guarantees) if the aggregate indebtedness following such action would exceed \$2,000,000;

(x) take any other action not described in Section A.8(a)(i)-(ix) if such action could alter or change the preferences, rights, privileges or powers of, or the restrictions provided for the benefit of, the Series A Preferred Stock, the Series B Preferred Stock, the Series C Preferred Stock or the Series D Preferred Stock; or

(xi) enter into any agreement to do any of the foregoing that is not expressly made conditional on obtaining the affirmative vote or written consent of the holders of not less than a Preferred Majority Interest;

(b) For so long as at least 10% of the Series A Preferred Stock issued as of the Closing Date remain outstanding (such amount to be adjusted appropriately for stock splits, dividends, combinations, recapitalizations and the like occurring after the Effective Time) as of the applicable date, the Corporation shall not (in any case, by merger, consolidation, operation of law or otherwise) take any action that alters or changes the powers, preferences or special rights of the Series A Preferred Stock so as to affect adversely the shares of Series A Preferred Stock without similarly affecting the entire class of Preferred Stock, without first having provided written notice of such proposed action to each holder of outstanding shares of Series A Preferred Stock and having obtained the affirmative vote or written consent of the holders of not less than a majority of the then outstanding shares of Series A Preferred Stock.

(c) For so long as at least 10% of the Series B Preferred Stock issued as of the Closing Date remain outstanding (such amount to be adjusted appropriately for stock splits, dividends, combinations, recapitalizations and the like occurring after the Effective Time) as of the applicable date, the Corporation shall not (in any case, by merger, consolidation, operation of law or otherwise) take any action that alters or changes the powers, preferences or special rights of the Series B Preferred Stock so as to affect adversely the shares of Series B Preferred Stock without similarly affecting the entire class of Preferred Stock (including, without limitation, amending the conversion provisions in Section A.6(a)(ii)), without first having provided written notice of such proposed action to each holder of outstanding shares of Series B Preferred Stock and having obtained the affirmative vote or written consent of the holders of not less than a Series B Majority Interest.

(d) For so long as at least 10% of the Series C Preferred Stock issued as of the Closing Date remain outstanding (such amount to be adjusted appropriately for stock splits, dividends, combinations, recapitalizations and the like occurring after the Effective Time) as of the applicable date, the Corporation shall not (in any case, by merger, consolidation, operation of law or otherwise) take any action that alters or changes the powers, preferences or special rights of the Series C Preferred Stock so as to affect adversely the shares of Series C Preferred Stock without similarly affecting the entire class of Preferred Stock (including, without limitation, amending the conversion provisions in Section A.6(a)(ii), amending the liquidation preferences of the Series C Preferred Stock described in Section A.4 or amending the antidilution provisions described in Section A.7 as they apply to the Series C Preferred Stock), without first having provided written notice of such proposed action to each holder of outstanding shares of Series C Preferred Stock and having obtained the affirmative vote or written consent of the holders of not less than fifty-eight percent (58%) of the then outstanding shares of Series C Preferred Stock.

(e) For so long as at least 10% of the Series D Preferred Stock issued as of the Closing Date remain outstanding (such amount to be adjusted appropriately for stock splits, dividends, combinations, recapitalizations and the like occurring after the Effective Time) as of the applicable date, the Corporation shall not (in any case, by merger, consolidation, operation of law or otherwise) take any action that alters or changes the powers, preferences or special rights of the Series D Preferred Stock so as to affect adversely the shares of Series D Preferred Stock without similarly affecting the entire class of Preferred Stock (including, without limitation, amending the conversion provisions in Section A.6(a)(ii) or amending the antidilution provisions described in Section A.7 as they apply to the Series D Preferred Stock), without first having provided written notice of such proposed action to each holder of outstanding shares of Series D Preferred Stock and having obtained the affirmative vote or written consent of the holders of not less than a majority of the then outstanding shares of Series D Preferred Stock.

For the avoidance of doubt, the authorization, creation or issuance of any debt or equity security of the Corporation that is senior to or on parity with any series of Preferred Stock authorized by this Restated Certificate shall not in and of itself require the affirmative vote or written consent provided for under Sections A.8(b), (c), (d) and (e).

Further, the Corporation shall not, by amendment, alteration or repeal of this Restated Certificate (whether by merger, consolidation, operation of law, or otherwise) or through any Liquidation Event, any event described in Section A.4(b) hereof, or any other reorganization, recapitalization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities, agreement or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms to be observed or performed hereunder by the Corporation and shall at all times in good faith assist in the carrying out of all the provisions of this Article IV and in the taking of all such action as may be necessary or appropriate in order to protect the rights of the holders of the Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock against impairment. Any successor to the Corporation shall agree in writing, as a condition to such succession, to carry out and observe the obligations of the Corporation hereunder with respect to the Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock.

9. Notice; Adjustments; Waivers.

(a) Liquidation Events, Etc. In the event (i) the Corporation establishes a record date to determine the holders of any class of securities who are entitled to receive any dividend or other distribution or who are entitled to vote at a meeting (or by written consent) in connection with any of the transactions identified in clause (ii) hereof, or (ii) any Liquidation Event, event deemed a Liquidation Event pursuant to Section A.4(b) hereof, QPO or any other public offering becomes reasonably likely to occur, the Corporation shall mail or cause to be mailed by first class mail (postage prepaid) to each holder of Preferred Stock at least thirty (30) days prior to such record date specified therein or the expected effective date of any such transaction, whichever is earlier, a notice specifying (A) the date of such record date for the purpose of such dividend or distribution or meeting or consent and a description of such dividend or distribution or the action to be taken at such meeting or by such consent, (B) the date on which any such Liquidation Event, event deemed a Liquidation Event pursuant to Section A.4(b) hereof, QPO or other public offering is expected to become effective, and (C) the date on which the books of the Corporation shall close or a record shall be taken with respect to any such event. Such notice shall be accompanied by a certificate prepared by the chief financial officer of the Corporation describing in reasonable detail (1) the facts of such transaction, (2) the amount(s) per share of Preferred Stock or Common Stock each holder of Preferred Stock would receive pursuant to the applicable provisions of this Restated Certificate, and (3) the facts upon which such amounts were determined.

(b) Adjustments; Calculations. Upon the occurrence of each adjustment or readjustment of the Conversion Price pursuant to Section A.7, the Corporation at its expense shall promptly compute such adjustment or readjustment in accordance with the terms hereof and prepare and furnish to each holder of Preferred Stock a certificate setting forth in reasonable detail (i) such adjustment or readjustment, (ii) the Conversion Price before and after such adjustment or readjustment, and (iii) the number of shares of Common Stock and the amount, if any, of other property which at the time would be received upon the conversion of such holder's shares of Preferred Stock. All such calculations shall be made to the nearest cent or to the nearest one hundredth (1/100) of a share as the case may be.

(c) Waiver of Notice. The holder or holders of (i) a Preferred Majority Interest, (ii) a majority of the then outstanding shares of Series D Preferred Stock voting together as a single class on an as-converted basis and (iii) fifty-eight percent (58%) of the Series C Preferred Stock voting together as a single class on an as-converted basis, may, at any time upon written notice to the Corporation, waive any notice or certificate delivery provisions specified herein for the benefit of such holders, and any such waiver shall be binding upon all holders of such securities.

10. No Reissuance of Preferred Stock. No share or shares of Preferred Stock acquired by the Corporation by reason of redemption, purchase, conversion or otherwise shall be reissued, and all such shares shall be canceled, retired and eliminated from the shares which the Corporation shall be authorized to issue.

11. Contractual Rights of Holders. The various provisions set forth herein for the benefit of the holders of the Preferred Stock shall be deemed contract rights enforceable by them, including, without limitation, one or more actions for specific performance.

12. Use of Certain Terms. The use of "Conversion Rate," "Conversion Price," "Original Issue Price," and "Preference Amount" shall mean, in each case, such terms as applicable to the individual shares of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock or Series D Preferred Stock at issue.

B. COMMON STOCK

1. Voting.

(a) Election of Directors. The holders of Common Stock shall be entitled to elect one (1) Director of the Corporation, and the holders of Common Stock and the Preferred Stock voting together as a single class (on an as converted to Common Stock basis) shall be entitled to elect three (3) Directors of the Corporation. Such Directors shall be elected by a plurality vote, with the elected candidates being the candidates receiving the greatest number of affirmative votes (with each holder entitled to cast one vote for or against each candidate with respect to each share held by such holder), with votes cast against such candidates and votes withheld having no legal effect. The election of such Directors shall occur at the annual meeting of holders of capital stock or at any special meeting called and held in accordance with the by-laws of the Corporation, or by consent in lieu thereof in accordance with this Restated Certificate and applicable law.

(b) Voting Generally. Except as otherwise expressly provided herein or required by law, each holder of outstanding shares of Common Stock shall be entitled to one (1) vote in respect of each share of Common Stock held thereby of record on the books of the Corporation for the election of directors and on all matters submitted to a vote of stockholders of the Corporation. Notwithstanding the provisions of Section 242(b)(2) of the Delaware General Corporation Law, the number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of shares of stock of the Corporation representing a majority of the votes represented by all outstanding shares of stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the Delaware General Corporation Law. For the avoidance of doubt, each holder of Preferred Stock shall be entitled to one (1) vote per share of Common Stock into which each share of Preferred Stock held by such holder could be converted on the applicable date, on all matters submitted to a vote of holders of Common Stock as a class (including, without limitation, pursuant to Section B.1(a) above or this Section B.1(b)).

2. Dividends. Subject to the payment in full of all preferential dividends to which the holders of the Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock are entitled hereunder, the holders of Common Stock shall be entitled to receive dividends out of funds legally available therefor at such times and in such amounts as the Board of Directors may determine in its sole discretion, with holders of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock, Series D Preferred Stock and Common Stock sharing *pari passu* in such dividends, as contemplated by Section A.3.

3. Liquidation. Upon any Liquidation Event, the assets of the Corporation shall be distributed as provided in Section A.4.

ARTICLE V

In furtherance of and not in limitation of powers conferred by statute, it is further provided:

1. Election of Directors need not be by written ballot unless the by-laws of the Corporation so provide.

2. Except as provided in Article IV, Section A.8(a)(iv), the Board of Directors is expressly authorized to adopt, amend or repeal the by-laws of the Corporation to the extent specified therein.

ARTICLE VI

Meetings of stockholders may be held within or without the State of Delaware, as the by-laws may provide.

ARTICLE VII

To the extent permitted by law, the books of the Corporation may be kept outside the State of Delaware at such place or places as may be designated in the by-laws of the Corporation or from time to time by its Board of Directors.

ARTICLE VIII

A Director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a Director of the Corporation, except for liability (a) for any breach of the Director's duty of loyalty to the Corporation or its stockholders, (b) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (c) under Section 174 of the Delaware General Corporation Law, or (d) for any transaction from which the Director derived an improper personal benefit. If the Delaware General Corporation Law is amended after the effective date of this Restated Certificate to authorize corporate action further eliminating or limiting the personal liability of Directors, then the liability of a Director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law of the State of Delaware.

Any amendment, repeal or modification of this Article VIII by the stockholders of the Corporation or by an amendment to the Delaware General Corporation Law shall not adversely affect any right or protection existing at the time of such repeal or modification with respect to any acts or omissions occurring either before such repeal or modification of a person serving as a Director prior to or at the time of such repeal or modification.

ARTICLE IX

The Corporation renounces any interest or expectancy of the Corporation in, or in being offered an opportunity to participate in, any Excluded Opportunity. An "Excluded Opportunity" is any matter, transaction or interest that is presented to, or acquired, created or developed by, or which otherwise comes into the possession of, (i) any Director of the Corporation who is not an employee of the Corporation or any of its subsidiaries, or (ii) any holder of Preferred Stock or any partner, member, director, stockholder,

employee or agent of any such holder, other than someone who is an employee of the Corporation or any of its subsidiaries (collectively, "Covered Persons"), unless such matter, transaction or interest is presented to, or acquired, created or developed by, or otherwise comes into the possession of, a Covered Person expressly and solely in such Covered Person's capacity as a Director of the Corporation.

ARTICLE X

Except as otherwise provided herein, the Corporation reserves the right to amend, alter, change or repeal any provision contained in this Restated Certificate, in the manner now or hereafter prescribed by statute, and all rights conferred upon stockholders herein are granted subject to this reservation.

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
TWIST BIOSCIENCE CORPORATION

Twist Bioscience Corporation, a corporation organized and existing under the General Corporation Law of the State of Delaware (the “**Corporation**”) does hereby certify that:

- A. The Corporation was originally incorporated and the original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 4, 2013, under the name “Twist Bioscience Corporation.”
- B. The Certificate of Incorporation was most recently amended and restated pursuant to an Amended and Restated Certificate of Incorporation filed with the Secretary of State of the State of Delaware on October 16, 2018.
- C. This Amended and Restated Certificate of Incorporation was duly adopted in accordance with Sections 242 and 245 of the General Corporation Law of the State of Delaware (the “**DGCL**”), and restates, integrates and further amends the provisions of the Corporation’s Certificate of Incorporation, and has been duly approved by the written consent of the stockholders of the Corporation in accordance with Section 228 of the DGCL.
- D. The Certificate of Incorporation of this Corporation is hereby amended and restated to read in its entirety as follows:

ARTICLE I

The name of the Corporation is Twist Bioscience Corporation.

ARTICLE II

The address of the registered office of the Corporation in the State of Delaware is 3500 South Dupont Highway, City of Dover, County of Kent, Delaware 19901, and the name of the registered agent of the Corporation in the State of Delaware at such address is Incorporating Services, Ltd.

ARTICLE III

The purpose of the Corporation is to engage in any lawful act or activity for which a corporation may be organized under the Delaware General Corporation Law (“**DGCL**”).

ARTICLE IV

4.1 Authorized Capital Stock. The total number of shares of all classes of capital stock that the Corporation is authorized to issue is 110,000,000 shares, consisting of 100,000,000 shares of Common Stock, par value \$0.00001 per share (the “**Common Stock**”), and 10,000,000 shares of Preferred Stock, par value \$0.00001 per share (the “**Preferred Stock**”).

4.2 Rights of Common Stock. Each share of Common Stock shall entitle the holder thereof to one vote on each matter submitted to a vote of holders of Common Stock at a meeting of stockholders.

4.3 Rights of Preferred Stock. The Board of Directors of the Corporation (the “**Board of Directors**”) is authorized, subject to limitations prescribed by law or this certificate of incorporation (the “**Certificate of Incorporation**” which term, as used herein, shall mean the certificate of incorporation of the Corporation, as amended from time to time, including the terms of any certificate of designations relating to any series of Preferred Stock), to provide for the issuance of shares of Preferred Stock in series and to fix by resolution or resolutions the designations, powers, preferences and rights, and the qualifications, limitations or restrictions thereof, of any wholly unissued series of Preferred Stock, including without limitation authority to fix by resolution or resolutions the dividend rights, dividend rate, conversion rights, voting rights, rights and terms of redemption (including sinking fund provisions), redemption price or prices, and liquidation preferences of any such series, and the number of shares constituting any such series and the designation thereof, or any of the foregoing.

4.4 Increase or Decrease in Authorized Capital Stock. The Board of Directors is further authorized to increase (but not above the total number of authorized shares of the class) or decrease (but not below the number of shares of any such series then outstanding) the number of shares of any series, the number of which was fixed by it, subsequent to the issuance of shares of such series then outstanding, subject to the powers, preferences and rights, and the qualifications, limitations and restrictions thereof stated in the Certificate of Incorporation or the resolution of the Board of Directors originally fixing the number of shares of such series. If the number of shares of any series is so decreased, then the shares constituting such decrease shall resume the status which they had prior to the adoption of the resolution originally fixing the number of shares of such series.

ARTICLE V

5.1 General Powers. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors.

5.2 Number of Directors; Election. Subject to the rights of holders of any series of Preferred Stock with respect to the election of directors, the number of directors that constitutes the entire Board of Directors of the Corporation shall be fixed solely by the Board of Directors pursuant to a resolution adopted by a majority of the Board of Directors.

5.3 Classified Board Structure.

(a) Effective upon the closing date (the “**Effective Date**”) of the initial sale of shares of Common Stock in the Corporation’s initial public offering pursuant to an effective registration statement filed under the Securities Act of 1933, as amended, and subject to the rights of holders of any series of Preferred Stock with respect to the election of directors, the directors of the Corporation shall be divided into three classes as nearly equal in size as is practicable, hereby designated Class I, Class II and Class III. The Board of Directors may assign members of the Board of Directors already in office to such classes at the time such classification becomes effective. The term of office of the initial Class I directors shall expire at the first annual meeting of the stockholders following the Effective Date, the term of office of the initial Class II directors shall expire at the second annual meeting of the stockholders following the Effective Date and the term of office of the initial Class III directors shall expire at the third annual meeting of the stockholders following the Effective Date. At each annual meeting of stockholders, commencing with the first annual meeting of stockholders following the Effective Date, either (i) directors shall be re-elected to the Board of Directors of the Corporation for a subsequent three-year term or (ii) successors to the directors shall be elected for a full term of three years to succeed the directors of the class whose terms expire at such annual meeting. Subject to the rights of holders of any series of Preferred Stock with respect to the election of directors, if the number of directors that constitutes the Board of Directors is changed, any newly created directorships or decrease in directorships shall be so apportioned by the Board of Directors among the classes as to make all classes as nearly equal in number as is practicable, provided that no decrease in the number of directors constituting the Board of Directors shall shorten the term of any incumbent director.

(b) Notwithstanding any other provisions of this Article, and subject to the rights of holders of any series of Preferred Stock with respect to the election of directors, each director shall serve until his or her successor is duly elected and qualified or until his or her earlier death, resignation, or removal.

5.4 Removal. Subject to the rights of holders of any series of Preferred Stock with respect to the election of directors, a director may be removed from office by the stockholders of the Corporation only for cause.

5.5 Vacancies and Newly Created Directorships. Subject to the rights of holders of any series of Preferred Stock with respect to the election of directors, and except as otherwise provided in the DGCL, vacancies occurring on the Board of Directors for any reason and newly created directorships resulting from an increase in the authorized number of directors may be filled only by vote of a majority of the remaining members of the Board of Directors, although less than a quorum, or by a sole remaining director, at any meeting of the Board of Directors. A person so elected by the Board of Directors to fill a vacancy or newly created directorship shall hold office until the next election of the class for which such director shall have been assigned by the Board of Directors and until his or her successor shall be duly elected and qualified.

5.6 Written Ballot. Elections of directors need not be by written ballot unless the Bylaws of the Corporation shall so provide.

ARTICLE VI

6.1 Annual Meetings. An annual meeting of stockholders for the election of directors to succeed those whose terms expire and for the transaction of such other business as may properly come before the meeting shall be held at such place, on such date, and at such time as the Board of Directors shall determine (or the chairperson of the Board of Directors in the absence of a designation by the Board of Directors).

6.2 No Action by Written Consent of Stockholders. Except as otherwise expressly provided by the terms of any series of Preferred Stock or other class of stock permitting the holders of such series to act by written consent, any action required or permitted to be taken by stockholders of the Corporation must be effected at a duly called annual or special meeting of the stockholders and may not be effected by written consent in lieu of a meeting.

6.3 Special Meetings. Except as otherwise expressly provided by the terms of any series of Preferred Stock permitting the holders of such series of Preferred Stock to call a special meeting of the holders of such series, special meetings of stockholders of the Corporation may be called only (i) by the Board of Directors, pursuant to a resolution adopted by a majority of the Board; (ii) the chairperson of the Board of Directors, (iii) the chief executive officer or (iv) the president (in the absence of a chief executive officer), and the ability of the stockholders to call a special meeting is hereby specifically denied. Special meetings of stockholders may not be called by any other person or persons. The Board of Directors may cancel, postpone or reschedule any previously scheduled special meeting at any time, before or after the notice for such meeting has been sent to the stockholders.

6.4 Advance Notice. Advance notice of stockholder nominations for the election of directors and of business to be brought by stockholders before any meeting of the stockholders of the Corporation shall be given in the manner provided in the Bylaws of the Corporation.

6.5 No Cumulative Voting. No stockholder will be permitted to cumulate votes at any election of directors.

ARTICLE VII

7.1 Limitation of Personal Liability. To the fullest extent permitted by the DGCL, as it presently exists or may hereafter be amended from time to time, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. If the DGCL is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the DGCL, as so amended.

7.2 Indemnification. Subject to any provisions in the Bylaws of the Corporation related to indemnification of directors or officers of the Corporation, the Corporation shall indemnify, to the fullest extent permitted by applicable law, as now or hereinafter in effect, any director or officer of the Corporation who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (a "**Proceeding**") by reason of the fact that he or she is or was a director or officer of the Corporation or is or was serving at the request of the Corporation as a director or officer of another Corporation, partnership, joint venture, trust or other enterprise, including service with respect to employee benefit plans, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with any such Proceeding. The Corporation shall be required to indemnify a person in connection with a Proceeding initiated by such person only if the Proceeding was authorized by the Board of Directors.

The Corporation shall have the power to indemnify, to the extent permitted by the DGCL, as it presently exists or may hereafter be amended from time to time, any employee or agent of the Corporation who was or is a party or is threatened to be made a party to any Proceeding by reason of the fact that he or she is or was an employee or agent of the Corporation or is or was serving at the request of the Corporation as an employee or agent of another corporation, partnership, joint venture, trust or other enterprise, including service with respect to employee benefit plans, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with any such Proceeding. The Corporation shall be required to indemnify a person in connection with a Proceeding initiated by such person only if the Proceeding was authorized by the Board of Directors.

A right to limitation of personal liability, indemnification or to advancement of expenses arising under a provision of this Certificate of Incorporation or a bylaw of the Corporation shall not be eliminated or impaired by an amendment to this Certificate of Incorporation or the Bylaws of the Corporation after the occurrence of the act or omission that is the subject of the civil, criminal, administrative or investigative action, suit or proceeding for which indemnification or advancement of expenses is sought, unless the provision in effect at the time of such act or omission explicitly authorizes such elimination or impairment after such action or omission has occurred.

ARTICLE VIII

Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (A) any derivative action or proceeding brought on behalf of the Corporation, (B) any action or proceeding asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee of the Corporation to the Corporation or the Corporation's stockholders, (C) any action or proceeding asserting a claim arising pursuant to any provision of the DGCL or the Corporation's Certificate of Incorporation or Bylaws, (D) any action or proceeding asserting a claim as to which the Delaware General Corporation Law confers jurisdiction upon the Court of Chancery of the State of Delaware, or (E) any action or proceeding asserting a claim governed by the internal affairs doctrine, in each case subject to said Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein.

Unless the Corporation consents in writing to the selection of an alternative forum, the federal district courts of the United States of America shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act of 1933, as amended.

ARTICLE IX

If any provision of this Certificate of Incorporation becomes or is declared on any ground by a court of competent jurisdiction to be illegal, unenforceable or void, portions of such provision, or such provision in its entirety, to the extent necessary, shall be severed from this Certificate of Incorporation, and the court will replace such illegal, void or unenforceable provision of this Certificate of Incorporation with a valid and enforceable provision that most accurately reflects the Corporation's intent, in order to achieve, to the maximum extent possible, the same economic, business and other purposes of the illegal, void or unenforceable provision. The balance of this Certificate of Incorporation shall be enforceable in accordance with its terms.

ARTICLE X

10.1 Amendment of Bylaws. In furtherance and not in limitation of the powers conferred by statute, the Board of Directors of the Corporation is expressly authorized to adopt, amend or repeal the Bylaws of the Corporation. The stockholders of the Corporation may adopt, amend or repeal the Bylaws only with the affirmative vote of the holders of at least a majority of total voting power of outstanding voting securities, voting together as a single class.

Notwithstanding any other provision of this Certificate of Incorporation, and in addition to any other vote that may be required by law or the terms of any series of Preferred Stock, the affirmative vote of the holders of at least 66 2/3% of the total voting power of outstanding voting securities, voting together as a single class, shall be required for the stockholders of the Corporation to alter, amend or repeal, or adopt any Bylaw inconsistent with Article II, Sections 3.1, 3.2, 3.4, and 3.12 of Article III, Article VI and Article XI of the Bylaws (including, without limitation, any such Article or Section as renumbered as a result of any amendment, alteration, change, repeal, or adoption of any other Bylaw).

10.2 Amendment of Certificate of Incorporation. The Corporation reserves the right to amend, alter, change or repeal any provision contained in this Certificate of Incorporation (including any rights, preferences or other designations of Preferred Stock), in the manner now or hereafter prescribed by this Certificate of Incorporation and the DGCL; and all rights, preferences and privileges herein conferred upon stockholders by and pursuant to this Certificate of Incorporation in its present form or as hereafter amended are granted subject to the right reserved in this Article X. Notwithstanding any other provision of this Certificate of Incorporation, and in addition to any other vote that may be required by law or the

terms of any series of Preferred Stock, the affirmative vote of the holders of at least 66 2/3% of the voting power of all then outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class, shall be required to amend, alter or repeal, or adopt any provision as part of this Certificate of Incorporation inconsistent with the purpose and intent of, Article V, Article VI, Article VII, Article VIII, Article IX or this Article X (including, without limitation, any such Article as renumbered as a result of any amendment, alteration, change, repeal or adoption of any other Article).

IN WITNESS WHEREOF, Twist Bioscience Corporation has caused this Amended and Restated Certificate of Incorporation to be signed by its President and Chief Executive Officer this th day of 2018.

TWIST BIOSCIENCE CORPORATION

By: _____
Emily M. Leproust, Ph.D.
President and Chief Executive Officer

BYLAWS

OF

TWIST BIOSCIENCE CORPORATION

(As Amended and Restated Effective , 2018)

TABLE OF CONTENTS

	<u>Page</u>
ARTICLE I CORPORATE OFFICES	1
1.1 REGISTERED OFFICE	1
1.2 OTHER OFFICES	1
ARTICLE II MEETINGS OF STOCKHOLDERS	1
2.1 PLACE OF MEETINGS	1
2.2 ANNUAL MEETING	1
2.3 SPECIAL MEETING	4
2.4 NOTICE OF STOCKHOLDER'S MEETINGS; AFFIDAVIT OF NOTICE	5
2.5 QUORUM	6
2.6 ORGANIZATION	6
2.7 CONDUCT OF BUSINESS	6
2.8 VOTING	6
2.9 STOCKHOLDER ACTION BY WRITTEN CONSENT WITHOUT A MEETING	6
2.10 WAIVER OF NOTICE	7
2.11 RECORD DATE FOR STOCKHOLDER NOTICE; VOTING	7
2.12 PROXIES	8
ARTICLE III DIRECTORS	8
3.1 POWERS	8
3.2 NUMBER OF DIRECTORS	8
3.3 ELECTION, QUALIFICATION AND TERM OF OFFICE OF DIRECTORS	8
3.4 RESIGNATION AND VACANCIES	9
3.5 PLACE OF MEETINGS; MEETINGS BY TELEPHONE	9
3.6 REGULAR MEETINGS	9
3.7 SPECIAL MEETINGS; NOTICE	9
3.8 QUORUM AND VOTING	10
3.9 WAIVER OF NOTICE	10
3.10 BOARD ACTION BY WRITTEN CONSENT WITHOUT A MEETING	10
3.11 FEES AND COMPENSATION OF DIRECTORS	10
3.12 REMOVAL OF DIRECTORS	11
3.13 CHAIRPERSON OF THE BOARD OF DIRECTORS	11
3.14 EMERGENCY BYLAWS	11
ARTICLE IV COMMITTEES	11
4.1 COMMITTEES OF DIRECTORS	11
4.2 COMMITTEE MINUTES	11
4.3 MEETINGS AND ACTION OF COMMITTEES	12
ARTICLE V OFFICERS	12
5.1 OFFICERS	12
5.2 APPOINTMENT OF OFFICERS	12
5.3 SUBORDINATE OFFICERS	12

5.4	REMOVAL AND RESIGNATION OF OFFICERS	12
5.5	VACANCIES IN OFFICES	13
5.6	CHIEF EXECUTIVE OFFICER	13
5.7	PRESIDENT	13
5.8	VICE PRESIDENTS	13
5.9	SECRETARY	13
5.10	CHIEF FINANCIAL OFFICER	14
5.11	REPRESENTATION OF SHARES OF OTHER CORPORATIONS	14
5.12	AUTHORITY AND DUTIES OF OFFICERS	14
ARTICLE VI INDEMNIFICATION OF DIRECTORS, OFFICERS, EMPLOYEES, AND OTHER AGENTS		15
6.1	RIGHT TO INDEMNIFICATION	15
6.2	POWER TO ADVANCE EXPENSES	15
6.3	RIGHT OF INDEMNITEE TO BRING SUIT	16
6.4	NON-EXCLUSIVITY OF RIGHTS	16
6.5	INSURANCE	16
6.6	INDEMNIFICATION OF EMPLOYEES AND AGENTS OF THE CORPORATION	16
6.7	NATURE OF RIGHTS	17
ARTICLE VII RECORDS AND REPORTS		17
7.1	MAINTENANCE AND INSPECTION OF RECORDS; STOCKLIST	17
ARTICLE VIII GENERAL MATTERS		17
8.1	CHECKS	17
8.2	EXECUTION OF CORPORATE CONTRACTS AND INSTRUMENTS	18
8.3	STOCK CERTIFICATES	18
8.4	LOST, STOLEN OR DESTROYED CERTIFICATES	18
8.5	CONSTRUCTION; DEFINITIONS	18
8.6	DIVIDENDS	19
8.7	FISCAL YEAR	19
8.8	REGISTERED STOCKHOLDERS	19
8.9	TIME PERIODS	19
ARTICLE IX NOTICE BY ELECTRONIC TRANSMISSION		19
9.1	NOTICE BY ELECTRONIC TRANSMISSION	19
ARTICLE X AMENDMENTS		20

**BYLAWS
OF
TWIST BIOSCIENCE CORPORATION**

ARTICLE I
CORPORATE OFFICES

1.1 REGISTERED OFFICE.

The registered office of the Corporation shall be fixed in the Corporation's Certificate of Incorporation, as the same may be amended from time to time.

1.2 OTHER OFFICES.

The Board of Directors may at any time establish other offices, and keep the books and records of the Corporation, except as may otherwise be required by law, at any place or places where the Corporation is qualified to do business.

ARTICLE II
MEETINGS OF STOCKHOLDERS

2.1 PLACE OF MEETINGS.

Meetings of stockholders shall be held at any place, within or outside the State of Delaware, designated by the Board of Directors. The Board of Directors may, in its sole discretion, determine that a meeting of stockholders shall not be held at any place, but may instead be held solely by means of remote communication as authorized by the Delaware General Corporation Law (the "DGCL"). In the absence of any such designation, stockholders' meetings shall be held at the registered office of the Corporation.

2.2 ANNUAL MEETING.

(a) The annual meeting of stockholders shall be held each year on a date and at a time designated by resolution of the Board of Directors. The meeting shall be for the election of directors to succeed those whose terms expire and for the transaction of such business as may properly come before the meeting. The Corporation may postpone, reschedule or cancel any annual meeting of Stockholders previously scheduled by the Board of Directors.

(b) Nominations of persons for election to the Board of Directors of the Corporation and the proposal of business to be considered by the stockholders may be made at an annual meeting of stockholders only (A) pursuant to the Corporation's proxy materials with respect to such meeting (or any supplement thereto), (B) by or at the direction of the Board of Directors or (C) by any stockholder of record (the "Record Stockholder") of the Corporation who is a stockholder of record at the time of giving such notice, who is entitled to vote at the meeting

and who complies with the notice procedures set forth in this Section. For the avoidance of doubt, the foregoing clause (C) shall be the exclusive means for a stockholder to make nominations or propose business (other than business included in the Corporation's proxy materials pursuant to Rule 14a-8 under the Securities Exchange Act, as amended (such act, and the rules and regulations promulgated thereunder, the "Exchange Act")) at an annual meeting of stockholders.

(c) For nominations or other business to be properly brought before an annual meeting by a Record Stockholder pursuant to clause (C) of the foregoing paragraph, the stockholder must have given timely notice thereof in writing to the Secretary of the Corporation, such business must be a proper subject for stockholder action, and the Record Stockholder and the beneficial owner, if any, on whose behalf any such proposal or nomination is made, must have acted in accordance with the representations set forth in the Solicitation Statement required by these Bylaws. To be timely, a Record Stockholder's notice shall be received by the Secretary at the principal executive offices of the Corporation not less than ninety (90) nor more than one hundred twenty (120) days prior to the one-year anniversary of the preceding year's annual meeting; *provided, however*, that, subject to the last sentence of this Section 2.2(c), in the event that no annual meeting was held in the previous year or if the annual meeting is convened more than thirty (30) days before or after such anniversary date, notice by the Record Stockholder to be timely must be so received not later than the close of business on the later of the ninetieth (90th) day prior to such annual meeting or the tenth (10th) day following the date on which public announcement (as defined below) of the date of such meeting is first made by the Corporation. In no event shall an adjournment, or postponement of an annual meeting for which notice has been given, commence a new time period (or extend any time period) for the giving of a Record Stockholder's notice as described above.

(d) Such Record Stockholder's notice shall set forth:

(A) as to each person whom the Record Stockholder proposes to nominate for election or re-election as a director (1) all information relating to such person that is required to be disclosed in solicitations of proxies for election of directors in an election contest, or is otherwise required, in each case pursuant to and in accordance with Regulation 14A under the Exchange Act, and (2) such person's written consent to being named in the proxy statement as a nominee and such person's intent to serve a full term as a director if elected;

(B) as to any business that the Record Stockholder proposes to bring before the meeting, a brief description of the business desired to be brought before the meeting, the text of the proposal or business (including the text of any resolutions proposed for consideration and in the event that such business includes a proposal to amend the Bylaws of the Corporation, the language of the proposed amendment), the reasons for conducting such business at the meeting and any interest in such business of such stockholder and the beneficial owner, if any, on whose behalf the proposal is made;

(C) as to the Record Stockholder giving the notice and the beneficial owner, if any, on whose behalf the nomination is made or the business is proposed (each, a “party”):

(1) the name and address of each such party;

(2) (A) the class, series and number of shares of capital stock of the Corporation which are owned, directly or indirectly, beneficially and of record by each such party, (B) any option, warrant, convertible security, stock appreciation right, or similar right with an exercise or conversion privilege or a settlement payment or mechanism at a price related to any class or series of shares of the Corporation or with a value derived in whole or in part from the value of any class or series of shares of the Corporation, whether or not such instrument or right shall be subject to settlement in the underlying class or series of capital stock of the Corporation or otherwise (a “Derivative Instrument”) directly or indirectly owned beneficially by each such party, and any other direct or indirect opportunity to profit or share in any profit derived from any increase or decrease in the value of shares of the Corporation, (C) any proxy, contract, arrangement, understanding, or relationship pursuant to which either party has a right to vote, directly or indirectly, any shares of any security of the Corporation, (D) any short interest in any security of the Corporation held by each such party (for purposes of this Section 2.2, a person shall be deemed to have a short interest in a security if such person directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has the opportunity to profit or share in any profit derived from any decrease in the value of the subject security), (E) any rights to dividends on the shares of the Corporation owned beneficially directly or indirectly by each such party that are separated or separable from the underlying shares of the Corporation, (F) any proportionate interest in shares of the Corporation or Derivative Instruments held, directly or indirectly, by a general or limited partnership in which either party is a general partner or, directly or indirectly, beneficially owns an interest in a general partner and (G) any performance-related fees (other than an asset-based fee) that each such party is directly or indirectly entitled to based on any increase or decrease in the value of shares of the Corporation or Derivative Instruments, if any, as of the date of such notice, including without limitation any such interests held by members of each such party’s immediate family sharing the same household (which information set forth in this paragraph shall be supplemented by such stockholder or such beneficial owner, as the case may be, not later than ten (10) days after the record date for determining the stockholders entitled to notice of the meeting and/or to vote at the meeting to disclose such ownership as of such record date);

(3) any other information relating to each such party that would be required to be disclosed in a proxy statement or other filings required to be made in connection with solicitations of proxies for, as applicable, the proposal and/or for the election of directors in a contested election pursuant to Section 14 of the Exchange Act; and

(4) a statement whether or not each such party will deliver a proxy statement and form of proxy to holders of, in the case of a proposal, at least the percentage of voting power of all of the shares of capital stock of the Corporation required under applicable law to carry the proposal or, in the case of a nomination or nominations, at least the percentage of voting power of all of the shares of capital stock of the Corporation reasonably believed by the Record Stockholder or beneficial holder, as the case may be, to be sufficient to elect the nominee or nominees proposed to be nominated by the Record Stockholder (such statement, a “Solicitation Statement”).

(e) The Corporation may require any proposed nominee to furnish such other information as may reasonably be required by the Corporation to determine the eligibility of such proposed nominee to serve as a director of the Corporation, including information relevant to a determination whether such proposed nominee can be considered an independent director.

(f) Only such business shall be conducted at an annual meeting of stockholders as shall have been brought before the meeting in accordance with the procedures set forth in these Bylaws. The chairperson of the meeting shall determine whether a nomination or any business proposed to be transacted by the stockholders has been properly brought before the meeting and, if any proposed nomination or business has not been properly brought before the meeting, the chairperson shall declare that such proposed business or nomination shall not be presented for stockholder action at the meeting.

(g) For purposes of this Article, "public announcement" shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press or a comparable national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Exchange Act.

(h) Notwithstanding the foregoing provisions of this Section 2.2, a stockholder shall also comply with all applicable requirements of the Exchange Act and the rules and regulations thereunder with respect to matters set forth in this Section 2.2. Nothing in this Section 2.2 shall be deemed to affect any rights of stockholders to request inclusion of proposals in the Corporation's proxy statement pursuant to Rule 14a-8 under the Exchange Act.

2.3 SPECIAL MEETING.

(a) A special meeting of the stockholders, other than those required by statute, may be called at any time by the Board of Directors acting pursuant to a resolution adopted by a majority of the Whole Board (for purposes of these Bylaws, the term "Whole Board" shall mean the total number of authorized directors whether or not there exist any vacancies in previously authorized directorships) and special meetings may not be called by any other person or persons. The Corporation may postpone, reschedule or cancel any special meeting of Stockholders previously scheduled by the Board of Directors.

(b) Only such business shall be conducted at a special meeting of stockholders as shall have been brought before the meeting by or at the direction of the Board of Directors. The notice of a special meeting shall include the purpose for which the meeting is called. Nominations of persons for election to the Board of Directors may be made at a special meeting of stockholders at which directors are to be elected (i) by or at the direction of the Board of Directors or (ii) provided that the Board of Directors has determined that directors shall be elected at such meeting, by any stockholder of record of the Corporation who is a stockholder of record at the time of the giving of the notice provided for in this paragraph, who is entitled to vote at the meeting and upon such election and who delivers a written notice to the Secretary setting forth the information set forth in Section 2.2(d)(A) and (C). Nominations by stockholders of persons for election to the Board of Directors may be made at such a special meeting of stockholders only if such stockholder of record's notice required by the preceding sentence shall be received by the Secretary at the principal executive offices of the Corporation not later than the close of business on the later of the ninetieth (90th) day prior to such special meeting or the tenth (10th) day following the day on which public announcement is first made of the date of the special meeting

and of the nominees proposed by the Board of Directors to be elected at such meeting. In no event shall an adjournment, or postponement of a special meeting for which notice has been given, commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above.

(c) Only such business shall be conducted at a special meeting of stockholders as shall have been brought before the meeting by or at the direction of the Board of Directors. The notice of such special meeting shall include the purpose for which the meeting is called.

(d) Notwithstanding the foregoing provisions of this Section 2.3, a stockholder shall also comply with all applicable requirements of the Exchange Act and the rules and regulations thereunder with respect to matters set forth in this Section 2.3. Nothing in this Section 2.3 shall be deemed to affect any rights of stockholders to request inclusion of proposals in the Corporation's proxy statement pursuant to Rule 14a-8 under the Exchange Act.

2.4 NOTICE OF STOCKHOLDER'S MEETINGS; AFFIDAVIT OF NOTICE.

Notice of the place, if any, date, and time of all meetings of the stockholders, the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such meeting, and the record date for determining the stockholders entitled to vote at the meeting, if such date is different from the record date for determining stockholders entitled to notice of the meeting, shall be given, not less than ten (10) nor more than sixty (60) days before the date on which the meeting is to be held, to each stockholder entitled to vote at such meeting as of the record date for determining the stockholders entitled to notice of the meeting, except as otherwise provided herein or required by law (meaning, here and hereinafter, as required from time to time by the DGCL or the Restated Certificate of Incorporation of the Corporation).

When a meeting is adjourned to another time or place, notice need not be given of the adjourned meeting if the time and place, if any, thereof, and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting are announced at the meeting at which the adjournment is taken; provided, however, that if the date of any adjourned meeting is more than thirty (30) days after the date for which the meeting was originally noticed, notice of the place, if any, date, and time of the adjourned meeting and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting, shall be given to each stockholder in conformity herewith. If after the adjournment a new record date for stockholders entitled to vote is fixed for the adjourned meeting, the Board of Directors shall fix a new record date for notice of such adjourned meeting, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board of Directors and, except as otherwise required by law, shall not be more than sixty (60) nor less than ten (10) days before the date of such adjourned meeting, and shall give notice of the adjourned meeting to each stockholder of record entitled to vote at such adjourned meeting as of the record date fixed for notice of such adjourned meeting. At any adjourned meeting, any business may be transacted which might have been transacted at the original meeting.

2.5 QUORUM.

At any meeting of stockholders, the holders of a majority of the voting power of all issued and outstanding stock entitled to vote thereat, present in person or represented by proxy, shall constitute a quorum for the transaction of business, except to the extent that the presence of a larger number may be required by law or the rules of any stock exchange upon which the Corporation's securities are listed. Where a separate vote by a class or classes or series is required, a majority of the voting power of all issued and outstanding stock of such class or series, present in person or represented by proxy, shall constitute a quorum entitled to take action with respect to such matter. If a quorum is not present or represented at any meeting of stockholders, then the chairperson of the meeting or the holders of a majority in voting power of the stock entitled to vote thereat, present in person or represented by proxy, shall have power to adjourn the meeting from time to time in accordance with Section 2.4.

2.6 ORGANIZATION.

Such person as the Board of Directors may have designated or, in the absence of such a person, the Chairman of the Board or, in his or her absence, the President of the Corporation or, in his or her absence, such person as may be chosen by the holders of a majority of the voting of the shares entitled to vote who are present, in person or by proxy, shall call to order any meeting of the stockholders and act as chairman of the meeting. In the absence of the Secretary of the Corporation, the secretary of the meeting shall be such person as the chairman of the meeting appoints.

2.7 CONDUCT OF BUSINESS.

The chairperson of any meeting of stockholders shall determine the order of business and the procedure at the meeting, including the manner of voting and the conduct of business. The chairman shall have the power to adjourn the meeting to another place, if any, date and time. The date and time of the opening and closing of the polls for each matter upon which the stockholders will vote at the meeting shall be announced at the meeting.

2.8 VOTING.

(a) Except as may be otherwise provided in the Restated Certificate of Incorporation or by law, each stockholder shall be entitled to one vote for each share of capital stock held by such stockholder.

(b) All elections shall be determined by a plurality of the votes cast, and except as otherwise required by law or the rules of any stock exchange upon which the Corporation's securities are listed, all other matters shall be determined by a majority of the votes cast affirmatively or negatively.

2.9 STOCKHOLDER ACTION BY WRITTEN CONSENT WITHOUT A MEETING.

Subject to the rights of the holders of the shares of any series of preferred stock, any action required or permitted to be taken by the stockholders of the Corporation must be effected at a duly called annual or special meeting of stockholders of the Corporation and may not be effected by any consent in writing by such stockholders.

2.10 WAIVER OF NOTICE.

Whenever notice is required to be given under any provision of the DGCL or of the Restated Certificate of Incorporation or these Bylaws to a stockholder, a written waiver thereof, signed by the person entitled to notice, whether before or after the time of the event for which notice is to be given, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the stockholders need be specified in any written waiver of notice unless so required by the Restated Certificate of Incorporation or these Bylaws.

2.11 RECORD DATE FOR STOCKHOLDER NOTICE; VOTING.

In order that the Corporation may determine the stockholders entitled to notice of any meeting of stockholders or any adjournment thereof, the Board of Directors may, except as otherwise required by law, fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board of Directors, and which record date shall not be more than sixty (60) nor less than ten (10) days before the date of such meeting. If the Board of Directors so fixes a date, such date shall also be the record date for determining the stockholders entitled to vote at such meeting unless the Board of Directors determines, at the time it fixes such record date, that a later date on or before the date of the meeting shall be the date for making such determination. If no record date is fixed by the Board of Directors, the record date for determining stockholders entitled to notice of and to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the Board of Directors may fix a new record date for determination of stockholders entitled to vote at the adjourned meeting, and in such case shall also fix as the record date for stockholders entitled to notice of such adjourned meeting the same or an earlier date as that fixed for determination of stockholders entitled to vote in accordance with the foregoing provisions of this Section at the adjourned meeting.

In order that the Corporation may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights or the stockholders entitled to exercise any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action, the Board of Directors may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted, and which record date shall be not more than sixty (60) days prior to such action. If no record date is fixed, the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

2.12 PROXIES.

Each stockholder entitled to vote at a meeting of stockholders may authorize another person or persons to act for such stockholder by a written proxy, signed by the stockholder and filed with the secretary of the Corporation, but no such proxy shall be voted or acted upon after three years from its date, unless the proxy provides for a longer period. A proxy shall be deemed signed if the stockholder's name is placed on the proxy (whether by manual signature, typewriting, electronic or telegraphic transmission or otherwise) by the stockholder or the stockholder's attorney-in-fact. The revocability of a proxy that states on its face that it is irrevocable shall be governed by the provisions of Section 212(e) of the DGCL.

ARTICLE III

DIRECTORS

3.1 POWERS.

Subject to the provisions of the DGCL and any limitations in the Certificate of Incorporation or these Bylaws relating to action required to be approved by the stockholders or by the outstanding shares, the business and affairs of the Corporation shall be managed and all corporate powers shall be exercised by or under the direction of the Board of Directors. In addition to the powers and authorities these Bylaws expressly confer upon them, the Board of Directors may exercise all such powers of the Corporation.

3.2 NUMBER OF DIRECTORS.

Subject to the rights of the holders of any series of preferred stock to elect directors under specified circumstances, the number of directors shall be fixed from time to time exclusively by the Board of Directors pursuant to a resolution adopted by a majority of the Whole Board.

3.3 ELECTION, QUALIFICATION AND TERM OF OFFICE OF DIRECTORS.

The Board shall be divided into three (3) classes, Class I, Class II and Class III, effective at the same time that the stockholders appoint and elect directors to the inaugural classes of Class I, Class II and Class III. Each director shall serve for a term expiring at the third annual meeting following his or her election; *provided, that*, with respect to the directors serving in the inaugural classes of Class I, Class II and Class III, the terms of the directors serving in Class I shall expire at the Corporation's first annual meeting of stockholders held after the effectiveness of the division of the Board into three (3) classes; the terms of the directors serving in Class II shall expire at the Corporation's second annual meeting of stockholders held after such effectiveness; and the terms of the directors serving in Class III shall expire at the Corporation's third annual meeting of stockholders held after such effectiveness. The Board of Directors and/or any committee thereof shall ensure that any nominee for election to the Board nominated by such body provide a written statement of such person's intent to serve a full term as a director if elected.

3.4 RESIGNATION AND VACANCIES.

Subject to the rights of the holders of any series of preferred stock then outstanding, newly created directorships resulting from any increase in the authorized number of directors or any vacancies in the Board of Directors resulting from death, resignation, retirement, disqualification, removal from office or other cause shall, unless otherwise required by law or by resolution of the Board of Directors, be filled only by a majority vote of the directors then in office, though less than a quorum (and not by the stockholders), and directors so chosen shall serve for a term expiring at the annual meeting of stockholders at which the term of office of the class to which they have been elected expires or until such director's successor shall have been duly elected and qualified. No decrease in the number of authorized directors shall shorten the term of any incumbent director.

3.5 PLACE OF MEETINGS; MEETINGS BY TELEPHONE.

The Board of Directors of the Corporation may hold meetings, both regular and special, either within or outside the State of Delaware. Unless otherwise restricted by the Restated Certificate of Incorporation or these Bylaws, members of the Board of Directors, or any committee designated by the Board of Directors, may participate in a meeting of the Board of Directors, or any committee, by means of conference telephone or similar communications equipment by means of which all persons participating in the meeting can hear each other, and such participation in a meeting shall constitute presence in person at the meeting.

3.6 REGULAR MEETINGS.

Regular meetings of the Board of Directors may be held without notice at such time and at such place as shall from time to time be determined by the Board of Directors.

3.7 SPECIAL MEETINGS; NOTICE.

Special meetings of the Board of Directors for any purpose or purposes may be called at any time by the chairperson of the board, the president, any vice president, the secretary or a majority of the Whole Board.

Notice of the time and place of special meetings shall be (i) delivered personally by courier or telephone to each director, (ii) sent by first-class mail, postage prepaid, (iii) sent by facsimile, or (iv) by electronic mail, directed to each director at that director's address, telephone number, facsimile number or electronic mail address as it is shown on the records of the Corporation. If the notice is mailed, it shall be deposited in the United States mail at least four (4) days before the time of the holding of the meeting. If the notice is (i) delivered personally by hand, by courier or by telephone, (ii) sent by facsimile or (iii) sent by electronic mail, it shall be delivered at least twenty-four (24) hours before the time of the holding of the meeting, or on such shorter notice as the person or persons calling such meeting may deem necessary and appropriate in the circumstances. Any oral notice given personally or by telephone may be communicated either to the director or to a person at the office of the director who the person giving the notice has reason to believe will promptly communicate it to the director. Notice of any meeting need not be given to any director who shall, either before or after the meeting, submit a waiver of such notice or who shall attend such meeting except attendance for the express purpose of objecting at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened. The notice need not specify the purpose of the meeting, and unless otherwise indicated in the notice thereof, any and all business may be transacted at a special meeting.

3.8 QUORUM AND VOTING.

At all meetings of the Board of Directors, a majority of the Whole Board shall constitute a quorum for the transaction of business and the vote of a majority of the directors present at any meeting at which there is a quorum shall be the act of the Board of Directors, except as may be otherwise specifically provided by statute or by the Restated Certificate of Incorporation. If a quorum is not present at any meeting of the Board of Directors, then the majority of directors present thereat may adjourn the meeting from time to time, without notice other than announcement at the meeting, until a quorum is present.

3.9 WAIVER OF NOTICE.

Whenever notice is required to be given under any provision of the DGCL or of the Restated Certificate of Incorporation or these Bylaws to a director, a written waiver thereof, signed by the person entitled to notice, whether before or after the time of the event for which notice is to be given, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the directors, or members of a committee of directors, need be specified in any written waiver of notice unless so required by the Restated Certificate of Incorporation or these Bylaws.

3.10 BOARD ACTION BY WRITTEN CONSENT WITHOUT A MEETING.

Unless otherwise restricted by the Restated Certificate of Incorporation or these Bylaws, any action required or permitted to be taken at any meeting of the Board of Directors, or of any committee thereof, may be taken without a meeting if all members of the Board of Directors or committee, as the case may be, consent thereto in writing or by electronic transmission and the writing or writings or electronic transmission or transmissions are filed with the minutes of proceedings of the Board of Directors or committee. Written consents representing actions taken by the board or committee may be executed by telex, telecopy or other facsimile transmission, and such facsimile shall be valid and binding to the same extent as if it were an original. Such action by written consent shall have the same force and effect as a unanimous vote of the Board of Directors.

3.11 FEES AND COMPENSATION OF DIRECTORS.

Unless otherwise restricted by the Restated Certificate of Incorporation or these Bylaws, the Board of Directors shall have the authority to fix the compensation of directors. No such compensation shall preclude any director from serving the Corporation in any other capacity and receiving compensation therefor.

3.12 REMOVAL OF DIRECTORS.

Unless otherwise restricted by statute, by the Restated Certificate of Incorporation or by these Bylaws, any director or the entire Board of Directors may be removed, but only for cause, by the holders of a majority of the shares then entitled to vote at an election of directors, voting together as a single class.

No reduction of the authorized number of directors shall have the effect of removing any director prior to the expiration of such director's term of office.

3.13 CHAIRPERSON OF THE BOARD OF DIRECTORS.

The Corporation may also have, at the discretion of the Board of Directors, a Chairperson of the Board of Directors who shall not be considered an officer of the Corporation.

3.14 EMERGENCY BYLAWS.

To the fullest extent permitted by law, in the event of any emergency, disaster or catastrophe, as referred to in Section 110 of the DGCL, or other similar emergency condition, the Board of Directors may adopt emergency bylaws.

ARTICLE IV

COMMITTEES

4.1 COMMITTEES OF DIRECTORS.

The Board of Directors may, by resolution passed by a majority of the Whole Board, designate one or more committees, with each committee to consist of one or more of the directors of the Corporation. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of a committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not such member or members constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in the place of any such absent or disqualified member. Any such committee, to the extent provided in the resolution of the Board of Directors or in the Bylaws of the Corporation, shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the Corporation, and may authorize the seal of the Corporation to be affixed to all papers that may require it; but no such committee shall have the power or authority to (a) approve or adopt or recommend any action or matter (other than election or removal of directors) expressly required by the DGCL to be submitted to stockholders or (b) amend the Bylaws of the Corporation.

4.2 COMMITTEE MINUTES.

Each committee shall keep regular minutes of its meetings and report the same to the Board of Directors when required.

4.3 MEETINGS AND ACTION OF COMMITTEES.

Each committee may determine the procedural rules for meeting and conducting its business and shall act in accordance therewith, except as otherwise provided herein or required by law. Adequate provision shall be made for notice to members of all meetings; one-third (1/3) of the members shall constitute a quorum unless the committee shall consist of one or two members, in which event one member shall constitute a quorum; and all matters shall be determined by a majority vote of the members present. Action may be taken by any committee without a meeting if all members thereof consent thereto in writing or by electronic transmission, and the writing or writings or electronic transmission or transmissions are filed with the minutes of the proceedings of such committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

ARTICLE V

OFFICERS

5.1 OFFICERS.

The officers of the Corporation shall be a chief executive officer, a president, a secretary, and a chief financial officer. The Corporation may also have, at the discretion of the Board of Directors, one or more vice presidents, one or more assistant secretaries, a treasurer, one or more assistant treasurers, and any such other officers as may be appointed in accordance with the provisions of Section 5.3 of these Bylaws. Any number of offices may be held by the same person.

5.2 APPOINTMENT OF OFFICERS.

The officers of the Corporation, except such officers as may be appointed in accordance with the provisions of Sections 5.3 or 5.5 of these Bylaws, shall be appointed by the Board of Directors, subject to the rights, if any, of an officer under any contract of employment.

5.3 SUBORDINATE OFFICERS.

The Board of Directors may appoint, or empower the chief executive officer or the president to appoint, such other officers and agents as the business of the Corporation may require, each of whom shall hold office for such period, have such authority, and perform such duties as are provided in these Bylaws or as the Board of Directors may from time to time determine.

5.4 REMOVAL AND RESIGNATION OF OFFICERS.

Subject to the rights, if any, of an officer under any contract of employment, any officer may be removed, either with or without cause, by an affirmative vote of the majority of the Board of Directors or, except in the case of an officer chosen by the Board of Directors, by any officer upon whom such power of removal may be conferred by the Board of Directors.

Any officer may resign at any time by giving written notice to the attention of the secretary of the Corporation. Any resignation shall take effect at the date of the receipt of that notice or at any later time specified in that notice; and, unless otherwise specified in that notice, the acceptance of the resignation shall not be necessary to make it effective. Any resignation is without prejudice to the rights, if any, of the Corporation under any contract to which the officer is a party.

5.5 VACANCIES IN OFFICES.

Any vacancy occurring in any office of the Corporation shall be filled by the Board of Directors.

5.6 CHIEF EXECUTIVE OFFICER.

Subject to such supervisory powers, if any, as may be given by the Board of Directors to the chairperson of the board, if any, the chief executive officer of the Corporation shall, subject to the control of the Board of Directors, have general supervision, direction, and control of the business and the officers of the Corporation. He or she shall preside at all meetings of the stockholders and, in the absence or nonexistence of a chairperson of the board, at all meetings of the Board of Directors and shall have the general powers and duties of management usually vested in the office of chief executive officer of a corporation and shall have such other powers and duties as may be prescribed or delegated by the Board of Directors or these Bylaws.

5.7 PRESIDENT.

Subject to such supervisory powers, if any, as may be given by the Board of Directors to the chairperson of the board (if any) or the chief executive officer, the president shall have general supervision, direction, and control of the business and other officers of the Corporation. He or she shall have the general powers and duties of management usually vested in the office of president of a corporation and such other powers and duties as may be prescribed or delegated by the Board of Directors or these Bylaws.

5.8 VICE PRESIDENTS.

In the absence or disability of the chief executive officer and president, the vice presidents, if any, in order of their rank as fixed by the Board of Directors or, if not ranked, a vice president designated by the Board of Directors, shall perform all the duties of the president and when so acting shall have all the powers of, and be subject to all the restrictions upon, the president. The vice presidents shall have such other powers and perform such other duties as from time to time may be prescribed or delegated to them respectively by the Board of Directors, these Bylaws, the president or the chairperson of the board.

5.9 SECRETARY.

The secretary shall keep or cause to be kept, at the principal executive office of the Corporation or such other place as the Board of Directors may direct, a book of minutes of all meetings and actions of directors, committees of directors, and stockholders. The minutes shall show the time and place of each meeting, the names of those present at directors' meetings or committee meetings, the number of shares present or represented at stockholders' meetings, and the proceedings thereof.

The secretary shall keep, or cause to be kept, at the principal executive office of the Corporation or at the office of the Corporation's transfer agent or registrar, as determined by resolution of the Board Of Directors, a share register, or a duplicate share register, showing the names of all stockholders and their addresses, the number and classes of shares held by each, the number and date of certificates evidencing such shares, and the number and date of cancellation of every certificate surrendered for cancellation.

The secretary shall give, or cause to be given, notice of all meetings of the stockholders and of the Board of Directors required to be given by law or by these Bylaws. He or she shall keep the seal of the Corporation, if one be adopted, in safe custody and shall have such other powers and perform such other duties as may be prescribed or delegated by the Board of Directors or by these Bylaws.

5.10 CHIEF FINANCIAL OFFICER.

The chief financial officer shall keep and maintain, or cause to be kept and maintained, adequate and correct books and records of accounts of the properties and business transactions of the Corporation, including accounts of its assets, liabilities, receipts, disbursements, gains, losses, capital retained earnings, and shares. The books of account shall at all reasonable times be open to inspection by any director.

The chief financial officer shall deposit all moneys and other valuables in the name and to the credit of the Corporation with such depositories as may be designated by the Board of Directors. He or she shall disburse the funds of the Corporation as may be ordered by the Board of Directors, shall render to the president, the chief executive officer, or the directors, upon request, an account of all his or her transactions as chief financial officer and of the financial condition of the Corporation, and shall have other powers and perform such other duties as may be prescribed or delegated by the Board of Directors or the Bylaws.

5.11 REPRESENTATION OF SHARES OF OTHER CORPORATIONS.

The chairperson of the board, the chief executive officer, the president, any vice president, the chief financial officer, the secretary or assistant secretary of this Corporation, or any other person authorized by the Board of Directors or the chief executive officer or the president or a vice president, is authorized to vote, represent, and exercise on behalf of this Corporation all rights incident to any and all shares of any other corporation or corporations held by this Corporation. The authority granted herein may be exercised either by such person directly or by any other person authorized to do so by proxy or power of attorney duly executed by the person having such authority.

5.12 AUTHORITY AND DUTIES OF OFFICERS.

In addition to the foregoing authority and duties, all officers of the Corporation shall respectively have such authority and perform such duties in the management of the business of the Corporation as may be designated or delegated from time to time by the Board of Directors.

ARTICLE VI

INDEMNIFICATION OF DIRECTORS, OFFICERS, EMPLOYEES, AND OTHER AGENTS

6.1 RIGHT TO INDEMNIFICATION.

Each person who was or is made a party or is threatened to be made a party to or is otherwise involved in any action, suit or proceeding, whether civil, criminal, administrative or investigative (hereinafter a “proceeding”), by reason of the fact that he or she is or was a director or an officer of the Corporation or is or was serving at the request of the Corporation as a director, officer or trustee of another corporation or of a partnership, joint venture, trust or other enterprise, including service with respect to an employee benefit plan (hereinafter an “indemnitee”), whether the basis of such proceeding is alleged action in an official capacity as a director, officer or trustee or in any other capacity while serving as a director, officer or trustee, shall be indemnified and held harmless by the Corporation to the fullest extent permitted by Delaware law, as the same exists or may hereafter be amended (but, in the case of any such amendment, only to the extent that such amendment permits the Corporation to provide broader indemnification rights than such law permitted the Corporation to provide prior to such amendment), against all expense, liability and loss (including attorneys’ fees, judgments, fines, ERISA excise taxes or penalties and amounts paid in settlement) reasonably incurred or suffered by such indemnitee in connection therewith; provided, however, that, except as provided in Section 6.3 of this Article VI with respect to proceedings to enforce rights to indemnification, the Corporation shall indemnify any such indemnitee in connection with a proceeding (or part thereof) initiated by such indemnitee only if such proceeding (or part thereof) was authorized by the Board of Directors of the Corporation.

6.2 POWER TO ADVANCE EXPENSES

The Corporation shall have the power to advance expenses to any person to the fullest extent permitted by law.

6.3 RIGHT OF INDEMNITEE TO BRING SUIT.

If a claim under Section 6.1 of this Article VI is not paid in full by the Corporation within sixty (60) days after a written claim has been received by the Corporation, the indemnitee may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim. To the fullest extent permitted by law, if successful in whole or in part in any such suit, the indemnitee shall be entitled to be paid also the expense of prosecuting or defending such suit. In any suit brought by the indemnitee to enforce a right to indemnification hereunder it shall be a defense that the indemnitee has not met any applicable standard for indemnification set forth in the DGCL. Neither the failure of the Corporation (including its directors who are not parties to such action, a committee of such directors, independent legal counsel, or its stockholders) to have made a determination prior to the commencement of such suit that indemnification of the indemnitee is proper in the circumstances because the indemnitee has met the applicable standard of conduct set forth in the DGCL, nor an actual determination by the Corporation (including its directors who are not parties to such action, a committee of such directors, independent legal counsel, or its stockholders) that the indemnitee has not met such applicable standard of conduct, shall create a presumption that the indemnitee has not met the applicable standard of conduct or, in the case of such a suit brought by the indemnitee, be a defense to such suit. In any suit brought by the indemnitee to enforce a right to indemnification hereunder, the burden of proving that the indemnitee is not entitled to be indemnified, under this Article VI or otherwise shall be on the Corporation.

6.4 NON-EXCLUSIVITY OF RIGHTS.

The rights to indemnification conferred in this Article VI shall not be exclusive of any other right which any person may have or hereafter acquire under any statute, the Corporation's Restated Certificate of Incorporation, Bylaws, agreement, vote of stockholders or directors or otherwise.

6.5 INSURANCE.

The Corporation may maintain insurance, at its expense, to protect itself and any director, officer, employee or agent of the Corporation or another corporation, partnership, joint venture, trust or other enterprise against any expense, liability or loss, whether or not the Corporation would have the power to indemnify such person against such expense, liability or loss under the DGCL.

6.6 INDEMNIFICATION OF EMPLOYEES AND AGENTS OF THE CORPORATION.

The Corporation may, to the extent authorized from time to time by the Board of Directors, grant rights to indemnification and to the advancement of expenses to any employee or agent of the Corporation to the fullest extent permitted by law.

6.7 NATURE OF RIGHTS.

(a) The rights conferred upon indemnitees in this Article VI shall be contract rights and such rights shall continue as to an indemnitee who has ceased to be a director, officer or trustee and shall inure to the benefit of the indemnitee's heirs, executors and administrators. Any amendment, alteration or repeal of this Article VI that adversely affects any right of an indemnitee or its successors shall be prospective only and shall not limit, eliminate, or impair any such right with respect to any proceeding involving any occurrence or alleged occurrence of any action or omission to act that took place prior to such amendment or repeal.

ARTICLE VII

RECORDS AND REPORTS

7.1 MAINTENANCE AND INSPECTION OF RECORDS; STOCKLIST.

The Corporation shall, either at its principal executive offices or at such place or places as designated by the Board of Directors, keep a record of its stockholders listing their names and addresses and the number and class of shares held by each stockholder, a copy of these Bylaws as amended to date, accounting books, and other records.

The officer who has charge of the stock ledger of the Corporation shall, at least ten (10) days before every meeting of stockholders, prepare and make a complete list of stockholders entitled to vote at any meeting of stockholders, provided, however, if the record date for determining the stockholders entitled to vote is less than ten (10) days before the meeting date, the list shall reflect the stockholders entitled to vote as of the tenth (10th) day before the meeting date, arranged in alphabetical order for each class of stock and showing the address of each such stockholder and the number of shares registered in his or her name. Such list shall be open to the examination of any stockholder for a period of at least ten (10) days prior to the meeting in the manner provided by law.

A stock list shall also be open to the examination of any stockholder during the whole time of the meeting as provided by law. This list shall presumptively determine (a) the identity of the stockholders entitled to examine such stock list and to vote at the meeting and (b) the number of shares held by each of them.

ARTICLE VIII

GENERAL MATTERS

8.1 CHECKS.

From time to time, the Board of Directors shall determine by resolution which person or persons may sign or endorse all checks, drafts, other orders for payment of money, notes or other evidences of indebtedness that are issued in the name of or payable to the Corporation, and only the persons so authorized shall sign or endorse those instruments.

8.2 EXECUTION OF CORPORATE CONTRACTS AND INSTRUMENTS.

The Board of Directors, except as otherwise provided in these Bylaws, may authorize any officer or officers, or agent or agents, to enter into any contract or execute any instrument in the name of and on behalf of the Corporation; such authority may be general or confined to specific instances. Unless so authorized or ratified by the Board of Directors or within the agency power of an officer, no officer, agent or employee shall have any power or authority to bind the Corporation by any contract or engagement or to pledge its credit or to render it liable for any purpose or for any amount.

8.3 STOCK CERTIFICATES.

The shares of the Corporation shall be represented by certificates, provided that the Board of Directors of the Corporation may provide by resolution or resolutions that some or all of any or all classes or series of its stock shall be uncertificated shares. Any such resolution shall not apply to shares represented by a certificate until such certificate is surrendered to the Corporation. Each holder of stock represented by certificates shall be entitled to a certificate signed by, or in the name of the Corporation by, the President or a Vice President, and by the Secretary or an Assistant Secretary, or the Treasurer or an Assistant Treasurer, certifying the number of shares owned by him or her. Any or all of the signatures on the certificate may be a facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed upon a certificate has ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Corporation with the same effect as if he or she were such officer, transfer agent or registrar at the date of issue. Notwithstanding any other provision in these Bylaws, the Corporation may adopt a system of issuance, recordation and transfer of shares of the Corporation by electronic or other means not involving any issuance of certificates, including provisions for notice to purchasers in substitution for any required statements on certificates, and as may be required by applicable corporate securities laws, which system has been approved by the Securities and Exchange Commission. Any system so adopted shall not become effective as to issued and outstanding certificated securities until the certificates therefor have been surrendered to the Corporation.

8.4 LOST, STOLEN OR DESTROYED CERTIFICATES.

Except as provided in this Section 8.4, no new certificates for shares shall be issued to replace a previously issued certificate unless the latter is surrendered to the Corporation and canceled at the same time. The Corporation may issue a new certificate of stock or uncertificated shares in the place of any certificate previously issued by it, alleged to have been lost, stolen or destroyed, and the Corporation may require the owner of the lost, stolen or destroyed certificate, or the owner's legal representative, to give the Corporation a bond sufficient to indemnify it against any claim that may be made against it on account of the alleged loss, theft or destruction of any such certificate or the issuance of such new certificate or uncertificated shares.

8.5 CONSTRUCTION; DEFINITIONS.

Unless the context requires otherwise, the general provisions, rules of construction, and definitions in the DGCL shall govern the construction of these Bylaws. Without limiting the generality of this provision, the singular number includes the plural, the plural number includes the singular, and the term "person" includes both a corporation and a natural person.

8.6 DIVIDENDS.

The directors of the Corporation, subject to any restrictions contained in (a) the DGCL or (b) the Restated Certificate of Incorporation, may declare and pay dividends upon the shares of its capital stock. Dividends may be paid in cash, in property, or in shares of the Corporation's capital stock.

The directors of the Corporation may set apart out of any of the funds of the Corporation available for dividends a reserve or reserves for any proper purpose and may abolish any such reserve. Such purposes shall include but not be limited to equalizing dividends, repairing or maintaining any property of the Corporation, and meeting contingencies.

8.7 FISCAL YEAR.

The fiscal year of the Corporation shall be fixed by resolution of the Board of Directors and may be changed by the Board of Directors.

8.8 REGISTERED STOCKHOLDERS.

The Corporation shall be entitled to recognize the exclusive right of a person registered on its books as the owner of shares to receive dividends and to vote as such owner, shall be entitled to hold liable for calls and assessments the person registered on its books as the owner of shares, and shall not be bound to recognize any equitable or other claim to or interest in such share or shares on the part of another person, whether or not it shall have express or other notice thereof, except as otherwise provided by the laws of Delaware.

8.9 TIME PERIODS.

In applying any provision of these Bylaws which requires that an act be done or not be done a specified number of days prior to an event or that an act be done during a period of a specified number of days prior to an event, calendar days shall be used, the day of the doing of the act shall be excluded, and the date of the event shall be included.

ARTICLE IX

NOTICE BY ELECTRONIC TRANSMISSION

9.1 NOTICE BY ELECTRONIC TRANSMISSION.

Without limiting the manner by which notice otherwise may be given effectively to stockholders pursuant to the DGCL, the Restated Certificate of Incorporation or these Bylaws, any notice shall be effective if given by a form of electronic transmission in the manner provided in Section 232 of the DGCL.

ARTICLE X
AMENDMENTS

In furtherance and not in limitation of the powers conferred by law, the Board of Directors is expressly authorized to adopt, amend and repeal these Bylaws subject to the power of the holders of capital stock of the Corporation to adopt, amend or repeal the Bylaws; provided, however, that, with respect to the power of holders of capital stock to adopt, amend and repeal Bylaws of the Corporation, notwithstanding any other provision of these Bylaws or any provision of law which might otherwise permit a lesser vote or no vote, but in addition to any affirmative vote of the holders of any particular class or series of the capital stock of the Corporation required by law, these Bylaws or any preferred stock, the affirmative vote of the holders of at least sixty-six and two-thirds percent (66 $\frac{2}{3}$)% of the voting power of all of the then-outstanding shares entitled to vote generally in the election of directors, voting together as a single class, shall be required to adopt, amend or repeal any provision of these Bylaws.

* * *

<p>NUMBER</p> <p>TB</p>		<p>SHARES</p>	
<p>INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE</p>		<p>CUSIP 90164D 10 0</p> <p>SEE REVERSE FOR CERTAIN DEFINITIONS AND LEGENDS</p>	
<p>This certifies that</p> <div style="border: 1px solid gray; height: 100px; width: 100%; background-color: #f0f0f0;"></div>			
<p>is the record holder of</p> <p>FULLY PAID AND NONASSESSABLE SHARES OF COMMON STOCK, \$0.00001 PAR VALUE, OF</p> <p>TWIST BIOSCIENCE CORPORATION</p> <p>transferable on the books of the corporation in person or by duly authorized attorney upon surrender of this Certificate properly endorsed. This Certificate is not valid until countersigned by the Transfer Agent and registered by the Registrar.</p> <p>WITNESS the facsimile seal of the Corporation and the facsimile signatures of its duly authorized officers.</p> <p>Dated:</p>			
<p>PRESIDENT & CHIEF EXECUTIVE OFFICER</p>		<p>SECRETARY</p>	<p>COUNTERSIGNED AND REGISTERED AMERICAN STOCK TRANSFER COMPANY, LLC <small>PROVIDENT, MD</small> TRANSFER AGENT AND REGISTRAR</p> <p>BY: _____</p> <p>AUTHORIZED SIGNATURE</p>

The Corporation shall furnish without charge to each stockholder who so requests a statement of the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock of the Corporation or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights. Such requests shall be made to the Corporation's Secretary at the principal office of the Corporation.

KEEP THIS CERTIFICATE IN A SAFE PLACE. IF IT IS LOST, STOLEN, OR DESTROYED THE CORPORATION WILL REQUIRE A BOND INDEMNITY AS A CONDITION TO THE ISSUANCE OF A REPLACEMENT CERTIFICATE.

The following abbreviations, when used in the inscription on the face of this certificate, shall be construed as though they were written out in full according to applicable laws or regulations:

TEN COM - as tenants in common
 TEN ENT - as tenants by the entireties
 JT TEN - as joint tenants with right of survivorship and not as tenants in common
 COM PROP - as community property

UNIF GIFT MIN ACT - Custodian
 (Cust) (Minor)
 under Uniform Gifts to Minors Act
 (State)
 UNIF TRF MIN ACT - Custodian (until age)
 (Cust) (Minor)
 under Uniform Transfers to Minors Act
 (State)

Additional abbreviations may also be used though not in the above list.

FOR VALUE RECEIVED, _____ hereby sell(s), assign(s) and transfer(s) unto

PLEASE INSERT SOCIAL SECURITY OR OTHER IDENTIFYING NUMBER OF ASSIGNEE

(PLEASE PRINT OR TYPEWRITE NAME AND ADDRESS, INCLUDING ZIP CODE, OF ASSIGNEE)

_____ shares of the capital stock represented by within Certificate, and do hereby irrevocably constitute and appoint

_____ attorney-in-fact to transfer the said stock on the books of the within named Corporation with full power of the substitution in the premises.

Dated _____

X _____
 X _____
 Signature(s) Guaranteed:

NOTICE: THE SIGNATURE TO THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THE CERTIFICATE IN EVERY PARTICULAR, WITHOUT ALTERATION OR ENLARGEMENT OR ANY CHANGE WHATSOEVER.

By _____

THE SIGNATURE(S) SHOULD BE GUARANTEED BY AN ELIGIBLE GUARANTOR INSTITUTION, (BANKS, STOCKBROKERS, SAVINGS AND LOAN ASSOCIATIONS AND CREDIT UNIONS WITH MEMBERSHIP IN AN APPROVED SIGNATURE GUARANTEE MEDALLION PROGRAM), PURSUANT TO S.E.C. RULE 17A6-15. GUARANTEES BY A NOTARY PUBLIC ARE NOT ACCEPTABLE. SIGNATURE GUARANTEES MUST NOT BE DATED.

AMENDED AND RESTATED REGISTRATION RIGHTS AGREEMENT

This AMENDED AND RESTATED REGISTRATION RIGHTS AGREEMENT (the "Agreement") is dated as of March 19, 2018, by and among Twist Bioscience Corporation, a Delaware corporation (the "Company"), Emily Leproust, Bill Peck and William Banyai (the "Founders"), the holders of outstanding Preferred Stock of the Company listed on Schedule 1 hereto (the "Existing Preferred Holders") and the purchasers of Series D Preferred Stock of the Company listed on Schedule 2 hereto (the "New Investors," and together with the Existing Preferred holders, the "Investors").

WHEREAS, the Company, the Founders and the Existing Preferred Holders are parties to an Amended and Restated Registration Rights Agreement dated as of January 8, 2016, as amended (the "Prior Agreement");

WHEREAS, the Company and the New Investors are simultaneously entering into a certain Series D Stock Purchase Agreement, dated as of the date hereof (the "Purchase Agreement"), whereby the New Investors have agreed to purchase shares of Series D Preferred Stock (the "Securities") from the Company;

WHEREAS, the execution of this Agreement by the Company is an inducement and a condition precedent to the purchase by the New Investors of the Securities under the Purchase Agreement; and

WHEREAS, the Company, the Founders and the Existing Preferred Holders desire to amend and restate the Prior Agreement in its entirety as set forth herein.

NOW, THEREFORE, in consideration of the premises, as an inducement to the Investors to consummate the transactions contemplated by the Purchase Agreement, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Company and the Investors hereby covenant and agree with each other as follows:

A. Amendment of Prior Agreement; Consent.

Pursuant to Section 10 of the Prior Agreement, effective and contingent upon execution of this Agreement by the Company and the holders of at least a majority of the Registrable Securities, the Prior Agreement is hereby amended and restated in its entirety as set forth in this Agreement, and the Company, the Founders, the Existing Preferred Holders and the New Investors shall be bound by the provisions hereof as the sole agreement of the Company, the Founders, the Existing Preferred Holders and the New Investors with respect to the subject matter hereof.

1. Certain Definitions.

As used in this Agreement, the following terms shall have the following respective meanings:

"Commission" shall mean the United States Securities and Exchange Commission, or any other federal agency administering the Securities Act and the Exchange Act at the time.

“Common Stock” shall mean the Common Stock and any other common equity securities issued by the Company, and any other shares of stock issued or issuable with respect thereto (whether by way of a stock dividend or stock split or in exchange for or upon conversion of such shares or otherwise in connection with a combination of shares, recapitalization, merger, consolidation or other corporate reorganization).

“Exchange Act” shall mean the Securities Exchange Act of 1934, as amended, or any similar successor federal statute, and the rules and regulations of the Commission thereunder, all as the same shall be in effect at the time.

“Fidelity” means, collectively, Fidelity Select Portfolios: Biotechnology Portfolio and Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund, which are individually referred to as each a “Fidelity Purchaser”.

“Founders’ Shares” means the shares of Common Stock issued to the Founders.

“Person” shall mean an individual, a corporation, a partnership, a joint venture, a trust, an unincorporated organization, a limited liability company or partnership, a government and any agency or political subdivision thereof.

“Registrable Securities” shall mean (i) any shares of Common Stock held by the Investors at any time, (ii) the Founders’ Shares, provided, however, that for the purposes of Section 2 and 3 the Founders’ Shares shall not be deemed Registrable Securities and the Founders shall not be deemed Holders and (iii) any other securities issued and issuable to the Investors with respect to any such shares described in clause (i) above by way of a stock dividend or stock split or in connection with a combination of shares, recapitalization, merger, consolidation or other reorganization (it being understood that for purposes of this Agreement, a Person will be deemed to be a holder of Registrable Securities whenever such Person has the right to then acquire or obtain from the Company any Registrable Securities, whether or not such acquisition has actually been effected), including, for the avoidance of doubt, any Common Stock issued upon conversion of Preferred Stock.

“Registration Expenses” shall mean the expenses so described in Section 6 hereof.

“Securities Act” shall mean the Securities Act of 1933, as amended, or any similar successor federal statute, and the rules and regulations of the Commission thereunder, all as the same shall be in effect at the time.

All other capitalized terms not defined herein shall have the meaning set forth in the Purchase Agreement unless otherwise indicated.

2. Demand Registration.

(a) At any time after one hundred eighty (180) days after the initial public offering of the Company’s Common Stock pursuant to an effective registration under the Securities Act, the holders of a majority of the Registrable Securities may notify the Company that they intend to offer or cause to be offered for public sale all or any portion of their Registrable Securities covering the registration of at least such number of the Registrable

Securities having an anticipated aggregate offering price, net of underwriting discounts and commissions, of at least \$10,000,000 in the manner specified in such request. Upon receipt of such request, the Company shall promptly deliver notice of such request to all Investors holding Registrable Securities who shall then have thirty (30) days to notify the Company in writing of their desire to be included in such registration. If the request for registration contemplates an underwritten public offering, the Company shall state such in the written notice and in such event the right of any Person to participate in such registration shall be conditioned upon such Person's participation in such underwritten public offering and the inclusion of such Person's Registrable Securities in the underwritten public offering to the extent provided herein. The Company will use its best efforts to expeditiously effect (but in any event no later than thirty (30) days after such request) the registration of all Registrable Securities whose holders request participation in such registration under the Securities Act, but only to the extent provided for in this Agreement; provided, however, that the Company shall not be required to effect registration pursuant to a request under this Section 2 more than two (2) times for the holders of the Registrable Securities as a group. Notwithstanding anything to the contrary contained herein, no request may be made under this Section 2 within ninety (90) days after the effective date of a registration statement filed by the Company covering a firm commitment underwritten public offering in which the holders of Registrable Securities shall have been entitled to join pursuant to Section 4 and in which there shall have been effectively registered all Registrable Securities as to which registration shall have been requested. A registration will not count as a requested registration under this Section 2(a) unless and until the registration statement relating to such registration has been declared effective by the Commission at the request of the initiating shareholders; provided, however, that a majority in interest of the participating holders of Registrable Securities may request, in writing, that the Company withdraw a registration statement which has been filed under this Section 2(a) but has not yet been declared effective, and a majority in interest of such holders may thereafter request the Company to reinstate such registration statement, if permitted under the Securities Act, or to file another registration statement, in accordance with the procedures set forth herein and without reduction in the number of demand registrations permitted under this Section 2(a).

(b) If a requested registration involves an underwritten public offering and the managing underwriter of such offering determines in good faith that the number of securities sought to be offered should be limited due to market conditions, then the number of securities to be included in such underwritten public offering shall be reduced to a number deemed satisfactory by such managing underwriter; provided, that the shares to be excluded shall be determined in the following order of priority: (i) persons not having any contractual or other right to include such securities in the registration statement, (ii) securities held by any other Persons (other than the holders of Registrable Securities) having a contractual, incidental "piggy back" right to include such securities in the registration statement, (iii) securities to be registered by the Company pursuant to such registration statement and, if necessary, (iv) Registrable Securities. If there is a reduction of the number of Registrable Securities pursuant to clause (iv), such reduction shall be made on a pro rata basis (based upon the aggregate number of Registrable Securities held by such holders).

(c) With respect to a request for registration pursuant to Section 2(a) which is for an underwritten public offering, the managing underwriter shall be chosen by the holders of a majority of the Registrable Securities to be sold in such offering (which approval will not be unreasonably withheld or delayed). The Company may not cause any other registration of securities for sale for its own account (other than a registration effected solely to implement an employee benefit plan or a transaction to which Rule 145 of the Securities Act is applicable) to become effective within one hundred twenty (120) days following the effective date of any registration required pursuant to this Section 2.

3. Form S-3.

After the first public offering of its securities registered under the Securities Act, the Company shall use its best efforts to qualify and remain qualified to register securities pursuant to a registration statement on Form S-3 (or any successor form) under the Securities Act. An Investor or Investors holding Registrable Securities anticipated to have an aggregate sale price (net underwriting discounts and commissions, if any) in excess of \$5,000,000 shall have the right to request any number of registrations on Form S-3 (or any successor form) for the Registrable Securities held by such requesting holders. Such requests shall be in writing and shall state the number of shares of Registrable Securities to be disposed of and the intended method of disposition of such shares by such holder or holders. The Company shall give notice to all other holders of the Registrable Securities of the receipt of a request for registration pursuant to this Section 3 and such holders of Registrable Securities shall then have thirty (30) days to notify the Company in writing of their desire to participate in the registration. The Company shall use its best efforts to effect promptly the registration of all shares on Form S-3 (or a comparable successor form) to the extent requested by such holders. The Company shall use its best efforts to keep such registration statement effective until the earlier of 90 days or until such holders have completed the distribution described in such registration statement.

4. Piggyback Registration.

If the Company at any time proposes to register any of its securities under the Securities Act for sale to the public (except with respect to registration statements on Forms S-4, S-8 or another form not available for registering the Registrable Securities for sale to the public), each such time it will give written notice at the applicable address of record to each holder of Registrable Securities of its intention to do so. Upon the written request of any of such holders of the Registrable Securities, given within twenty (20) days after receipt by such Person of such notice, the Company will, subject to the limits contained in this Section 4, use its best efforts to cause all such Registrable Securities of said requesting holders to be registered under the Securities Act and qualified for sale under any state blue sky law, all to the extent required to permit such sale or other disposition of said Registrable Securities; provided, however, that if the Company is advised in writing in good faith by any managing underwriter of the Company's securities being offered in a public offering pursuant to such registration statement that the amount to be sold by persons other than the Company (collectively, "Selling Stockholders") is greater than the amount which can be offered without adversely affecting the offering, the Company may reduce the amount offered for the accounts of Selling Stockholders (including such holders of shares of Registrable Securities) to a number deemed satisfactory by such managing underwriter; provided, that the Founders' Shares included in such offering shall be reduced prior to any reduction in the amount of shares offered for the account of any Investor; and provided further, that (a) in no event shall the amount of Registrable Securities of selling Investors be reduced below fifty percent (50%) of the total amount of securities included in such

offering, unless such offering is the initial public offering of the Company's securities; and (b) any shares to be excluded shall be determined in the following order of priority: (i) securities held by any Persons not having any such contractual, incidental registration rights, (ii) securities held by any Persons having contractual, incidental registration rights pursuant to an agreement which is not this Agreement, and (iii) the Registrable Securities sought to be included by the holders thereof as determined on a pro rata basis (based upon the aggregate number of Registrable Securities held by such holders).

5. **Registration Procedures.** If and whenever the Company is required by the provisions of this Agreement to use its best efforts to promptly effect the registration of any of its securities under the Securities Act, the Company will:

(a) use its best efforts diligently to prepare and file with the Commission a registration statement on the appropriate form under the Securities Act with respect to such securities, which form shall comply as to form in all material respects with the requirements of the applicable form and include all financial statements required by the Commission to be filed therewith, and use its best efforts to cause such registration statement to become and remain effective until completion of the proposed offering;

(b) use its best efforts to diligently prepare and file with the Commission such amendments and supplements to such registration statement and the prospectus used in connection therewith as may be necessary to keep such registration statement effective until the Holder or Holders have completed the distribution described in such registration statement and to comply with the provisions of the Securities Act with respect to the sale or other disposition of all securities covered by such registration statement whenever the seller or sellers of such securities shall desire to sell or otherwise dispose of the same, but only to the extent provided in this Agreement;

(c) furnish to each selling holder and the underwriters, if any, such number of copies of such registration statement, any amendments thereto, any documents incorporated by reference therein, the prospectus, including a preliminary prospectus, in conformity with the requirements of the Securities Act, and such other documents as such selling holder may reasonably request in order to facilitate the public sale or other disposition of the securities owned by such selling holder;

(d) use its best efforts to register or qualify the securities covered by such registration statement under such other securities or state blue sky laws of such jurisdictions as each selling holder shall request, and do any and all other acts and things which may be necessary under such securities or blue sky laws to enable such selling holder to consummate the public sale or other disposition in such jurisdictions of the securities owned by such selling holder, except that the Company shall not for any such purpose be required to qualify to do business as a foreign corporation in any jurisdiction wherein it is not so qualified;

(e) within a reasonable time before each filing of the registration statement or prospectus or amendments or supplements thereto with the Commission, furnish to counsel selected by the holders of Registrable Securities copies of such documents proposed to be filed, which documents shall be subject to the approval of such counsel;

(f) immediately notify each selling holder of Registrable Securities, such selling holder's counsel and any underwriter and (if requested by any such Person) confirm such notice in writing, of the happening of any event which makes any statement made in the registration statement or related prospectus untrue or which requires the making of any changes in such registration statement or prospectus so that they will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein in the light of the circumstances under which they were made not misleading; and, as promptly as practicable thereafter, prepare and file with the Commission and furnish a supplement or amendment to such prospectus so that, as thereafter deliverable to the purchasers of such Registrable Securities, such prospectus will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading;

(g) use its best efforts to prevent the issuance of any order suspending the effectiveness of a registration statement, and if one is issued use its best efforts to obtain the withdrawal of any order suspending the effectiveness of a registration statement at the earliest possible moment;

(h) if requested by the managing underwriter or underwriters (if any), any selling holder, or such selling holder's counsel, promptly incorporate in a prospectus supplement or post effective amendment such information as such Person requests to be included therein, including, without limitation, with respect to the securities being sold by such selling holder to such underwriter or underwriters, the purchase price being paid therefor by such underwriter or underwriters and with respect to any other terms of an underwritten offering of the securities to be sold in such offering, and promptly make all required filings of such prospectus supplement or post effective amendment;

(i) make available to each selling holder, any underwriter participating in any disposition pursuant to a registration statement, and any attorney, accountant or other agent or representative retained by any such selling holder or underwriter (collectively, the "Inspectors"), all financial and other records, pertinent corporate documents and properties of the Company (collectively, the "Records"), as shall be reasonably necessary to enable them to exercise their due diligence responsibility, and cause the Company's officers, directors and employees to supply all information requested by any such Inspector in connection with such registration statement;

(j) enter into any reasonable underwriting agreement required by the proposed underwriter(s) for the selling holders, if any, and use its best efforts to facilitate the public offering of the securities;

(k) furnish to each prospective selling holder a signed counterpart, addressed to the prospective selling holder, of (A) an opinion of counsel for the Company, dated the effective date of the registration statement, and (B) a "comfort" letter signed by the independent public accountants who have certified the Company's financial statements included in the registration statement, covering substantially the same matters with respect to the registration statement (and the prospectus included therein) and (in the case of the accountants' letter) with respect to events subsequent to the date of the financial statements, as are customarily covered (at the time of such registration) in opinions of the Company's counsel and in accountants' letters delivered to the underwriters in underwritten public offerings of securities;

(l) cause the securities covered by such registration statement to be listed on the securities exchange or quoted on the quotation system on which the Common Stock of the Company is then listed or quoted (or if the Common Stock is not yet listed or quoted, then on such exchange or quotation system as the selling holders of Registrable Securities and the Company shall determine);

(m) otherwise use its best efforts to comply with all applicable rules and regulations of the Commission and make generally available to its security holders, in each case as soon as practicable, but not later than 30 days after the close of the period covered thereby, an earnings statement of the Company which will satisfy the provisions of Section 11(a) of the Securities Act and Rule 158 thereunder (or any comparable successor provisions);

(n) otherwise cooperate with the underwriter(s), the Commission and other regulatory agencies and take all actions and execute and deliver or cause to be executed and delivered all documents necessary to effect the registration of any securities under this Agreement; and

(o) during the period when the prospectus is required to be delivered under the Securities Act, promptly file all documents required to be filed with the Commission pursuant to Sections 13(a), 13(c), 14, or 15(d) of the Exchange Act.

6. **Expenses.** All expenses incurred by the Company or the Investors in effecting the registrations provided for in Sections 2, 3 and 4, including, without limitation, all registration and filing fees, printing expenses, fees and disbursements of counsel for the Company, and one counsel (which such counsel's fees and disbursements shall be in an amount not to exceed \$50,000 per registration for Sections 2 and 4, and not to exceed \$35,000 for Section 3) for the Investors participating in such registration as a group (selected by the holders of a majority of the Registrable Securities who participate in the registration), underwriting expenses (other than fees, commissions or discounts), expenses of any audits incident to or required by any such registration and expenses of complying with the securities or blue sky laws of any jurisdictions (all of such expenses referred to as "Registration Expenses"), shall be paid by the Company. Notwithstanding the foregoing, all underwriting discounts, selling commissions and stock transfer taxes, and fees and disbursements of counsel to Investors as a group not provided for above that are incurred by the Investors in effecting the registrations provided for in Section 3 shall be paid by the Investors pro rata on the basis of the number of Registrable Securities registered on their behalf.

7. **Indemnification.**

(a) To the maximum extent permitted by law, the Company shall indemnify and hold harmless each Investor that is a selling holder of Registrable Securities (including its partners (including partners of partners and shareholders of such partners)), each underwriter (as defined in the Securities Act), and directors, officers, employees and agents of any of them, and each other Person who participates in the offering of such securities and each other Person, if

any, who controls (within the meaning of the Securities Act) such seller, underwriter or participating Person (individually and collectively, the “Indemnified Person”) against any losses, claims, damages or liabilities (collectively, the “liability”), joint or several, to which such Indemnified Person may become subject under the Securities Act or any other statute or at common law, insofar as such liability (or action in respect thereof) arises out of or is based upon (i) any untrue statement or alleged untrue statement of any material fact contained, on the effective date thereof, in any registration statement under which such securities were registered under the Securities Act, any preliminary prospectus or final prospectus contained therein, or any amendment or supplement thereto, or (ii) any omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, or (iii) any violation by the Company of the Securities Act, any state securities or “blue sky” laws or any sale or regulation thereunder in connection with such registration. Except as otherwise provided in Section 7(d), the Company shall reimburse each such Indemnified Person in connection with investigating or defending any such liability; provided, however, that the Company shall not be liable to any Indemnified Person in any such case to the extent that any such liability arises out of or is based upon any untrue statement or alleged untrue statement or omission or alleged omission made in such registration statement, preliminary or final prospectus, or amendment or supplement thereto in reliance upon and in conformity with information furnished in writing to the Company by such Person specifically for use therein; and provided further, that the Company shall not be required to indemnify any Person against any liability arising from any untrue or misleading statement or omission contained in any preliminary prospectus if such deficiency is corrected in the final prospectus or for any liability which arises out of the failure of any Person to deliver a prospectus as required by the Securities Act regardless of any investigation made by or on behalf of such Indemnified Person and shall survive transfer of such securities by such seller.

(b) To the maximum extent permitted by law, each Investor holding any securities included in such registration being effected shall indemnify and hold harmless each other selling holder of any securities, the Company, its directors and officers, each underwriter and each other Person, if any, who controls (within the meaning of the Securities Act) the Company or such underwriter (individually and collectively also the “Indemnified Person”), against any liability, joint or several, to which any such Indemnified Person may become subject under the Securities Act or any other statute or at common law, insofar as such liability (or actions in respect thereof) arises out of or is based upon (i) any untrue statement or alleged untrue statement of any material fact contained, on the effective date thereof, in any registration statement under which securities were registered under the Securities Act at the request of such selling Investor, any preliminary prospectus or final prospectus contained therein, or any amendment or supplement thereto, or (ii) any omission or alleged omission by such selling Investor to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in the case of (i) and (ii) to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in such registration statement, preliminary or final prospectus, amendment or supplement thereto in reliance upon and in conformity with information furnished in writing to the Company by such selling Investor specifically for use therein. Such selling Investor shall reimburse any Indemnified Person for any legal fees incurred in investigating or defending any such liability; provided, however, that in no event shall the liability of any Investor for indemnification under this Section 7 in its capacity as a seller of Registrable Securities exceed the lesser of (i) that

proportion of the total of such losses, claims, damages, expenses or liabilities indemnified against equal to the proportion of the total securities sold under such registration statement which is being held by such Investor, or (ii) the amount equal to the net proceeds to such Investor of the securities sold in any such registration; and provided further, however, that no selling Investor shall be required to indemnify any Person against any liability arising from any untrue or misleading statement or omission contained in any preliminary prospectus if such deficiency is corrected in the final prospectus or for any liability which arises out of the failure of any Person to deliver a prospectus as required by the Securities Act.

(c) Indemnification similar to that specified in Sections 7(a) and (b) shall be given by the Company and each selling holder (with such modifications as may be appropriate) with respect to any required registration or other qualification of their securities under any federal or state law or regulation of governmental authority other than the Securities Act.

(d) In the event the Company, any selling holder or other Person receives a complaint, claim or other notice of any liability or action, giving rise to a claim for indemnification under Sections 7(a), (b) or (c) above, the Person claiming indemnification under such paragraphs shall promptly notify the Person against whom indemnification is sought of such complaint, notice, claim or action, and such indemnifying Person shall have the right to investigate and defend any such loss, claim, damage, liability or action.

(e) If the indemnification provided for in this Section 7 for any reason is held by a court of competent jurisdiction to be unavailable to an Indemnified Person in respect of any losses, claims, damages expenses or liabilities referred to therein, then each indemnifying party under this Section 7, in lieu of indemnifying such indemnified party thereunder, shall contribute to the amount paid or payable by such indemnified party as a result of such losses, claims, damages, expenses or liabilities (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, the Investor, or Investors and the underwriters from the offering of Registrable Securities or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company, the other Investors and the underwriters in connection with the statements or omissions which resulted in such losses, claims, damages expenses or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company, the Investors and the underwriters shall be deemed to be in the same respective proportions that the net proceeds from the offering (before deducting expenses) received by the Company, the Investors, and the underwriting discount received by the underwriters, in each case as set forth in the table on the cover page of the applicable prospectus, bear to the aggregate public offering price of the Registrable Securities. The relative fault of the Company, the Investors and the underwriters shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company, the Investors, or the underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The Company, the Investors and the Underwriters agree that it would not be just and equitable if contribution to this Section 7 were determined by pro rata or per capita allocation or by any other method of allocation which does not take account the equitable considerations referred to in the immediately preceding paragraph. In no event, however, shall an Investor be required to contribute under this Section 7(e) in excess of the lesser of (i) that proportion of the total of such losses, claims, damages expenses or liabilities indemnified against equal to the proportion of the total Registrable Securities sold under such registration statement which are being sold by such Investor or (ii) the net proceeds received by such Investor from its sale of Registrable Securities under such registration statement. No Person found guilty of fraudulent representation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not found guilty of such fraudulent misrepresentation.

(f) The amount paid by an indemnifying party or payable to an Indemnified Person as a result of the losses, claims, damages, expenses and liabilities referred to in this Section 7 shall be deemed to include, subject to limitations set forth above, any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending any such action or claim, payable as the same are incurred. The indemnification and contribution provided for in this Section 7 will remain in full force and effect regardless of any investigation made by or on behalf of the indemnified parties or any other officer, director, employee, agent or controlling person of the indemnified parties. No indemnifying party, in the defense of any such claim or litigation, shall enter into a consent or entry of any judgment or enter into a settlement without the consent of the Indemnified Person, which consent will not be unreasonably withheld or delayed.

8. Compliance with Rule 144. In the event that the Company (i) registers a class of securities under Section 12 of the Exchange Act or (ii) shall commence to file reports under Section 13 or 15(d) of the Exchange Act, the Company will use its best efforts thereafter to file with the Commission such information as is required under the Exchange Act for so long as there are holders of Registrable Securities; and in such event, the Company shall use its best efforts to take all action as may be required as a condition to the availability of Rule 144 under the Securities Act (or any comparable successor rules). The Company shall furnish to any holder of Registrable Securities upon request a written statement executed by the Company as to the steps it has taken to comply with the current public information requirement of Rule 144 (or such comparable successor rules). After the occurrence of the first underwritten public offering of Common Stock of the Company pursuant to an offering registered under the Securities Act on Form S-1 (or any comparable successor forms), subject to the limitations on transfers imposed by this Agreement, the Company shall use its best efforts to facilitate and expedite transfers of Registrable Securities pursuant to Rule 144 under the Securities Act, which efforts shall include timely notice to its transfer agent to expedite such transfers of Registrable Securities.

9. Rule 144A Information. The Company shall, upon written request of any Investor, provide to such Investor and to any prospective institutional transferee of the Common Stock designated by such Investor, such financial and other information as is available to the Company or can be obtained by the Company without material expense and as such Investor may reasonably determine is required to permit such transfer to comply with the requirements of Rule 144A promulgated under the Securities Act.

10. **Amendments.** Except as provided in this Agreement to the contrary, the provisions of this Agreement may be amended, and the Company may take any action herein prohibited or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the holders of at least a majority of the Registrable Securities. For the purposes of this Agreement and all agreements executed pursuant hereto, no course of dealing between or among any of the parties hereto and no delay on the part of any party hereto in exercising any rights hereunder or thereunder shall operate as a waiver of the rights hereof and thereof. Notwithstanding the foregoing, this Agreement may be amended with only the consent of the Company for the sole purpose of including additional purchasers of Series D Preferred Stock (pursuant to the terms of the Purchase Agreement) as “Investors” hereunder.

11. **Postponement.** The Company may postpone the filing of any registration statement required hereunder for a reasonable period of time, not to exceed ninety (90) days in the aggregate during any twelve month period, if the Company has been advised by legal counsel that such filing would require a special audit or the disclosure of a material impending transaction or other matter and the Company’s Board of Directors determines reasonably and in good faith that such disclosure would have a material adverse effect on the Company (a “**Black Out Period**”). Upon notice of the existence of a Black Out Period from the Company to any Investor or Investors with respect to any registration statement already effective, such Investor or Investors shall refrain from selling their Registrable Securities under such registration statement until such Black Out Period has ended; provided, however, that the Company shall not impose a Black Out Period with respect to any registration statement that is already effective more than once during any period of twelve (12) consecutive months and in no event shall such Black Out Period exceed sixty (60) days.

12. **Market Stand Off.** Each Investor agrees, that if requested by the Company and an underwriter of Registrable Securities of the Company in connection with the initial public offering of the Company, not to directly or indirectly offer, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant for the sale of or otherwise dispose of or transfer any shares held by it as of immediately prior to the initial public offering for such period, not to exceed one hundred eighty (180) days following the effective date of the relevant registration statement filed under the Securities Act in connection with the Company’s initial public offering of Registrable Securities (or such extended period, if an extension of this period is required by the Financial Industry and Regulatory Authority), provided, however, that all officers and directors of the Company and all 1% or greater stockholders of the Company enter into similar agreements (such stockholders, together with the Investors, the “**Locked-Up Holders**” and each a “**Locked-Up Holder**”). Any amendment or waiver of the provisions of this Section 12 that is adverse to Fidelity shall require the written consent of Fidelity and (i) if any such amendment or waiver affects the rights of any Locked-Up Holder differently to the rights of other Locked-Up Holders, then the written consent of such differently affected Locked-Up Holder shall be required to effect such amendment or waiver on such differently affected Lock-Up Holder and (ii) if any Locked-Up Holder is released from compliance with the provisions of this Section 12, then each other Locked-Up Holder shall be permitted to be released from this Section 12 upon the same terms.

13. **Transferability of Registration Rights.** The registration rights set forth in this Agreement are transferable to each transferee of Registrable Securities. Each subsequent holder of Registrable Securities must consent in writing to be bound by the terms and conditions of this Agreement in order to acquire the rights granted pursuant to this Agreement.

14. **Rights Which May Be Granted to Subsequent Investors.** Other than permitted transferees of Registrable Securities under this Section, the Company shall not, without the prior written consent of holders of at least a majority of the Registrable Securities, (a) allow purchasers of the Company's securities to become a party to this Agreement or (b) grant any other registration rights other than any incidental or so called piggyback registration rights to any third parties that are not inconsistent with the terms of this Agreement.

15. **Damages.** The Company recognizes and agrees that each holder of Registrable Securities will not have an adequate remedy if the Company fails to comply with the terms and provisions of this Agreement and that damages will not be readily ascertainable, and the Company expressly agrees that, in the event of such failure, it shall not oppose an application by any holder of Registrable Securities or any other Person entitled to the benefits of this Agreement requiring specific performance of any and all provisions hereof or enjoining the Company from continuing to commit any such breach of this Agreement.

16. **Confidentiality.** Each Investor shall keep confidential and shall not disclose, divulge or use for any purpose (other than to monitor its investment in the Company) any confidential information obtained from the Company pursuant to the terms of this Agreement or the Purchase Agreement or any other Transaction Agreements (as defined in the Purchase Agreement) (including, without limitation, notice of the Company's intention to file a registration statement or the terms or existence of any equity or debt financing of the Company), unless such confidential information (a) is known or becomes known to the public in general (other than as a result of a breach of this Section 16 by such Investor), (b) is or has been independently developed or conceived by the Investor without use of the Company's confidential information, or (c) is or has been made known or disclosed to the Investor by a third party without a breach of any obligation of confidentiality such third party may have to the Company; provided, however, that an Investor may disclose confidential information (i) to its attorneys, accountants, consultants, and other professionals to the extent necessary to obtain their services in connection with monitoring its investment in the Company; (ii) to any prospective purchaser of any Registrable Securities from such Investor or seller of any Registrable Securities to such Investor, if such prospective purchaser, or seller, as applicable, agrees to be bound by the provisions of this Section 16; (iii) to any affiliate, partner, member, stockholder, or wholly owned subsidiary of such Investor in the ordinary course of business, provided that such Investor informs such person that such information is confidential and directs such person to maintain the confidentiality of such information; or (iv) as may otherwise be required by law, provided that the Investor promptly notifies the Company of such disclosure and takes reasonable steps to minimize the extent of any such required disclosure. Notwithstanding the foregoing, each Investor registered as an "Investment Company" under the Investment Company Act of 1940, as amended, shall be permitted to make disclosures consistent with such Investor's policies, procedures and practices.

17. **Termination of Registration Rights.** No holder of Registrable Securities shall be entitled to exercise any right provided for in this Agreement after the earlier of (a) five years following the consummation of a QPO (as defined in the Restated Certificate), (b) such time as Rule 144 or another similar exemption under the Securities Act is available for the sale of all of such Holder's shares during a three-month period without registration, or (c) upon termination of this Agreement, as provided in Section 18.

18. **Termination of Agreement.** This Agreement shall terminate and have no further force or effect upon the consummation of a transaction or series of related transactions deemed to be a liquidation, dissolution or winding up of the Company pursuant to the Company's Certificate of Incorporation.

19. **Information Requests by Fidelity or Illumina.** The Company shall promptly and accurately respond, and shall use commercially reasonable efforts to cause its transfer agent to promptly respond, to requests for information made on behalf of any Fidelity Purchaser or Illumina relating to (a) accounting or securities law matters required in connection with its audit or (b) the actual holdings of each Fidelity Purchaser or Illumina, as applicable, including in relation to the total outstanding shares; provided however, that the Company shall not be obligated to provide any such information that could reasonably result in a violation of applicable law or conflict with the Company's insider trading policy or a confidentiality obligation of the Company. These rights shall expire with respect to Fidelity once no Fidelity Purchaser holds any securities of the Company that are restricted under the Securities Act of 1933, as amended (the "Securities Act") and with respect to Illumina once Illumina no longer holds any securities of the Company that are restricted under the Securities Act.

20. **Miscellaneous.**

(a) **Notices.** All notices, requests, demands and other communications provided for hereunder shall be in writing and mailed (by first class registered or certified mail, postage prepaid), emailed, sent by express overnight courier service or electronic facsimile transmission (with a copy by mail), or delivered to the applicable party at the addresses indicated below:

If to the Company: Twist Bioscience Corporation
455 Mission Bay Blvd. South
Suite 545
San Francisco, CA 94158
Attention: Emily Leproust

With a copy to: Orrick, Herrington & Sutcliffe LLP
1000 Marsh Road
Menlo Park, CA 94025
Telecopy: (650) 614-7401
Attention: John V. Bautista, Esq.

If to the Investors: At the addresses, facsimile numbers or email addresses shown on the signature pages hereto

If to any other holder of Registrable Securities: At such Person's address for notice as set forth in the books and records of the Company

or, as to each of the foregoing, at such other address as shall be designated by such Person in a written notice to other parties complying as to delivery with the terms of this subsection (a). All such notices, requests, demands and other communications shall, when mailed, telegraphed or sent, respectively, be effective (i) two days after being deposited in the mails or (ii) one day after being delivered to the telegraph company, deposited with the express overnight courier service or sent by electronic facsimile transmission, respectively, addressed as aforesaid.

(b) Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the state of Delaware, without giving effect to conflict of laws principles thereof.

(c) Dispute Resolution.

(i) All disputes, claims or controversies arising out of or relating to this Agreement or any other agreement executed and delivered pursuant to this Agreement or the negotiation, validity or performance hereof and thereof or the transactions contemplated hereby and thereby that are not resolved by mutual agreement shall be resolved solely and exclusively by binding arbitration before JAMS/Endispute, Inc. ("JAMS"), or its successor. The arbitration shall be held in San Francisco, California before a single arbitrator and shall be conducted in accordance with the rules and regulations promulgated by JAMS unless specifically modified herein.

The parties covenant and agree that the arbitration shall commence within one hundred twenty (120) days of the date on which a written demand for arbitration is filed by any party hereto. In connection with the arbitration proceeding, the arbitrator shall have the power to order the production of documents by each party and any third party witnesses. In addition, each party may take up to three (3) depositions as of right, and the arbitrator may in his or her discretion allow additional depositions upon good cause shown by the moving party. However, the arbitrator shall not have the power to order the answering of interrogatories or the response to requests for admission. In connection with any arbitration, each party shall provide to the other, no later than fourteen (14) business days before the date of the arbitration, the identity of all persons that may testify at the arbitration and a copy of all documents that may be introduced at the arbitration or considered or used by a party's witness or expert. The arbitrator's decision and award shall be made and delivered within sixty (60) days of the selection of the arbitrator. The arbitrator's decision shall set forth a reasoned basis for any award of damages or finding of liability. The arbitrator shall not have the power to award damages in excess of actual compensatory damages and shall not multiply actual damages or award punitive damages or any other damages that are specifically excluded under this Agreement, and each party hereby irrevocably waives any claim to such damages.

The parties covenant and agree that they will participate in the arbitration in good faith and that they will share equally its costs, except as otherwise provided herein. The arbitrator may in his or her discretion assess costs and expenses (including reasonable legal fees and expenses of the prevailing party) against any party to a proceeding. Any party unsuccessfully refusing to comply with an order of the arbitrators shall be liable for costs and expenses, including attorney's fees, incurred by the other party in enforcing the award. This Section applies equally to requests for temporary, preliminary or permanent injunctive relief, except that in the case of temporary or preliminary injunctive relief any party may proceed in court without prior arbitration for the limited purpose of avoiding immediate and irreparable harm. The provisions of this Section shall be enforceable in any court of competent jurisdiction.

Subject to the second sentence of the immediately preceding paragraph, the parties shall bear their own attorneys' fees, costs and expenses in connection with the arbitration. The parties will share equally in the fees and expenses charges by JAMS.

(ii) Each of the parties hereto irrevocably and unconditionally consents to the exclusive jurisdiction of JAMS to resolve all disputes, claims or controversies arising out of or relating to this Agreement or any other agreement executed and delivered pursuant to this Agreement or the negotiation, validity or performance hereof and thereof or the transactions contemplated hereby and thereby and further consents to the jurisdiction of the courts of San Francisco, California for the purposes of enforcing the arbitration provisions of paragraph (a) above. Each party further irrevocably waives any objection to proceeding before JAMS based upon lack of personal jurisdiction or to the laying of the venue and further irrevocably and unconditionally waives and agrees not to make a claim in any court that arbitration before JAMS has been brought in an inconvenient forum. Each of the parties hereto hereby consents to service of process by registered mail at the address to which notices are to be given. Each of the parties hereto agrees that its or his submission to jurisdiction and its or his consent to service of process by mail is made for the express benefit of the other parties hereto.

(d) Massachusetts Business Trust. A copy of the Agreement and Declaration of Trust of each Fidelity Purchaser, or any affiliate thereof, is on file with the Secretary of State of the Commonwealth of Massachusetts and notice is hereby given that this Agreement is executed on behalf of the trustees of such Investor or any affiliate thereof as trustees and not individually and that the obligations of this Agreement are not binding on any of the trustees, officers or stockholders of such Investor or any affiliate thereof individually but are binding only upon such Investor or any affiliate thereof and its assets and property.

(e) Counterparts. This Agreement may be executed in two or more facsimile counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

(f) Severability. If any provision of this Agreement shall be held to be illegal, invalid or unenforceable, such illegality, invalidity or unenforceability shall attach only to such provision and shall not in any manner affect or render illegal, invalid or unenforceable any other provision of this Agreement, and this Agreement shall be carried out as if any such illegal, invalid or unenforceable provision were not contained herein.

(g) Integration. This Agreement, including the exhibits, documents and instruments referred to herein or therein, constitutes the entire agreement among the parties with respect to the subject matter.

[SIGNATURE PAGES FOLLOW]

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

COMPANY:

TWIST BIOSCIENCE CORPORATION

By: /s/ Emily Leproust

Name: Emily Leproust

Title: Chief Executive Officer

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

FOUNDER:

EMILY LEPROUST

By: /s/ Emily Leproust

FOUNDER:

BILL PECK

By: _____

FOUNDER:

WILLIAM BANYAI

By: _____

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

FOUNDER:

EMILY LEPROUST

By: _____

FOUNDER:

BILL PECK

By: _____

FOUNDER:

WILLIAM BANYAI

By: /s/ William Banyai

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

FOUNDER:

EMILY LEPROUST

By: _____

FOUNDER:

BILL PECK

By: /s/ Bill Peck _____

FOUNDER:

WILLIAM BANYAI

By: _____

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

EVER ALPHA FUND L.P.

By: /s/ Xiaomin Ao

Name: Xiaomin Ao

Title: Director

Address for notices: 16th Floor, Tianhebei
Rd, Metro Plaza, Guangzhou, Guangdong

Phone: +8620-38467515

Fax: +8620-87555888

Email: maixiaoying@gf.com.cn

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**BAY CITY CAPITAL GF XINDE
INTERNATIONAL LIFE SCIENCES
USD FUND, L.P.**

By: /s/ Fred Craves

Name: Fred Craves

Title: Managing Director

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**TAO INVEST II LLC, A DELAWARE
LIMITED LIABILITY COMPANY**

By: /s/ Nicholas J. Pritzker

Name: Nicholas J. Pritzker

Title: Chairman

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**TAO INVEST LLC, A DELAWARE
LIMITED LIABILITY COMPANY**

By: /s/ Nicholas J. Pritzker

Name: Nicholas J. Pritzker

Title: Manager

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**BIOMATICS CAPITAL PARTNERS,
L.P.**

By: /s/ Boris Nikolic

(Signature)

Name: Boris Nikolic

Title: Managing Director

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

VITAL TWIST INVESTORS LLC

By: /s/ Craig Asher

Name: Craig Asher

Title: Manager

Address for Notices:

c/o Vital Venture Capital
One Overlook Point, Suite 100
Lincolnshire, IL 60069
Attn: Craig Asher

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

ARCH VENTURE FUND VII, L.P.

By: ARCH Venture Partners VI, L.P., its General Partner

By: ARCH Venture Partners VII, LLC, its General Partner

By: /s/ Keith Crandell

Name: Keith Crandell

Title: Managing Director

Addresses for notices:

c/o ARCH Venture Partners VII, L.P.
8725 W. Higgins Road, Suite 290
Chicago, IL 60631
Attn: Mark McDonnell
Phone: (773) 380-6600
Fax: (773) 380-6606
Email: mmcdonnell@archventure.com

With a mandatory copy, which shall not constitute notice, to:

Proskauer Rose LLP
One International Place
Boston, MA 02110
Attn: Ori Solomon
Phone: (617) 526-9889
Fax: (617) 526-9899
Email: osolomon@proskauer.com

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

ARCH VENTURE FUND VIII, L.P.

By: ARCH Venture Partners VIII, L.P., its General Partner

By: /s/ Mark McDonnell

Name: Mark McDonnell

Title: Managing Director

Addresses for notices:

c/o ARCH Venture Partners VII, L.P.

8725 W. Higgins Road, Suite 290

Chicago, IL 60631

Attn: Mark McDonnell

Phone: (773) 380-6600

Fax: (773) 380-6606

Email: mmcdonnell@archventure.com

With a mandatory copy, which shall not constitute notice, to:

Proskauer Rose LLP

One International Place

Boston, MA 02110

Attn: Ori Solomon

Phone: (617) 526-9889

Fax: (617) 526-9899

Email: osolomon@proskauer.com

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

ILLUMINA, INC.

By: /s/ Johnathon Seaton

Name: Johnathon Seaton

Title: SVP Concept Bus Dev.

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**WUXI PHARMATECH HEALTHCARE
FUND I L.P.**

By: WuXi PharmaTech Fund I General Partner L.P., its general partner

By: WuXi PharmaTech Investments (Cayman) Inc., its general partner

By: /s/ Edward Hu

Name: Edward Hu

Title: Authorized Person

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

WUXI HEALTHCARE VENTURES II L.P.

By: WUXI HEALTHCARE MANAGEMENT, LLC, its General Partner

By: /s/ Edward Hu

Name: Edward Hu

Title: Director

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

BC SYNBIO LIMITED

By: /s/ Karen Qianye Liu
Name: Karen Qianye Liu
Title: Director

Address for notices:

Trinity Chambers, P.O. Box 4301,
Road Town, Tortola, British Virgin Islands

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

CAPITAL FORTUNE VENTURES LIMITED

By: /s/ Yuen Yui Wing & Tang Chun Wai Nelson
(Signature)

Name: Yuen Yui Wing & Tang Chun Wai Nelson

Title: Director

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

MERIEUX PARTICIPATIONS SAS

By: /s/ F. Valencony _____
Name: F. Valencony
Title: President

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

REINET COLUMBUS LIMITED

By: /s/ A.C. Lambrechis
(Signature)

Name: A.C. Lambrechis

Title: Director

By: _____
(Signature)

Name: _____

Title: _____

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

PALADIN III, L.P.

By: Paladin Holdings III, L.P.
By: Paladin Capital Group III, LLC, its General Partner

By: /s/ Michael R. Steed
Name: Michael R. Steed
Title: an Authorized Person

PALADIN III (Cayman Islands), L.P.

By: Paladin Holdings III (Cayman Islands), L.P.
By: Paladin Homeland Security Corporation III, Ltd., its General Partner

By: /s/ Michael R. Steed
Name: Michael R. Steed
Title: an Authorized Person

PALADIN III (NY City), L.P.

By: Paladin Holdings III, L.P.
By: Paladin Capital Group III, LLC, its General Partner

By: /s/ Michael R. Steed
Name: Michael R. Steed
Title: an Authorized Person

PALADIN III (HR), L.P.

By: Paladin Holdings III, L.P.
By: Paladin Capital Group III, LLC its General Partner

By: /s/ Michael R. Steed
Name: Michael R. Steed
Title: an Authorized Person

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

PALADIN III (CA), LP

By: Paladin Holdings III, L.P.
By: Paladin Capital Group III, LLC its General Partner

By: /s/ Michael R. Steed
Name: Michael R. Steed
Title: an Authorized Person

PALADIN III CO-INVESTMENT, LLC

By: Paladin Holdings III, L.P., its Managing Member
By: Paladin Capital Group III, LLC, its General Partner
By: 200 H Ave. Investments, LLC, its Managing Member

By: /s/ Michael R. Steed
Name: Michael R. Steed
Title: an Authorized Person

Address for Notices:

Patrice Rainier — Director, Investor Relations
c/o Paladin Capital Group
2020 K Street, NW — Suite 400
Washington, DC 20006

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**CORMORANT GLOBAL HEALTHCARE MASTER
FUND, LP**

By: Cormorant Global Healthcare GP, LLC

By: /s/ Bihua Chen

Name: Bihua Chen

Title: Managing Member of the GP

Address for notices:

Cormorant Global Healthcare GP, LLC

200 Clarendon Street, 52nd Floor

Boston, MA 02116

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

**CORMORANT PRIVATE HEALTHCARE MASTER
FUND I, LP**

By: Cormorant Private Healthcare GP, LLC

By: /s/ Bihua Chen

Name: Bihua Chen

Title: Managing Member of the GP

Address for notices:

Cormorant Global Healthcare GP, LLC 200 Clarendon Street,
52nd Floor Boston, MA 02116

IN WITNESS WHEREOF, the parties hereto have caused this Amended and Restated Registration Rights Agreement to be duly executed as of the date first set forth above.

INVESTORS:

CRMA SPV, L.P.

By: Cormorant Asset Management, LLC

Its: Attorney-In-Fact

By: /s/ Bihua Chen

Name: Bihua Chen

Title: Managing Member

Address for notices:

Cormorant Asset Management, LLC

PO Box 309, Uglan House

Grand Cayman; KY1-1104 Cayman Islands

SCHEDULE 1

EXISTING PREFERRED HOLDERS

Alexandria Equities, LLC
AME Cloud Ventures, LLC
Apoletto Limited
Applied Ventures, LLC
ARCH Venture Fund VII, L.P.
ARCH Venture Fund VIII Overage, L.P.
Ashley Ann Ledbetter Dombkowski and Brian Eugene Dombkowski
Asset Management Ventures
Bautista, John V.
BC SynBio Limited
Biomatics Capital Partners, L.P.
BXN, LLC
Cambridge Twist, LLC
Capital Fortune Ventures Limited
Chaim Friedman (Trust) Ltd.
Chris Austin
Cormorant Global Healthcare Master Fund, LP
Cormorant Private Healthcare Fund I, LP
CRMA SPV, LP
Dana Beyer
Dentsu Ventures Global Fund I
Ditch Plains Private Ventures VII, LLC
Dugong LLC
Edward L. Michael Trust
Efraim Debbi
Eric Anschutz
Fay Xing
Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund
Fidelity Select Portfolios: Biotechnology Portfolio
Foresite Capital Fund II, L.P.
Foundry Square Investors - XIII, LLC
Foundry Square Investors - XIV, LLC
Foundry Square Investors - XIII, LLC
Foundry Square Investors - XV, LLC
Harmonic Grace Limited
Illumina, Inc.
Illumina Innovation Fund I, L.P.
Itschak Friedman

Jonathan Dong
Manhattan Trust
Merieux Participations SAS
NanoDimension II Limited Partnership
P3 Private Equity Fund 1, LLC
Paladin III (CA), LP
Paladin III (Cayman Islands), LP
Paladin III (HR), LP
Paladin III (NY City), LP
Paladin III Co-Investment, LLC
Paladin III, LP
Peter Lamb
Prosaic Growth Fund, LLC
Rajagopal, Asha
Shlomo Nevo
Tao Invest LLC, A Delaware Limited Liability Company
The Craves Family Foundation
Vital Twist Investors LLC
Walt, David
WS Investment Company, LLC (2013A)
WS Investment Company, LLC (2014A)
WuXi Healthcare Ventures II, L.P.
WuXi Pharmatech Healthcare Fund I L.P.

SCHEDULE 2

NEW INVESTORS

EVER ALPHA FUND L.P.



ORRICK, HERRINGTON & SUTCLIFFE LLP
1000 Marsh Road
Menlo Park, CA 94025-1015
United States
tel +1 650-614-7400
fax +1 650-614-7401
WWW.ORRICK.COM

October 17, 2018

Twist Bioscience Corporation
455 Mission Bay Boulevard
Suite 545
San Francisco, CA 94158

Re: Registration Statement on Form S-1

Ladies and Gentlemen:

We are acting as counsel for Twist Bioscience Corporation, a Delaware corporation (the "Company"), in connection with the registration statement on Form S-1 filed by the Company with the Securities and Exchange Commission (the "Commission") on October 3, 2018 (File No. 333-227672), as amended (the "Registration Statement"), under the Securities Act of 1933, as amended (the "Securities Act"). The Registration Statement relates to the registration of 5,000,000 shares of common stock of the Company, par value \$0.00001 per share, (the "Primary Shares") and 750,000 shares of which may be purchased by the underwriters pursuant to an option to purchase additional shares (together with the Primary Shares, the "Shares"). We understand that the Shares are to be sold to the underwriters for resale to the public as described in the Registration Statement and pursuant to an underwriting agreement, substantially in the form filed as an exhibit to the Registration Statement, to be entered into by and among the Company and the underwriters (the "Underwriting Agreement").

In connection with rendering the opinion set forth below, we have examined and relied upon originals or copies, certified or otherwise identified to our satisfaction, of instruments, documents, and records which we deemed relevant and necessary for the purpose of rendering our opinion set forth below. In such examination, we have assumed the following: (a) the authenticity of original documents and the genuineness of all signatures, (b) the conformity to the originals of all documents submitted to us as copies, (c) the representations of officers and employees are correct as to questions of fact, (d) the Registration Statement has been declared effective pursuant to the Securities Act and (e) a pricing committee of the board of directors will have taken action necessary to set the sale price of the Shares.

Our opinion herein is limited to the General Corporation Law of the State of Delaware.

Based upon the foregoing, we are of the opinion that the Shares to be issued and sold by the Company have been duly authorized and, when such Shares are issued and paid for in accordance with the terms of the Underwriting Agreement, will be validly issued, fully paid and non-assessable.



ORRICK

Twist Bioscience Corporation
Registration Statement on Form S-1
October 17, 2018
Page 2

We consent to the filing of this opinion as an exhibit to the Registration Statement, and we further consent to the use of our name under the caption “Legal matters” in the Registration Statement and the prospectus that forms a part thereof. In giving these consents, we do not thereby admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the Rules and Regulations of the Commission promulgated thereunder, nor do we thereby admit that we are “experts” within the meaning of such term as used in the Securities Act with respect to any part of the Registration Statement, including this opinion letter as an exhibit or otherwise.

Very truly yours,

/s/ Orrick, Herrington & Sutcliffe LLP

ORRICK, HERRINGTON & SUTCLIFFE LLP

TWIST BIOSCIENCE CORPORATION

2018 EQUITY INCENTIVE PLAN

1. Purposes of the Plan. The purposes of this Plan are (a) to attract and retain the best available personnel to ensure the Company's success and accomplish the Company's goals; (b) to incentivize Employees, Directors and Independent Contractors with long-term equity-based compensation to align their interests with the Company's stockholders, and (c) to promote the success of the Company's business.

The Plan permits the grant of Incentive Stock Options, Nonstatutory Stock Options, Restricted Stock, Restricted Stock Units, Stock Appreciation Rights, Performance Units and Performance Shares.

2. Definitions. As used herein, the following definitions will apply:

(a) "Administrator" means the Board or any of its Committees as will be administering the Plan, in accordance with Section 4 of the Plan.

(b) "Affiliate" means (i) an entity other than a Subsidiary which, together with the Company, is under common control of a third person or entity and (ii) an entity other than a Subsidiary in which the Company and/or one or more Subsidiaries own a controlling interest.

(c) "Applicable Laws" means all applicable laws, rules, regulations and requirements, including, but not limited to, all applicable U.S. federal or state laws, rules and regulations, the rules and regulations of any stock exchange or quotation system on which the Common Stock is listed or quoted, and the applicable laws, rules and regulations of any other country or jurisdiction where Awards are, or will be, granted under the Plan or Participants reside or provide services to the Company or any Parent or Subsidiary of the Company, as such laws, rules, and regulations shall be in effect from time to time.

(d) "Award" means, individually or collectively, a grant under the Plan of Options, Stock Appreciation Rights, Restricted Stock, Restricted Stock Units, Performance Units or Performance Shares.

(e) "Award Agreement" means the written or electronic agreement setting forth the terms and provisions applicable to each Award granted under the Plan. The Award Agreement is subject to the terms and conditions of the Plan.

(f) "Board" means the Board of Directors of the Company.

(g) “Cause” means, with respect to the termination of a Participant’s status as a Service Provider, except as otherwise defined in an Award Agreement, (i) in the case where there is no employment agreement, consulting agreement, change in control agreement or similar agreement in effect between the Company or an Affiliate of the Company and the Participant at the time of the grant of the Award (or where there is such an agreement but it does not define “cause” (or words of like import) or where it only applies upon the occurrence of a change in control and one has not yet taken place): (A) any material breach by Participant of any material written agreement between Participant and the Company; (B) any failure by Participant to comply with the Company’s material written policies or rules as they may be in effect from time to time; (C) neglect or persistent unsatisfactory performance of Participant’s duties; (D) Participant’s repeated failure to follow reasonable and lawful instructions from the Board or Chief Executive Officer; (E) Participant’s indictment for, conviction of, or plea of guilty or nolo contendere to, any felony or crime that results in, or is reasonably expected to result in, a material adverse effect on the business or reputation of the Company; (F) Participant’s commission of or participation in an act of fraud against the Company; (G) Participant’s intentional material damage to the Company’s business, property or reputation; or (H) Participant’s unauthorized use or disclosure of any proprietary information or trade secrets of the Company or any other party to whom the Participant owes an obligation of nondisclosure as a result of his or her relationship with the Company; or (ii) in the case where there is an employment agreement, consulting agreement, change in control agreement or similar agreement in effect between the Company or an Affiliate and the Participant at the time of the grant of the Award that defines “cause” (or words of like import), “cause” as defined under such agreement; provided, however, that with regard to any agreement under which the definition of “cause” only applies on occurrence of a change in control, such definition of “cause” shall not apply until a change in control actually takes place and then only with regard to a termination thereafter. For purposes of clarity, a termination without “Cause” does not include any termination that occurs solely as a result of Participant’s death or Disability. The determination as to whether a Participant’s status as a Service Provider for purposes of the Plan has been terminated for Cause shall be made in good faith by the Company and shall be final and binding on the Participant. The foregoing definition does not in any way limit the Company’s ability (or that of any Parent or Subsidiary or any successor thereto, as appropriate) to terminate a Participant’s employment or consulting relationship at any time, subject to Applicable Laws.

(h) “Change in Control” except as may otherwise be provided in an Award Agreement or other applicable agreement, means the occurrence of any of the following:

(i) The consummation of a merger or consolidation of the Company with or into another entity or any other corporate reorganization, if the Company’s stockholders immediately prior to such merger, consolidation or reorganization cease to directly or indirectly own immediately after such merger, consolidation or reorganization at least a majority of the combined voting power of the continuing or surviving entity’s securities outstanding immediately after such merger, consolidation or reorganization;

(ii) The consummation of the sale, transfer or other disposition of all or substantially all of the Company’s assets (other than (x) to a corporation or other entity of which at least a majority of its combined voting power is owned directly or indirectly by the Company, (y) to a corporation or other entity owned directly or indirectly by the shareholders of the Company in substantially the same proportions as their ownership of the Common Stock of the Company or (z) to a continuing or surviving entity described in Section 2(h)(i) in connection with a merger, consolidation or reorganization which does not result in a Change in Control under Section 2(h)(i));

(iii) A change in the effective control of the Company which occurs on the date that a majority of members of the Board is replaced during any twelve (12) month period by Directors whose appointment or election is not endorsed by a majority of the members of the Board prior to the date of the appointment or election; or

(iv) The consummation of any transaction as a result of which any Person becomes the “beneficial owner” (as defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of securities of the Company representing at least fifty percent (50%) of the total voting power represented by the Company’s then outstanding voting securities. For purposes of this Section 2(g), the term “Person” shall have the same meaning as when used in Sections 13(d) and 14(d) of the Exchange Act but shall exclude:

(1) a trustee or other fiduciary holding securities under an employee benefit plan of the Company or an affiliate of the Company;

(2) a corporation or other entity owned directly or indirectly by the stockholders of the Company in substantially the same proportions as their ownership of the Common Stock of the Company;

(3) the Company; and

(4) a corporation or other entity of which at least a majority of its combined voting power is owned directly or indirectly by the

Company.

A transaction shall not constitute a Change in Control if its sole purpose is to change the state of the Company’s incorporation or to create a holding company that will be owned in substantially the same proportions by the persons who held the Company’s securities immediately before such transactions. In addition, if any Person (as defined above) is considered to be in effective control of the Company, the acquisition of additional control of the Company by the same Person will not be considered to cause a Change in Control. If required for compliance with Section 409A of the Code, in no event will a Change in Control be deemed to have occurred if such transaction is not also a “change in the ownership or effective control of” the Company or “a change in the ownership of a substantial portion of the assets of” the Company as determined under Treasury Regulation Section 1.409A-3(i)(5) (without regard to any alternative definition thereunder).

(i) “Code” means the Internal Revenue Code of 1986, as amended. Reference to a specific section of the Code or regulation thereunder shall include such section or regulation, any valid regulation promulgated under such section, and any comparable provision of any future legislation or regulation amending, supplementing or superseding such section or regulation.

(j) “Committee” means a committee of Directors or of other individuals satisfying Applicable Laws appointed by the Board in accordance with Section 4 hereof.

(k) “Common Stock” means the common stock of the Company.

(l) “Company” means Twist Bioscience Corporation, a Delaware corporation, or any successor thereto.

(m) “Director” means a member of the Board.

(n) “Disability” means total and permanent disability as defined in Section 22(e)(3) of the Code, provided that in the case of Awards other than Incentive Stock Options, the Administrator in its discretion may determine whether a permanent and total disability exists in accordance with uniform and non-discriminatory standards adopted by the Administrator from time to time.

(o) “Effective Date” means the day immediately prior to the Registration Date.

(p) “Employee” means any person, including Officers and Directors, employed by the Company or any Parent or Subsidiary of the Company. Neither service as a Director nor payment of a director’s fee by the Company will be sufficient to constitute “employment” by the Company.

(q) “Exchange Act” means the Securities Exchange Act of 1934, as amended.

(r) “Exchange Program” means a program under which outstanding Awards are amended to provide for a lower exercise price or surrendered or cancelled in exchange for (i) Awards with a lower exercise price, (ii) a different type of Award or awards under a different equity incentive plan, (iii) cash, or (iv) a combination of (i), (ii) and/or (iii). Notwithstanding the preceding, the term Exchange Program does not include (i) any action described in Section 13 or any action taken in connection with a Change in Control transaction nor (ii) any transfer or other disposition permitted under Section 12. For the purpose of clarity, each of the actions described in the prior sentence, none of which constitute an Exchange Program, may be undertaken (or authorized) by the Administrator in its sole discretion without approval by the Company’s stockholders.

(s) “Fair Market Value” means, as of any date, the value of Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or a national market system, its Fair Market Value will be the closing sales price for such stock (or the closing bid, if no sales were reported) as quoted on such exchange or system on the day of determination, as reported in such source as the Administrator deems reliable;

(ii) If the Common Stock is regularly quoted by a recognized securities dealer but selling prices are not reported, the Fair Market Value of a Share will be the mean between the high bid and low asked prices for the Common Stock on the day of determination, as reported in such source as the Administrator deems reliable;

(iii) For purposes of any Awards granted on the Registration Date, the Fair Market Value will be the initial price to the public as set forth in the final prospectus included within the registration statement on Form S-1 filed with the Securities and Exchange Commission for the initial public offering of the Company’s Common Stock; or

(iv) In the absence of an established market for the Common Stock, the Fair Market Value will be determined in good faith by the Administrator in compliance with applicable laws and regulations and in a manner that complies with Sections 409A of the Code.

(t) “Fiscal Year” means the fiscal year of the Company.

- (u) “Incentive Stock Option” means an Option that by its terms qualifies and is intended to qualify as an incentive stock option within the meaning of Section 422 of the Code and the regulations promulgated thereunder.
- (v) “Independent Contractor” means any person, including an advisor, consultant or agent, engaged by the Company or a Parent or Subsidiary to render services to such entity or who renders, or has rendered, services to the Company, or any Parent, Subsidiary or affiliate and is compensated for such services.
- (w) “Inside Director” means a Director who is an Employee.
- (x) “Nonstatutory Stock Option” means an Option that by its terms does not qualify or is not intended to qualify as an Incentive Stock Option.
- (y) “Officer” means a person who is an officer of the Company within the meaning of Section 16 of the Exchange Act and the rules and regulations promulgated thereunder.
- (z) “Option” means a stock option granted pursuant to the Plan.
- (aa) “Outside Director” means a Director who is not an Employee.
- (bb) “Parent” means any corporation (other than the Company) in an unbroken chain of corporations ending with the Company if each of the corporations other than the Company owns stock possessing fifty percent (50%) or more of the total combined voting power of all classes of stock in one of the other corporations in such chain. A corporation that attains the status of a Parent on a date after the adoption of the Plan shall be considered a Parent commencing as of such date.
- (cc) “Participant” means the holder of an outstanding Award.
- (dd) “Performance Goal” means a formula or standard determined by the Committee with respect to each Performance Period based on one or more of the following criteria and any adjustment(s) thereto established by the Committee: (1) sales or non-sales revenue; (2) return on revenues; (3) operating income; (4) income or earnings including operating income; (5) income or earnings before or after taxes, interest, depreciation and/or amortization; (6) income or earnings from continuing operations; (7) net income; (8) pre-tax income or after-tax income; (9) net income excluding amortization of intangible assets, depreciation and impairment of goodwill and intangible assets and/or excluding charges attributable to the adoption of new accounting pronouncements; (10) raising of financing or fundraising; (11) project financing; (12) revenue backlog; (13) gross margin; (14) operating margin or profit margin; (15) capital expenditures, cost targets, reductions and savings and expense management; (16) return on assets (gross or net), return on investment, return on capital, or return on stockholder equity; (17) cash flow, free cash flow, cash flow return on investment (discounted or otherwise), net cash provided by operations, or cash flow in excess of cost of capital; (18) performance warranty and/or guarantee claims; (19) stock price or total stockholder return; (20) earnings or book value per share (basic or diluted); (21) economic value created; (22) pre-tax profit or after-tax profit; (23) strategic business criteria, consisting of one or more objectives based on meeting specified market penetration or market share, completion of strategic agreements such as licenses, joint ventures, acquisitions, and the like, geographic business expansion, objective customer satisfaction or information technology goals, intellectual property asset metrics; (24) objective goals

relating to divestitures, joint ventures, mergers, acquisitions and similar transactions; (25) objective goals relating to staff management, results from staff attitude and/or opinion surveys, staff satisfaction scores, staff safety, staff accident and/or injury rates, compliance, headcount, performance management, completion of critical staff training initiatives; (26) objective goals relating to projects, including project completion, timing and/or achievement of milestones, project budget, technical progress against work plans; and (27) enterprise resource planning. Awards issued to Participants may take into account other criteria (including subjective criteria). Performance Goals may differ from Participant to Participant, Performance Period to Performance Period and from Award to Award. Any criteria used may be measured, as applicable, (i) in absolute terms, (ii) in relative terms (including, but not limited to, any increase (or decrease) over the passage of time and/or any measurement against other companies or financial or business or stock index metrics particular to the Company), (iii) on a per share and/or share per capita basis, (iv) against the performance of the Company as a whole or against any affiliate(s), or a particular segment(s), a business unit(s) or a product(s) of the Company or individual project company, (v) on a pre-tax or after-tax basis, and/or (vi) using an actual foreign exchange rate or on a foreign exchange neutral basis.

(ee) "Performance Period" means the time period during which the Performance Goals or other vesting provisions must be satisfied for Performance Shares or Performance Units.

(ff) "Performance Share" means an Award denominated in Shares which may be earned in whole or in part upon attainment of Performance Goals or other vesting criteria as the Administrator may determine pursuant to Section 10.

(gg) "Performance Unit" means an Award which may be earned in whole or in part upon attainment of Performance Goals or other vesting criteria as the Administrator may determine and which may be settled for cash, Shares or other securities or a combination of the foregoing pursuant to Section 10.

(hh) "Period of Restriction" means the period during which the transfer of Shares of Restricted Stock are subject to restrictions and therefore, the Shares are subject to a substantial risk of forfeiture. Such restrictions may be based on the passage of time, the achievement of target levels of performance, or the occurrence of other events as determined by the Administrator.

(ii) "Plan" means this 2018 Equity Incentive Plan.

(jj) "Registration Date" means the effective date of the first registration statement that is filed by the Company and declared effective pursuant to Section 12(g) of the Exchange Act, with respect to any class of the Company's securities.

(kk) "Restricted Stock" means Shares issued pursuant to a Restricted Stock award under Section 7 of the Plan.

(ll) "Restricted Stock Unit" means a bookkeeping entry representing an amount equal to the Fair Market Value of one Share, granted pursuant to Section 8. Each Restricted Stock Unit represents an unfunded and unsecured obligation of the Company.

(mm) "Rule 16b-3" means Rule 16b-3 of the Exchange Act or any successor to Rule 16b-3, as in effect when discretion is being exercised with respect to the Plan.

(nn) "Section 16(b)" means Section 16(b) of the Exchange Act.

(oo) "Service Provider" means an Employee, Director or Independent Contractor.

(pp) "Share" means a share of the Common Stock, as adjusted in accordance with Section 13 of the Plan.

(qq) "Stock Appreciation Right" means an Award, granted alone or in connection with an Option, that pursuant to Section 9 is designated as a Stock Appreciation Right.

(rr) "Subsidiary" means any corporation (other than the Company) in an unbroken chain of corporations beginning with the Company if each of the corporations other than the last corporation in the unbroken chain owns stock possessing fifty percent (50%) or more of the total combined voting power of all classes of stock in one of the other corporations in such chain. A corporation that attains the status of a Subsidiary on a date after the adoption of the Plan shall be considered a Subsidiary commencing as of such date.

(ss) "Tax-Related Items" means income tax, social insurance or other social contributions, national insurance, social security, payroll tax, fringe benefits tax, payment on account or other tax-related items.

3. Stock Subject to the Plan.

(a) Stock Subject to the Plan. Subject to the provisions of Section 13 of the Plan, the maximum aggregate number of Shares that may be issued under the Plan is 5,856,505 Shares, which number is the sum of (i) 2,494,700 new Shares plus (ii) any Shares that, as of the Effective Date, have been reserved but not issued pursuant to any awards granted under the Company's 2013 Stock Plan (the "Existing Plan") and are not subject to any awards granted thereunder in an amount not to exceed 928,974 Shares, and (iii) any Shares subject to awards under the Existing Plan that otherwise would have been returned to the Existing Plan on or after the Effective Date on account of the expiration, cancellation, forfeiture or repurchase of awards granted thereunder in an amount not to exceed 2,432,831 Shares. The Shares may be authorized, but unissued, or reacquired Common Stock. Notwithstanding the foregoing, subject to the provisions of Section 13 below, in no event shall the maximum aggregate number of Shares that may be issued under the Plan pursuant to Incentive Stock Options exceed the number set forth in this Section 3(a) plus, to the extent allowable under Section 422 of the Code and the regulations promulgated thereunder, any Shares that again become available for issuance pursuant to Sections 3(b) and 3(c).

(b) Automatic Share Reserve Increase. The number of Shares available for issuance under the Plan will be increased on the first day of each Fiscal Year beginning with the 2020 Fiscal Year, in an amount equal to the lessor of (i) 999,900 Shares, (ii) four percent (4%) of the outstanding Shares on the last day of the immediately preceding Fiscal Year and (iii) such number of Shares determined by the Board.

(c) Lapsed Awards. To the extent an Award should expire or be forfeited or become unexercisable for any reason without having been exercised in full, or is surrendered pursuant to an Exchange Program, the unissued Shares that were subject thereto shall, unless the Plan shall have been terminated, continue to be available under the Plan for issuance pursuant to future Awards. In

addition, any Shares which are retained by the Company upon exercise of an Award in order to satisfy the exercise or purchase price for such Award or any withholding taxes due with respect to such Award shall be treated as not issued and shall continue to be available under the Plan for issuance pursuant to future Awards. Shares issued under the Plan and later forfeited to the Company due to the failure to vest or repurchased by the Company at the original purchase price paid to the Company for the Shares (including, without limitation, upon forfeiture to or repurchase by the Company in connection with a Participant ceasing to be a Service Provider) shall again be available for future grant under the Plan. To the extent an Award under the Plan is paid out in cash rather than Shares, such cash payment will not result in reducing the number of Shares available for issuance under the Plan.

4. Administration of the Plan.

(a) Procedure.

(i) Multiple Administrative Bodies. Different Committees with respect to different groups of Service Providers may administer the Plan.

(ii) Rule 16b-3. To the extent desirable to qualify transactions hereunder as exempt under Rule 16b-3, the transactions contemplated hereunder will be structured to satisfy the requirements for exemption under Rule 16b-3.

(iii) Other Administration. Other than as provided above, the Plan will be administered by (A) the Board or (B) a Committee, which committee will be constituted to satisfy Applicable Laws.

(b) Powers of the Administrator. Subject to the provisions of the Plan, the Administrator will have the authority, in its discretion:

(i) to determine the Fair Market Value in accordance with Section 2(c);

(ii) to select the Service Providers to whom Awards may be granted hereunder;

(iii) to determine the number of Shares to be covered by each Award granted hereunder;

(iv) to approve forms of Award Agreements for use under the Plan;

(v) to determine the terms and conditions, not inconsistent with the terms of the Plan, of any Award granted hereunder; such terms and conditions include, but are not limited to, the exercise price, the time or times when Awards may be exercised (which may be based on performance criteria), any vesting acceleration or waiver of forfeiture restrictions, and any restriction or limitation regarding any Award or the Shares relating thereto, based in each case on such factors as the Administrator will determine;

(vi) to institute and determine the terms and conditions of an Exchange Program; provided however, that the Committee shall not implement an Exchange Program without the approval of the holders of a majority of the Shares that are present in person or by proxy and entitled to vote at any annual or special meeting of Company's stockholders;

(vii) to construe and interpret the terms of the Plan and Awards granted pursuant to the Plan;

(viii) to prescribe, amend and rescind rules and regulations relating to the Plan, including rules and regulations established for the purpose of satisfying applicable non-U.S. laws, for qualifying for favorable tax treatment under applicable non-U.S. laws or facilitating compliance with non-U.S. laws (sub-plans may be created for any of these purposes);

(ix) to modify or amend each Award (subject to Section 20 of the Plan), including but not limited to the discretionary authority to extend the post-termination exercisability period of Awards, to accelerate vesting and to extend the maximum term of an Option (subject to Section 6(b) of the Plan regarding Incentive Stock Options);

(x) to allow Participants to satisfy tax withholding obligations in such manner as prescribed in Section 14 of the Plan;

(xi) to authorize any person to execute on behalf of the Company any instrument required to effect the grant of an Award previously granted by the Administrator;

(xii) to allow a Participant to defer the receipt of the payment of cash or the delivery of Shares that would otherwise be due to such Participant under an Award; and

(xiii) to make all other determinations deemed necessary or advisable for administering the Plan.

(c) Effect of Administrator's Decision. The Administrator's decisions, determinations and interpretations will be final and binding on all Participants and any other holders of Awards.

(d) Delegation by the Committee. To the extent permitted by Applicable Law, the Committee, in its sole discretion and on such terms and conditions as it may provide, may delegate all or any part of its authority and powers under the Plan to one or more Directors or officers of the Company.

5. Award Eligibility. Nonstatutory Stock Options, Stock Appreciation Rights, Restricted Stock, Restricted Stock Units, Performance Shares and Performance Units may be granted to Service Providers. Incentive Stock Options may be granted only to Employees.

6. Stock Options.

(a) Limitations. Each Option will be designated in the Award Agreement as either an Incentive Stock Option or a Nonstatutory Stock Option. However, notwithstanding such designation, to the extent that the aggregate Fair Market Value of the Shares with respect to which Incentive Stock Options are exercisable for the first time by the Participant during any calendar year (under all plans of the Company and any Parent or Subsidiary) exceeds one hundred thousand dollars

(\$100,000), such Options will be treated as Nonstatutory Stock Options. For purposes of this Section 6(a), Incentive Stock Options will be taken into account in the order in which they were granted. The Fair Market Value of the Shares will be determined as of the date the Option with respect to such Shares is granted. With respect to the Committee's authority in Section 4(b)(ix), if, at the time of any such extension, the exercise price per Share of the Option is less than the Fair Market Value of a Share, the extension shall, unless otherwise determined by the Committee, be limited to the earlier of (1) the maximum term of the Option as set by its original terms, or (2) ten (10) years from the grant date. Unless otherwise determined by the Committee, any extension of the term of an Option pursuant to this Section 4(b)(ix) shall comply with Code Section 409A to the extent necessary to avoid taxation thereunder.

(b) Term of Option. The term of each Option will be stated in the Award Agreement. In the case of an Incentive Stock Option, the term will be ten (10) years from the date of grant or such shorter term as may be provided in the Award Agreement. Moreover, in the case of an Incentive Stock Option granted to a Participant who, at the time the Incentive Stock Option is granted, owns stock representing more than ten percent (10%) of the total combined voting power of all classes of stock of the Company or any Parent or Subsidiary, the term of the Incentive Stock Option will be five (5) years from the date of grant or such shorter term as may be provided in the Award Agreement.

(c) Option Exercise Price and Consideration.

(i) Exercise Price. The per share exercise price for the Shares to be issued pursuant to exercise of an Option will be determined by the Administrator, subject to the following:

(1) In the case of an Incentive Stock Option

(A) granted to an Employee who, at the time the Incentive Stock Option is granted, owns stock representing more than ten percent (10%) of the voting power of all classes of stock of the Company or any Parent or Subsidiary, the per Share exercise price will be no less than one hundred ten percent (110%) of the Fair Market Value per Share on the date of grant.

(B) granted to any Employee other than an Employee described in paragraph (A) immediately above, the per Share exercise price will be no less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant.

(2) In the case of a Nonstatutory Stock Option, the per Share exercise price will be no less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant.

(3) Notwithstanding the foregoing, Options may be granted with a per Share exercise price of less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant pursuant to a transaction described in, and in a manner consistent with, Section 424(a) of the Code.

(ii) Waiting Period and Exercise Dates. At the time an Option is granted, the Administrator will fix the period within which the Option may be exercised and will determine any conditions that must be satisfied before the Option may be exercised.

(iii) Form of Consideration. The Administrator will determine the acceptable form of consideration for exercising an Option, including the method of payment. In the case of an Incentive Stock Option, the Administrator will determine the acceptable form of consideration at the time of grant. Such consideration for both types of Options may consist entirely of: (1) cash; (2) check; (3) promissory note, to the extent permitted by Applicable Laws, (4) other Shares, provided that such Shares have a Fair Market Value on the date of surrender equal to the aggregate exercise price of the Shares as to which such Option will be exercised and provided that accepting such Shares will not result in any adverse accounting consequences to the Company, as the Administrator determines in its sole discretion; (5) consideration received by the Company under a broker-assisted (or other) cashless exercise program (whether through a broker or otherwise) implemented by the Company in connection with the Plan; (6) by net exercise; (7) such other consideration and method of payment for the issuance of Shares to the extent permitted by Applicable Laws; or (8) any combination of the foregoing methods of payment.

(d) Exercise of Option.

(i) Procedure for Exercise; Rights as a Stockholder. Any Option granted hereunder will be exercisable according to the terms of the Plan and at such times and under such conditions as determined by the Administrator and set forth in the Award Agreement. An Option may not be exercised for a fraction of a Share.

An Option will be deemed exercised when the Company receives: (i) a notice of exercise (in such form as the Administrator may specify from time to time) from the person entitled to exercise the Option, and (ii) full payment for the Shares with respect to which the Option is exercised (together with full payment of any applicable taxes or other amounts required to be withheld or deducted with respect to the Option). Full payment may consist of any consideration and method of payment authorized by the Administrator and permitted by the Award Agreement and the Plan. Shares issued upon exercise of an Option will be issued in the name of the Participant or, if requested by the Participant, in the name of the Participant and his or her spouse. Until the Shares are issued (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company), no right to vote or receive dividends or any other rights as a stockholder will exist with respect to the Shares subject to an Option, notwithstanding the exercise of the Option. The Company will issue (or cause to be issued) such Shares promptly after the Option is exercised. No adjustment will be made for a dividend or other right for which the record date is prior to the date the Shares are issued, except as provided in Section 13 of the Plan.

(ii) Termination of Relationship as a Service Provider. If a Participant ceases to be a Service Provider, other than upon the Participant's termination as the result of the Participant's death, Disability or Cause, the Participant may exercise his or her Option within such period of time as is specified in the Award Agreement to the extent that the Option is vested on the date of termination (but in no event later than the expiration of the term of such Option as set forth in the Award Agreement). In the absence of a specified time in the Award Agreement, the Option will remain exercisable for three (3) months following the Participant's termination. Unless otherwise provided by the Administrator, if on the date of termination the Participant is not vested as to his or her entire Option, the Shares covered by the unvested portion of the Option will revert to the Plan. If after termination the Participant does not exercise his or her Option within the time specified by the Administrator, the Option will terminate, and the Shares covered by such Option will revert to the Plan.

(iii) Disability of Participant. If a Participant ceases to be a Service Provider as a result of the Participant's Disability, the Participant may exercise his or her Option within such period of time as is specified in the Award Agreement to the extent the Option is vested on the date of termination (but in no event later than the expiration of the term of such Option as set forth in the Award Agreement). In the absence of a specified time in the Award Agreement, the Option will remain exercisable for twelve (12) months following the Participant's termination. Unless otherwise provided by the Administrator, if on the date of termination the Participant is not vested as to his or her entire Option, the Shares covered by the unvested portion of the Option will revert to the Plan. If after termination the Participant does not exercise his or her Option within the time specified herein, the Option will terminate, and the Shares covered by such Option will revert to the Plan.

(iv) Death of Participant. If a Participant dies while a Service Provider, the Option may be exercised following the Participant's death within such period of time as is specified in the Award Agreement to the extent that the Option is vested on the date of death (but in no event may the Option be exercised later than the expiration of the term of such Option as set forth in the Award Agreement), by the Participant's designated beneficiary, provided such beneficiary has been designated prior to Participant's death in a form acceptable to the Administrator. If no such beneficiary has been designated by the Participant, then such Option may be exercised by the personal representative of the Participant's estate or by the person(s) to whom the Option is transferred pursuant to the Participant's will or in accordance with the laws of descent and distribution. In the absence of a specified time in the Award Agreement, the Option will remain exercisable for twelve (12) months following Participant's death. Unless otherwise provided by the Administrator, if on the date of termination the Participant is not vested as to his or her entire Option, the Shares covered by the unvested portion of the Option will revert to the Plan. If the Option is not so exercised within the time specified herein, the Option will terminate, and the Shares covered by such Option will revert to the Plan.

(v) Termination for Cause. If a Participant ceases to be a Service Provider as a result of being terminated for Cause, any outstanding Option (including any vested portion thereof) held by such Participant shall immediately terminate in its entirety upon the Participant being first notified of his or her termination for Cause and the Participant will be prohibited from exercising his or her Option from and after the date of such termination. All the Participant's rights under any Option, including the right to exercise the Option, may be suspended pending an investigation of whether Participant will be terminated for Cause.

7. Restricted Stock.

(a) Grant of Restricted Stock. Subject to the terms and provisions of the Plan, the Administrator, at any time and from time to time, may grant Shares of Restricted Stock to Service Providers in such amounts as the Administrator, in its sole discretion, will determine.

(b) Restricted Stock Agreement. Each Award of Restricted Stock will be evidenced by an Award Agreement that will specify the Period of Restriction, the number of Shares granted, and such other terms and conditions as the Administrator, in its sole discretion, will determine. Unless the Administrator determines otherwise, the Company as escrow agent will hold Shares of Restricted Stock until the restrictions on such Shares have lapsed.

(c) Transferability. Except as provided in this Section 7 or the Award Agreement, Shares of Restricted Stock may not be sold, transferred, pledged, assigned, or otherwise alienated or hypothecated until the end of the applicable Period of Restriction.

(d) Other Restrictions. The Administrator, in its sole discretion, may impose such other restrictions on Shares of Restricted Stock as it may deem advisable or appropriate.

(e) Removal of Restrictions. Except as otherwise provided in this Section 7, Shares of Restricted Stock covered by each Restricted Stock grant made under the Plan will be released from escrow as soon as practicable after the last day of the Period of Restriction or at such other time as the Administrator may determine. The Administrator, in its discretion, may accelerate the time at which any restrictions will lapse or be removed.

(f) Voting Rights. During the Period of Restriction, Service Providers holding Shares of Restricted Stock granted hereunder may exercise full voting rights with respect to those Shares, unless the Administrator determines otherwise.

(g) Dividends and Other Distributions. During the Period of Restriction, Service Providers holding Shares of Restricted Stock will be entitled to receive all dividends and other distributions paid with respect to such Shares, unless the Administrator provides otherwise. If any such dividends or distributions are paid in Shares, the Shares will be subject to the same restrictions, including, without limitation, restrictions on transferability and forfeitability, as the Shares of Restricted Stock with respect to which they were paid.

(h) Return of Restricted Stock to Company. On the date set forth in the Award Agreement, the Restricted Stock for which restrictions have not lapsed will be cancelled and returned as unissued shares to the Company and again will become available for grant under the Plan.

8. Restricted Stock Units.

(a) Grant. Restricted Stock Units may be granted at any time and from time to time as determined by the Administrator. After the Administrator determines that it will grant Restricted Stock Units under the Plan, it will advise the Participant in an Award Agreement of the terms, conditions, and restrictions (if any) related to the grant, including the number of Restricted Stock Units.

(b) Vesting Criteria and Other Terms. The Administrator will set vesting criteria in its discretion, which, depending on the extent to which the criteria are met, will determine the number of Restricted Stock Units that will be paid out to the Participant. The Administrator may set vesting criteria based upon the achievement of Company-wide, business unit, or individual goals (including, but not limited to, continued employment), or any other basis (including the passage of time) determined by the Administrator in its discretion.

(c) Earning Restricted Stock Units. Upon meeting the applicable vesting criteria, the Participant will be entitled to receive a payout as determined by the Administrator. Notwithstanding the foregoing, at any time after the grant of Restricted Stock Units, the Administrator, in its sole discretion, may reduce or waive any vesting criteria that must be met to receive a payout.

(d) Dividend Equivalents. The Administrator may, in its sole discretion, award dividend equivalents in connection with the grant of Restricted Stock Units that may be settled in cash, in Shares of equivalent value, or in some combination thereof.

(e) Form and Timing of Payment. Payment of earned Restricted Stock Units will be made upon the date(s) determined by the Administrator and set forth in the Award Agreement. The Administrator, in its sole discretion, may only settle earned Restricted Stock Units in cash, Shares, or a combination of both.

(f) Cancellation. On the date set forth in the Award Agreement, all Shares underlying any unvested, unlapsd unearned Restricted Stock Units will be forfeited to the Company for future issuance.

9. Stock Appreciation Rights.

(a) Grant of Stock Appreciation Rights. Subject to the terms and conditions of the Plan, a Stock Appreciation Right may be granted to Service Providers at any time and from time to time as will be determined by the Administrator, in its sole discretion.

(b) Number of Shares. The Administrator will have complete discretion to determine the number of Stock Appreciation Rights granted to any Service Provider.

(c) Exercise Price and Other Terms. The per share exercise price for the Shares to be issued pursuant to exercise of a Stock Appreciation Right will be determined by the Administrator and will be no less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant. Otherwise, the Administrator, subject to the provisions of the Plan, will have complete discretion to determine the terms and conditions of Stock Appreciation Rights granted under the Plan.

(d) Stock Appreciation Right Agreement. Each Stock Appreciation Right grant will be evidenced by an Award Agreement that will specify the exercise price, the term of the Stock Appreciation Right, the conditions of exercise, and such other terms and conditions as the Administrator, in its sole discretion, will determine.

(e) Expiration of Stock Appreciation Rights. A Stock Appreciation Right granted under the Plan will expire upon the date determined by the Administrator, in its sole discretion, and set forth in the Award Agreement. Notwithstanding the foregoing, the rules of Section 6(b) relating to the maximum term and Section 6(d) relating to exercise also will apply to Stock Appreciation Rights.

(f) Payment of Stock Appreciation Right Amount. Upon exercise of a Stock Appreciation Right, a Participant will be entitled to receive payment from the Company in an amount determined by multiplying:

- (i) The difference between the Fair Market Value of a Share on the date of exercise over the exercise price; times

(ii) The number of Shares with respect to which the Stock Appreciation Right is exercised.

At the discretion of the Administrator, the payment upon Stock Appreciation Right exercise may be in cash, in Shares of equivalent value, or in some combination thereof.

10. Performance Units and Performance Shares.

(a) Grant of Performance Units/Shares. Performance Units and Performance Shares may be granted to Service Providers at any time and from time to time, as will be determined by the Administrator, in its sole discretion. The Administrator will have complete discretion in determining the number of Performance Units and Performance Shares granted to each Participant.

(b) Value of Performance Units/Shares. Each Performance Unit will have an initial value that is established by the Administrator on or before the date of grant. Each Performance Share will have an initial value equal to the Fair Market Value of a Share on the date of grant.

(c) Performance Goals and Other Terms. The Administrator will set Performance Goals or other vesting provisions (including, without limitation, continued status as a Service Provider) in its discretion which, depending on the extent to which they are met, will determine the number or value of Performance Units/Shares that will be paid out to the Service Providers. Each Award of Performance Units/Shares will be evidenced by an Award Agreement that will specify the Performance Period, and such other terms and conditions as the Administrator, in its sole discretion, will determine. Without limiting the foregoing, the Committee shall adjust any Performance Goals or other feature of an Award that relates to or is wholly or partially based on the number of, or the value of, any stock of the Company, to reflect any stock dividend or split, repurchase, recapitalization, combination, or exchange of shares or other similar changes in such stock.

(d) Earning of Performance Units/Shares. After the applicable Performance Period has ended, the holder of Performance Units/Shares will be entitled to receive a payout of the number of Performance Units/Shares earned by the Participant over the Performance Period, to be determined as a function of the extent to which the corresponding Performance Goals or other vesting provisions have been achieved. After the grant of a Performance Unit/Share, the Administrator, in its sole discretion, may reduce or waive any Performance Goals or other vesting provisions for such Performance Unit/Share.

(e) Form and Timing of Payment of Performance Units/Shares. Payment of earned Performance Units/Shares will be made upon the time set forth in the applicable Award Agreement. The Administrator, in its sole discretion, may pay earned Performance Units/Shares in the form of cash, in Shares (which have an aggregate Fair Market Value equal to the value of the earned Performance Units/Shares at the close of the applicable Performance Period) or in a combination thereof.

(f) Cancellation of Performance Units/Shares. On the date set forth in the Award Agreement, all unearned or unvested Performance Units/Shares will be forfeited to the Company, and again will be available for grant under the Plan.

11. Leaves of Absence/Transfer Between Locations. The Administrator shall have the discretion to determine at any time whether and to what extent the vesting of Awards shall be suspended during any leave of absence; provided, however, that in the absence of such determination, vesting of Awards shall continue during any paid leave and shall be suspended during any unpaid leave (unless otherwise required by Applicable Laws). A Participant will not cease to be an Employee in the case of (i) any leave of absence approved by the Participant's employer or (ii) transfers between locations of the Company or between the Company, its Parent, or any Subsidiary. If an Employee is holding an Incentive Stock Option and such leave exceeds three (3) months then, for purposes of Incentive Stock Option status only, such Employee's service as an Employee shall be deemed terminated on the first (1st) day following such three (3) month period and the Incentive Stock Option shall thereafter automatically be treated for tax purposes as a Nonstatutory Stock Option in accordance with Applicable Laws, unless reemployment upon the expiration of such leave is guaranteed by contract or statute, or unless provided otherwise pursuant to a written Company policy.

12. Transferability of Awards. Unless determined otherwise by the Administrator, an Award may not be sold, pledged, assigned, hypothecated, transferred, or disposed of in any manner other than by will or by the laws of descent or distribution and may be exercised, during the lifetime of the Participant, only by the Participant. If the Administrator makes an Award transferable, such Award will contain such additional terms and conditions as the Administrator deems appropriate.

13. Adjustments; Dissolution or Liquidation; Merger or Change in Control.

(a) Adjustments. In the event of a stock split, reverse stock split, stock dividend, combination, consolidation, recapitalization (including a recapitalization through a large nonrecurring cash dividend) or reclassification of the Shares, subdivision of the Shares, a rights offering, a reorganization, merger, spin-off, split-up, repurchase, or exchange of Common Stock or other securities of the Company or other significant corporate transaction, or other change affecting the Common Stock occurs, the Administrator, in order to prevent dilution, diminution or enlargement of the benefits or potential benefits intended to be made available under the Plan, will, in such manner as it may deem equitable, adjust the number, kind and class of securities that may be delivered under the Plan and/or the number, class, kind and price of securities covered by each outstanding Award. Notwithstanding the forgoing, all adjustments under this Section 13 shall be made in a manner that does not result in taxation under Code Section 409A.

(b) Dissolution or Liquidation. In the event of the proposed winding up, dissolution or liquidation of the Company, the Administrator will notify each Participant as soon as practicable prior to the effective date of such proposed transaction. To the extent it has not been previously exercised or settled, an Award will terminate immediately prior to the consummation of such proposed action.

(c) Corporate Transaction. In the event of (i) a transfer of all or substantially all of the Company's assets, (ii) a merger, consolidation or other capital reorganization or business combination transaction of the Company with or into another corporation, entity or person, or (iii) the consummation of a transaction, or series of related transactions, in which any "person" (as such term is used in Sections 13(d) and 14(d) of the Exchange Act) becomes the "beneficial owner" (as defined in Rule 13d-3 of the Exchange Act), directly or indirectly, of more than 50% of the Company's then outstanding capital stock (a "Corporate Transaction"), each outstanding Award (vested or unvested)

will be treated as the Administrator determines, which determination may be made without the consent of any Participant and need not treat all outstanding Awards (or portion thereof) in an identical manner. Such determination, without the consent of any Participant, may provide (without limitation) for one or more of the following in the event of a Corporate Transaction: (A) the continuation of such outstanding Awards by the Company (if the Company is the surviving corporation); (B) the assumption of such outstanding Awards by the surviving corporation or its parent; (C) the substitution by the surviving corporation or its parent of new options or other equity awards for such Awards; (D) the cancellation of such Awards in exchange for a payment to the Participants equal to the excess of (1) the Fair Market Value of the Shares subject to such Awards as of the closing date of such Corporate Transaction over (2) the exercise price or purchase price paid or to be paid (if any) for the Shares subject to the Awards; provided further, that at the discretion of the Committee, such payment may be subject to the same conditions that apply to the consideration that will be paid to holders of Shares in connection with the transaction; provided, however, that any payout in connection with a terminated award shall comply with Section 409A of the Code to the extent necessary to avoid taxation thereunder; or (c) the opportunity for Participants to exercise the Options prior to the occurrence of the Corporate Transaction and the termination (for no consideration) upon the consummation of such Corporate Transaction of any Options not exercised prior thereto.

(d) Change in Control. An Award may be subject to additional acceleration of vesting and exercisability upon or after a Change in Control as may be provided in the Award Agreement for such Award or as may be provided in any other written agreement between the Company or any Affiliate and the Participant, but in the absence of such provision, no such acceleration will occur.

14. Tax.

(a) Withholding Requirements. Prior to the delivery of any Shares or cash pursuant to an Award (or exercise thereof) or prior to any time the Award or Shares are subject to taxation or other Tax-Related Items, the Company and/or the Participant's employer will have the power and the right to deduct or withhold, or require a Participant to remit to the Company, an amount sufficient to satisfy any Tax-Related Items or other items that are required to be withheld or deducted or otherwise applicable with respect to such Award.

(b) Withholding Arrangements. The Administrator, in its sole discretion and pursuant to such procedures as it may specify from time to time, may permit a Participant to satisfy such withholding or deduction obligations or any other Tax-Related Items, in whole or in part by (without limitation) (a) paying cash, (b) electing to have the Company withhold otherwise deliverable cash or Shares, or (c) delivering to the Company already-owned Shares; provided that, unless specifically permitted by the Company, any proceeds derived from a cashless exercise must be an approved broker-assisted cashless exercise or the cash or Shares withheld or delivered must be limited to avoid financial accounting charges under applicable accounting guidance or Shares must have been previously held for the minimum duration required to avoid financial accounting charges under applicable accounting guidance. Except as otherwise determined by the Administrator, the Fair Market Value of the Shares to be withheld or delivered will be determined as of the date that the amounts are required to be withheld or deducted.

(c) Compliance With Code Section 409A. Awards will be designed and operated in such a manner that they are either exempt from the application of, or comply with, the requirements of Code Section 409A such that the grant, payment, settlement or deferral will not be subject to the additional tax or interest applicable under Code Section 409A. The Plan and each Award Agreement under the Plan is intended to meet the requirements of Code Section 409A (or an exemption therefrom) and will be construed and interpreted in accordance with such intent, except as otherwise determined in the sole discretion of the Administrator. To the extent that an Award or payment, or the settlement or deferral thereof, is subject to Code Section 409A the Award will be granted, paid, settled or deferred in a manner that will meet the requirements of Code Section 409A (or an exemption therefrom), such that the grant, payment, settlement or deferral will not be subject to the additional tax or interest applicable under Code Section 409A. In no event will the Company be responsible for or reimburse a Participant for any taxes or other penalties incurred as a result of applicable of Code Section 409A.

15. No Effect on Employment or Service. Neither the Plan nor any Award will confer upon a Participant any right with respect to continuing the Participant's relationship as a Service Provider with the Company or any Subsidiary or Affiliate, nor will they interfere in any way with the Participant's right or the Company's or any Subsidiary or Affiliate's right to terminate such relationship at any time, with or without cause, to the extent permitted by Applicable Laws.

16. Date of Grant. The date of grant of an Award will be, for all purposes, the date on which the Administrator makes the determination granting such Award, or such other later date as is determined by the Administrator. Notice of the determination will be provided to each Participant within a reasonable time after the date of such grant.

17. Corporate Records Control. In the event that the corporate records (e.g., Board consents, resolutions or minutes) documenting the corporate action constituting the grant contain terms (e.g., exercise price, vesting schedule or number of shares) that are inconsistent with those in the Award Agreement or related grant documents as a result of a clerical error in the papering of the Award Agreement or related grant documents, the corporate records will control and the Participant will have no legally binding right to the incorrect term in the Award Agreement or related grant documents.

18. Clawback/Recovery. All Awards granted under the Plan will be subject to recoupment in accordance with any clawback policy that the Company is required to adopt pursuant to the listing standards of any national securities exchange or association on which the Company's securities are listed or as is otherwise required by the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the Board may impose such other clawback, recovery or recoupment provisions in an Award Agreement as the Board determines necessary or appropriate, including but not limited to a reacquisition right in respect of previously acquired Shares or other cash or property upon the occurrence of an event constituting Cause. No recovery of compensation under such a clawback policy will be an event giving rise to a right to resign for "good reason" or "constructive termination" (or similar term) under any agreement with the Company.

19. Term of Plan. Subject to Section 23 of the Plan, the Plan will become effective as of the Effective Date. The Plan will continue in effect for a term of ten (10) years measured from the earlier of the date the Board approves the this Plan or the approval of this Plan by the Company's stockholders, unless terminated earlier under Section 20 of the Plan.

20. Amendment and Termination of the Plan.

(a) Amendment and Termination. The Administrator may at any time amend, alter, suspend or terminate the Plan.

(b) Stockholder Approval. The Company will obtain stockholder approval of any Plan amendment to the extent necessary and desirable to comply with Applicable Laws.

(c) Effect of Amendment or Termination. No amendment, alteration, suspension or termination of the Plan will materially impair the rights of any Participant, unless mutually agreed otherwise between the Participant and the Administrator, which agreement must be in writing and signed by the Participant and the Company. Termination of the Plan will not affect the Administrator's ability to exercise the powers granted to it hereunder with respect to Awards granted under the Plan prior to the date of such termination.

21. Conditions Upon Issuance of Shares.

(a) Legal Compliance. Shares will not be issued pursuant to the exercise or vesting (as applicable) of an Award unless the exercise or vesting of such Award and the issuance and delivery of such Shares will comply with Applicable Laws and will be further subject to the approval of counsel for the Company with respect to such compliance.

(b) Investment Representations. As a condition to the exercise of an Award, the Company may require the person exercising such Award to represent and warrant at the time of any such exercise that the Shares are being purchased only for investment and without any present intention to sell or distribute such Shares if, in the opinion of counsel for the Company, such a representation is required.

22. Inability to Obtain Authority. The inability of the Company to obtain authority from any regulatory body having jurisdiction, which authority is deemed by the Company's counsel to be necessary to the lawful issuance and sale of any Shares hereunder, will relieve the Company of any liability in respect of the failure to issue or sell such Shares as to which such requisite authority will not have been obtained.

23. Stockholder Approval. The Plan will be subject to approval by the stockholders of the Company within twelve (12) months after the date the Plan is adopted by the Board. Such stockholder approval will be obtained in the manner and to the degree required under Applicable Laws.

24. Governing Law. The Plan and all Awards hereunder shall be construed in accordance with and governed by the laws of the State of California, but without regard to its conflict of law provisions.

o O o

TWIST BIOSCIENCE CORPORATION
2018 EQUITY INCENTIVE PLAN
RESTRICTED STOCK AWARD AGREEMENT

Unless otherwise defined herein, the terms defined in the Twist Bioscience Corporation 2018 Equity Incentive Plan (the “*Plan*”) will have the same defined meanings in this Restricted Stock Award Agreement (the “*Award Agreement*”).

NOTICE OF RESTRICTED STOCK GRANT

Participant Name:

You have been granted the right to receive an Award of Restricted Stock, subject to the terms and conditions of the Plan and this Award Agreement, as follows:

Grant Number	_____
Date of Grant	_____
Vesting Commencement Date	_____
Total Number of Shares Granted	_____

Vesting Schedule:

Subject to Section 3 of the Award Agreement, the Restricted Stock will vest and the Company’s right to reacquire the Restricted Stock will lapse in accordance with the following schedule:

[INSERT VESTING SCHEDULE]

By Participant's signature and the signature of the representative of Twist Bioscience Corporation (the "**Company**") below, or by Participant otherwise accepting this Award, Participant and the Company agree that this Award of Restricted Stock is granted under and governed by the terms and conditions of the Plan and this Award Agreement, including the Terms and Conditions of Restricted Stock Grant (including any country-specific addendum thereto), attached hereto as Exhibit A, all of which are made a part of this document. Participant has reviewed the Plan and this Award Agreement in their entirety, has had an opportunity to obtain the advice of counsel prior to executing this Award Agreement and fully understands all provisions of the Plan and Award Agreement. Participant hereby agrees to accept as binding, conclusive and final all decisions or interpretations of the Administrator upon any questions relating to the Plan and Award Agreement.

PARTICIPANT:

TWIST BIOSCIENCE CORPORATION

Signature

By

Print Name

Title

EXHIBIT A

TERMS AND CONDITIONS OF RESTRICTED STOCK GRANT

1. **Grant of Restricted Stock.** The Company hereby grants to the individual named in the Notice of Grant attached as Part I of this Award Agreement (the “**Participant**”) under the Plan for past services as an Employee, Director, or Independent Contractor and as a separate incentive in connection with his or her services and not in lieu of any salary or other compensation for his or her services, an Award of Shares of Restricted Stock, subject to all of the terms and conditions in this Award Agreement and the Plan, which is incorporated herein by reference. Subject to Section 20 of the Plan, in the event of a conflict between the terms and conditions of the Plan and the terms and conditions of this Award Agreement, the terms and conditions of the Plan will prevail.

2. **Escrow of Shares.**

(a) All Shares of Restricted Stock will, upon execution of this Award Agreement, be delivered and deposited with an escrow holder designated by the Company (the “**Escrow Holder**”). The Shares of Restricted Stock will be held by the Escrow Holder until such time as the Shares of Restricted Stock vest or the date Participant ceases to be a Service Provider.

(b) The Escrow Holder will not be liable for any act it may do or omit to do with respect to holding the Shares of Restricted Stock in escrow while acting in good faith and in the exercise of its judgment.

(c) Upon Participant’s termination as a Service Provider for any reason, the Escrow Holder, upon receipt of written notice of such termination, will take all steps necessary to accomplish the transfer of the unvested Shares of Restricted Stock to the Company. Participant hereby appoints the Escrow Holder with full power of substitution, as Participant’s true and lawful attorney in fact with irrevocable power and authority in the name and on behalf of Participant to take any action and execute all documents and instruments, including, without limitation, stock powers which may be necessary to transfer the certificate or certificates evidencing such unvested Shares of Restricted Stock to the Company upon such termination.

(d) The Escrow Holder will take all steps necessary to accomplish the transfer of Shares of Restricted Stock to Participant after they vest following Participant’s request that the Escrow Holder do so.

(e) Subject to the terms hereof, Participant will have all the rights of a stockholder with respect to the Shares while they are held in escrow, including without limitation, the right to vote the Shares and to receive any cash dividends declared thereon.

(f) In the event of any dividend or other distribution (whether in the form of cash, Shares, other securities, or other property), recapitalization, stock split, reverse stock split, reorganization, merger, consolidation, split-up, spin-off, combination, repurchase, or exchange of Shares or other securities of the Company, or other change in the corporate structure of the Company affecting the Shares, the Shares of Restricted Stock will be increased, reduced or otherwise changed, and by virtue of any such change Participant will in his or her capacity as

owner of unvested Shares of Restricted Stock be entitled to new or additional or different shares of stock, cash or securities (other than rights or warrants to purchase securities); such new or additional or different shares, cash or securities will thereupon be considered to be unvested Shares of Restricted Stock and will be subject to all of the conditions and restrictions which were applicable to the unvested Shares of Restricted Stock pursuant to this Award Agreement. If Participant receives rights or warrants with respect to any unvested Shares of Restricted Stock, such rights or warrants may be held or exercised by Participant, provided that until such exercise any such rights or warrants and after such exercise any shares or other securities acquired by the exercise of such rights or warrants will be considered to be unvested Shares of Restricted Stock and will be subject to all of the conditions and restrictions which were applicable to the unvested Shares of Restricted Stock pursuant to this Award Agreement.

(g) The Company may instruct the transfer agent for its Common Stock to place a legend on the certificates representing the Restricted Stock or otherwise note its records as to the restrictions on transfer set forth in this Award Agreement.

3. Vesting Schedule. Subject to Section 4, the Shares of Restricted Stock awarded by this Award Agreement will vest in accordance with the vesting provisions set forth in the Notice of Grant. Shares of Restricted Stock scheduled to vest on a certain date or upon the occurrence of a certain condition will not vest in accordance with any of the provisions of this Award Agreement, unless Participant will have been continuously a Service Provider from the Date of Grant until the date such vesting occurs. Service Provider status for purposes of the Plan will end on the day that Participant is no longer actively providing services as an Employee, Director, or Independent Contractor and will not be extended by any notice period or "garden leave" that may be required contractually or under Applicable Laws. Notwithstanding the foregoing, the Administrator (or any delegate) shall have the sole and absolute discretion to determine when Participant is no longer providing active service for purposes of Service Provider status and participation in the Plan.

4. Forfeiture upon Termination of Status as a Service Provider. Notwithstanding any contrary provision of this Award Agreement, the balance of the Shares of Restricted Stock that have not vested as of the time Participant's status as a Service Provider ceases in accordance with Section 3 above will be forfeited and automatically transferred to and reacquired by the Company at no cost to the Company upon the date of such termination and Participant will have no further rights thereunder. Participant will not be entitled to a refund of the price paid for the Shares of Restricted Stock, if any, returned to the Company pursuant to this Section 4. Participant hereby appoints the Escrow Agent with full power of substitution, as Participant's true and lawful attorney-in-fact with irrevocable power and authority in the name and on behalf of Participant to take any action and execute all documents and instruments, including, without limitation, stock powers which may be necessary to transfer the certificate or certificates evidencing such unvested Shares to the Company upon such termination of service.

5. Death of Participant. Any distribution or delivery to be made to Participant under this Award Agreement will, if Participant is then deceased, be made to Participant's designated beneficiary, if so allowed by the Administrator in its sole discretion, or if no beneficiary survives Participant, the administrator or executor of Participant's estate. Any such transferee must furnish the Company with (a) written notice of his or her status as transferee, and (b) evidence satisfactory to the Company to establish the validity of the transfer and compliance with any Applicable Laws or regulations pertaining to said transfer.

6. **Withholding of Taxes.** Regardless of any action the Company or Participant's employer (the "**Employer**") takes with respect to any or all applicable national, local, or other tax or social contribution, withholding, required deductions, or other payments, if any, that arise upon the grant or vesting of the Restricted Stock or the holding or subsequent sale of Shares, and the receipt of dividends, if any, or otherwise in connection with the Shares ("**Tax-Related Items**"), Participant acknowledges and agrees that the ultimate liability for all Tax-Related Items legally due by Participant is and remains Participant's responsibility and may exceed any amount actually withheld by the Company or the Employer. Participant further acknowledges and agrees that Participant is solely responsible for filing all relevant documentation that may be required in relation to the Shares or any Tax-Related Items (other than filings or documentation that is the specific obligation of the Company or a Parent, Subsidiary, or Employer pursuant to Applicable Law) such as but not limited to personal income tax returns or reporting statements in relation to the grant of Shares, the holding of Shares or any bank or brokerage account, the subsequent sale of Shares, and the receipt of any dividends. Participant further acknowledges that the Company and the Employer (a) make no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of the Restricted Stock, including grant or vesting, the subsequent sale of Shares acquired under the Plan, and the receipt of dividends, if any; and (b) does not commit to and is under no obligation to structure the terms of the Restricted Stock or any aspect of the Restricted Stock to reduce or eliminate Participant's liability for Tax-Related Items, or achieve any particular tax result. Participant also understands that Applicable Laws may require varying Share valuation methods for purposes of calculating Tax-Related Items, and the Company assumes no responsibility or liability in relation to any such valuation or for any calculation or reporting of income or Tax-Related Items that may be required of Participant under Applicable Laws. Further, if Participant has become subject to tax in more than one jurisdiction between the date of grant and the date of any relevant taxable event, Participant acknowledges that the Company and/or the Employer (or former employer, as applicable) may be required to withhold or account for Tax-Related Items in more than one jurisdiction. Notwithstanding any contrary provision of this Award Agreement, no certificate representing the Shares of Restricted Stock may be released from the escrow established pursuant to Section 2, unless and until satisfactory arrangements (as determined by the Administrator) will have been made by Participant with respect to the payment of any Tax-Related Items which the Company determines must be withheld with respect to such Shares.

As a condition to the grant and vesting of the Shares of Restricted Stock and as set forth in Section 14 of the Plan, Participant hereby agrees to make adequate provision for the satisfaction of (and will indemnify the Company and any Parent or Subsidiary for) any Tax-Related Items. The Tax-Related Items shall be satisfied by the Company's withholding all or a portion of any Shares of Restricted Stock that vest; provided that amounts withheld shall not exceed the amount necessary to satisfy the Company's minimum tax withholding obligations. Such withheld Shares shall be valued based on the Fair Market Value as of the date the withholding obligations are satisfied. Furthermore, Participant agrees to pay the Company or any Parent, Subsidiary, or Employer any Tax-Related Items that cannot be satisfied by the foregoing methods.¹

¹ To exempt the withholding of shares upon vesting of the Restricted Stock to satisfy tax obligations from the requirements of Section 16 of the Securities Exchange Act of 1934, we recommend that the Company provide that taxes be satisfied through automatic share withholding. Alternatively, the withholding of shares to satisfy tax obligations may qualify for exemption if the participant may elect the method of tax withholding. For administrative ease, we recommend that the Company provide for automatic share withholding instead of allowing the participant to elect the method of tax withholding.

7. Rights as Stockholder. Neither Participant nor any person claiming under or through Participant will have any of the rights or privileges of a stockholder of the Company in respect of any Shares deliverable hereunder unless and until certificates representing such Shares will have been issued, recorded on the records of the Company or its transfer agents or registrars, and delivered to Participant or the Escrow Agent. Except as provided in Section 2, after such issuance, recordation and delivery, Participant will have all the rights of a stockholder of the Company with respect to voting such Shares and receipt of dividends and distributions on such Shares, but prior to such issuance, Participant will not have any rights to dividends and/or distributions on such Shares.

8. No Guarantee of Continued Service or Grants. PARTICIPANT ACKNOWLEDGES AND AGREES THAT THE VESTING OF THE SHARES OF RESTRICTED STOCK PURSUANT TO THE VESTING SCHEDULE HEREOF SHALL OCCUR ONLY BY CONTINUING AS A SERVICE PROVIDER AT THE WILL OF THE EMPLOYER OR CONTRACTING ENTITY (AS APPLICABLE) AND NOT THROUGH THE ACT OF BEING HIRED, BEING GRANTED THIS RESTRICTED STOCK OR ACQUIRING SHARES HEREUNDER. PARTICIPANT FURTHER ACKNOWLEDGES AND AGREES THAT THIS AWARD AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREUNDER AND THE VESTING SCHEDULE SET FORTH HEREIN DO NOT CONSTITUTE AN EXPRESS OR IMPLIED PROMISE OF CONTINUED ENGAGEMENT AS A SERVICE PROVIDER FOR THE VESTING PERIOD, FOR ANY PERIOD, OR AT ALL, AND WILL NOT INTERFERE IN ANY WAY WITH PARTICIPANT'S RIGHT OR THE RIGHT OF THE EMPLOYER OR THE COMPANY, PARENT, OR SUBSIDIARY TO TERMINATE PARTICIPANT'S RELATIONSHIP AS A SERVICE PROVIDER AT ANY TIME, WITH OR WITHOUT CAUSE.

Participant also acknowledges and agrees that: (a) the Plan is established voluntarily by the Company, it is discretionary in nature and it may be modified, amended, suspended or terminated by the Company at any time; (b) the grant of Restricted Stock is voluntary and occasional and does not create any contractual or other right to receive future grants of Restricted Stock, or benefits in lieu of Restricted Stock even if Restricted Stock have been granted repeatedly in the past; (c) all decisions with respect to future awards of Restricted Stock, if any, will be at the sole discretion of the Company; (d) Participant's participation in the Plan is voluntary; (e) the Restricted Stock and the Shares subject to the Restricted Stock are extraordinary items that do not constitute regular compensation for services rendered to the Company or the Employer, and that are outside the scope of Participant's employment contract, if any; (f) the Restricted Stock and the Shares subject to the Restricted Stock are not intended to replace any pension rights or compensation; (g) the Restricted Stock and the Shares subject to the Restricted Stock are not part of normal or expected compensation or salary for any purposes, including, but not limited to, calculating any severance, resignation, termination, redundancy, dismissal, or end of service payments, bonuses, long-service awards, pension or retirement or welfare benefits or similar payments and in no event should be considered as compensation for, or relating in any way to, past services for the Company or the Employer, subject to Applicable Laws.

9. Address for Notices. Any notice to be given to the Company under the terms of this Award Agreement will be addressed to the Company, in care of its Secretary at Twist Bioscience Corporation, 455 Mission Bay Boulevard South, San Francisco, CA 94158, or at such other address as the Company may hereafter designate in writing.

10. Grant is Not Transferable. Except to the limited extent provided in Section 5, the unvested Shares subject to this grant and the rights and privileges conferred hereby will not be transferred, assigned, pledged or hypothecated in any way (whether by operation of law or otherwise) and may not be subject to sale under execution, attachment or similar process. Upon any attempt to transfer, assign, pledge, hypothecate or otherwise dispose of any unvested Shares of Restricted Stock subject to this grant, or any right or privilege conferred hereby, or upon any attempted sale under any execution, attachment or similar process, this grant and the rights and privileges conferred hereby immediately will become null and void.

11. Binding Agreement. Subject to the limitation on the transferability of this grant contained herein, this Award Agreement will be binding upon and inure to the benefit of the heirs, legatees, legal representatives, successors and assigns of the parties hereto.

12. Additional Conditions; Release from Escrow. The Company will not be required to issue any certificate or certificates for Shares hereunder or release such Shares from the escrow established pursuant to Section 2 prior to fulfillment of all the following conditions: (a) the admission of such Shares to listing on all stock exchanges on which such class of stock is then listed; (b) the completion of any registration or other qualification of such Shares under any Applicable Laws or under the rulings or regulations of the Securities and Exchange Commission or any other governmental regulatory body or the securities exchange on which the Shares are then registered, which the Administrator will, in its absolute discretion, deem necessary or advisable; (c) the obtaining of any approval or other clearance from any state or federal governmental agency, which the Administrator will, in its absolute discretion, determine to be necessary or advisable; and (d) the lapse of such reasonable period of time following the date of grant of the Restricted Stock as the Administrator may establish from time to time for reasons of administrative convenience.

Furthermore, the Company reserves the right to impose other requirements on Participant's participation in the Plan, on the Restricted Stock and on any Shares acquired under the Plan, to the extent the Company determines it is necessary or advisable in order to comply with Applicable Laws or facilitate the administration of the Plan, and to require Participant to sign any additional agreements or undertakings that may be necessary to accomplish the foregoing. Furthermore, Participant understands that the Applicable Laws of the country in which he or she is resident at the time of grant or vesting of the Restricted Stock or the holding or disposition of Shares (including any rules or regulations governing securities, foreign exchange, tax, labor or other matters) may restrict or prevent the issuance of Shares or may subject Participant to additional procedural or regulatory requirements he or she is solely responsible for and will have to independently fulfill in relation to the Restricted Stock or the Shares. Notwithstanding any provision herein, the Restricted Stock and any Shares shall be subject to any special terms and conditions or disclosures as set forth in any addendum for Participant's country (the "Country-

Specific Addendum,” which forms part this Award Agreement). Participant also understands and agrees that if he works, resides, moves to, or otherwise is or becomes subject to Applicable Laws or company policies of another jurisdiction at any time, certain country-specific notices, disclaimers and/or terms and conditions may apply to him as from the date of grant, unless otherwise determined by the Company in its sole discretion.

13. Lock-Up Agreement. In connection with the initial public offering of the Company’s securities, Participant hereby agrees not to offer, pledge, sell, contract to sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any securities of the Company however and whenever acquired (other than those included in the registration) without the prior written consent of the Company and the managing underwriters for such offering for such period of time (not to exceed 180 days) from the effective date of such registration as may be requested by the Company or such managing underwriters and to execute an agreement reflecting the foregoing as may be requested by the underwriters at the time of the Company’s initial public offering. In addition, upon request of the Company or the underwriters managing a public offering of the Company’s securities (other than the initial public offering), Participant hereby agrees to be bound by similar restrictions, and to sign a similar agreement, in connection with no more than one additional registration statement filed within 12 months after the closing date of the initial public offering, provided that the duration of the lock-up period with respect to such additional registration shall not exceed 90 days from the effective date of such additional registration statement. Notwithstanding the foregoing, if during the last 17 days of the restricted period, the Company issues an earnings release or material news or a material event relating to the Company occurs, or prior to the expiration of the restricted period the Company announces that it will release earnings results during the 16-day period beginning on the last day of the restricted period, then, upon the request of the managing underwriter, to the extent required by any FINRA rules, the restrictions imposed by this subsection shall continue to apply until the end of the third trading day following the expiration of the 15-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event. In no event will the restricted period extend beyond 216 days after the effective date of the registration statement. In order to enforce the restriction set forth above, the Company may impose stop-transfer instructions with respect to the Shares acquired under this Agreement until the end of the applicable stand-off period. The Company’s underwriters shall be beneficiaries of the agreement set forth in this Section.

If the underwriters release or waive any of the foregoing restrictions in connection with a transfer of shares of Common Stock, the underwriters shall notify the Company at least three business days before the effective date of any such release or waiver. Further, the Company will announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by the underwriters shall only be effective two business days after the publication date of such press release. The provisions of this paragraph will not apply if (x) the release or waiver is effected solely to permit a transfer not for consideration and (y) the transferee has agreed in writing to be bound by the same terms of the lock-up provisions applicable in general to the extent, and for the duration, that such lock-up provision remain in effect at the time of the transfer.

14. Plan Governs. This Award Agreement is subject to all terms and provisions of the Plan. In the event of a conflict between one or more provisions of this Award Agreement and one or more provisions of the Plan, the provisions of the Plan will govern. Capitalized terms used and not defined in this Award Agreement will have the meaning set forth in the Plan.

15. Administrator Authority. The Administrator will have the power to interpret the Plan and this Award Agreement and to adopt such rules for the administration, interpretation and application of the Plan as are consistent therewith and to interpret or revoke any such rules (including, but not limited to, the determination of whether or not any Shares of Restricted Stock have vested). All actions taken and all interpretations and determinations made by the Administrator in good faith will be final and binding upon Participant, the Company and all other interested persons. No member of the Administrator will be personally liable for any action, determination or interpretation made in good faith with respect to the Plan or this Award Agreement.

16. Electronic Delivery and Acceptance; Translation. The Company may, in its sole discretion, decide to deliver any documents related to the Shares of Restricted Stock awarded under the Plan or future Restricted Stock that may be awarded under the Plan by electronic means or request Participant's consent to participate in the Plan by electronic means. Participant hereby consents to receive such documents by electronic delivery and agrees to participate in the Plan through any on-line or electronic system established and maintained by the Company or another third party designated by the Company. If Participant has received this Award Agreement, including appendices, or any other document related to the Plan translated into a language other than English, and the meaning of the translated version is different than the English version, the English version will control.

17. Captions. Captions provided herein are for convenience only and are not to serve as a basis for interpretation or construction of this Award Agreement.

18. Agreement Severable. In the event that any provision in this Award Agreement will be held invalid or unenforceable, such provision will be severable from, and such invalidity or unenforceability will not be construed to have any effect on, the remaining provisions of this Award Agreement.

19. Modifications to the Award Agreement. This Award Agreement constitutes the entire understanding of the parties on the subjects covered. Participant expressly warrants that he or she is not accepting this Award Agreement in reliance on any promises, representations, or inducements other than those contained herein. Modifications to this Award Agreement or the Plan can be made only in an express written contract executed by a duly authorized officer of the Company. Notwithstanding anything to the contrary in the Plan or this Award Agreement, the Company reserves the right to revise this Award Agreement as it deems necessary or advisable, in its sole discretion and without the consent of Participant, to comply with Section 409A of the Code or to otherwise avoid imposition of any additional tax or income recognition under Section 409A of the Code in connection to this Award of Restricted Stock.

20. Data Privacy. ***Participant hereby explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of Participant's Personal Data (as described below) by and among, as applicable, the Company, any Parent, Subsidiary, or affiliate, or third parties as may be selected by the Company for the exclusive purpose of implementing, administering and managing Participant's participation in the Plan. Participant understands that refusal or withdrawal of consent will affect Participant's ability to participate in the Plan; without providing consent, Participant will not be able to participate in the Plan or realize benefits (if any) from the Restricted Stock.***

Participant understands that the Company and any Parent, Subsidiary, affiliate, or designated third parties may hold personal information about Participant, including, but not limited to, Participant's name, home address and telephone number, date of birth, social insurance number or other identification number, salary, nationality, job title, any shares of stock or directorships held in the Company or any Parent, Subsidiary, or affiliate, details of all Restricted Stock or any other entitlement to Shares awarded, canceled, exercised, vested, unvested or outstanding in Participant's favor ("Personal Data"). Participant understands that Personal Data may be transferred to any Parent, Subsidiary, affiliate, or third parties assisting in the implementation, administration and management of the Plan, that these recipients may be located in the United States, Participant's country (if different than the United States), or elsewhere, and that the recipient's country may have different data privacy laws and protections than Participant's country. In particular, the Company may transfer Personal Data to the broker or stock plan administrator assisting with the Plan, to its legal counsel and tax/accounting advisor, and to the affiliate or entity that is Participant's employer and its payroll provider.

Participant should also refer to any data privacy policy implemented by the Company (which will be available to Participant separately and may be updated from time to time) for more information regarding the collection, use, storage, and transfer of Participant's Personal Data.

21. Foreign Exchange Fluctuations and Restrictions. Participant understands and agrees that the future value of the underlying Shares is unknown and cannot be predicted with certainty and may decrease. Participant also understands that neither the Company, nor any affiliate is responsible for any foreign exchange fluctuation between local currency and the United States Dollar or the selection by the Company or any affiliate in its sole discretion of an applicable foreign currency exchange rate that may affect the value of the Restricted Stock or Shares received (or the calculation of income or Tax-Related Items thereunder). Participant understands and agrees that unless otherwise permitted by the Company any cross-border remittance made to transfer proceeds received upon the sale of Shares must be made through a locally authorized financial institution or registered foreign exchange agency and may require the Participant to provide such entity with certain information regarding the transaction.

22. Amendment, Suspension or Termination of the Plan. By accepting this Award, Participant expressly warrants that he or she has received an Award of Restricted Stock under the Plan, and has received, read and understood a description of the Plan. Participant understands that the Plan is discretionary in nature and may be amended, suspended or terminated by the Company at any time.

23. Governing Law and Venue. This Award Agreement will be governed by the laws of the State of California, without giving effect to the conflict of law principles thereof. For purposes of litigating any dispute that arises under this Award of Restricted Stock or this Award Agreement, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of San Francisco County, California, or the federal courts for the United States for the Northern District of California, and no other courts.

o O o

-10-

Country-Specific Addendum

This Addendum includes additional country-specific notices, disclaimers, and/or terms and conditions that apply to individuals who are working or residing in the countries listed below and that may be material to Participant's participation in the Plan. Such notices, disclaimers, and/or terms and conditions may also apply, as from the date of grant, if Participant moves to or otherwise is or becomes subject to the Applicable Laws or company policies of the country listed. However, because foreign exchange regulations and other local laws are subject to frequent change, Participant is advised to seek advice from his or her own personal legal and tax advisor prior to accepting the Restricted Stock or holding or selling Shares acquired under the Plan. The Company is not providing any tax, legal or financial advice, nor is the Company making any recommendations regarding Participant's acceptance of the Restricted Stock or participation in the Plan. Unless otherwise noted below, capitalized terms shall have the same meaning assigned to them under the Plan, the Notice of Restricted Stock Grant and the Award Agreement. This Addendum forms part of the Award Agreement and should be read in conjunction with the Award Agreement and the Plan.

Securities Law Notice: Unless otherwise noted, neither the Company nor the Shares are registered with any local stock exchange or under the control of any local securities regulator outside the United States. The Award Agreement (of which this Addendum is a part), the Notice of Restricted Stock Grant, the Plan, and any other communications or materials that you may receive regarding participation in the Plan do not constitute advertising or an offering of securities outside the United States, and the issuance of securities described in any Plan-related documents is not intended for public offering or circulation in your jurisdiction.

European Union and Switzerland

Data Privacy. *Where Participant is a resident of the EU, the following provision applies and supplements Section 20 of the Award Agreement. Participant understands and acknowledges that:*

- *The data controller is the Company; queries or requests regarding the Participant's Personal Data should be made in writing to the Company's representative relating to the Plan or Restricted Stock matters, who may be contacted at: Paula Green, VP Human Resources;*
- *The legal basis for the processing of Personal Data is that the processing is necessary for the performance of a contract to which the Participant is a party (namely, this Award Agreement);*
- *Personal Data will be held only as long as is necessary to implement, administer and manage Participant's participation in the Plan;*
- *He or she may, at any time, access his or her Personal Data, request additional information about the storage and processing of Personal Data, require any necessary amendments to Personal Data without cost or exercise any other rights they may have in relation to their Personal Data under applicable law, including the right to make a complaint to an EU data protection regulator.*

Denmark	<p>Foreign Account Reporting. Danish resident holders of non-Danish bank accounts or accounts with non-Danish brokers should submit certain forms to the Danish tax authorities:</p> <p>Erklæring V regarding shares deposited with a non-Danish bank or broker https://www.skat.dk/SKAT.aspx?oId=90030)</p> <p>Erklæring K regarding money deposited with a non-Danish bank or broker https://www.skat.dk/SKAT.aspx?oId=73344</p>
France	<p>Foreign Ownership Reporting. Residents of France with foreign account balances in excess of EUR 1 million or its equivalent must report monthly to the Bank of France.</p> <p>Consent to Receive Information in English. By accepting the Restricted Stock, you confirm having read and understood the Plan and the Agreement, which were provided in the English language. You accept the terms of those documents accordingly. [En acceptant cette attribution gratuite d'actions, vous confirmez avoir lu et comprenez le Plan et ce Contrat, incluant tous leurs termes et conditions, qui ont été transmis en langue anglaise. Vous acceptez les dispositions de ces documents en connaissance de cause.]</p>
Israel	[TBD]
Japan	<p>[Securities Law Notice. TBD]</p> <p>Share Ownership and Payment Reporting. If you acquire Shares valued at more than ¥100,000,000 total, you must file a Securities Acquisition Report with the Ministry of Finance (“MOF”) through the Bank of Japan within 20 days of the acquisition of the Shares.</p> <p>Exit Tax. Please note that you may be subject to tax on your Restricted Stock, even prior to vesting, if you relocate from Japan if you (1) hold financial assets with an aggregate value of ¥100,000,000 or more upon departure from Japan and (2) maintained a principle place of residence (<i>jusho</i>) or temporary place of abode (<i>kyosho</i>) in Japan for 5 years or more during the 10-year period immediately prior to departing Japan. You should discuss your tax treatment with your personal tax advisor.</p>

Singapore

Securities Law Notice. This offer and the Shares to be issued hereunder shall be made available through this platform/facility and are offered to you in reliance on the exemption under section 272A (1) of the Securities and Futures Act (Chapter 289) of Singapore (the “SFA”). These offers are not made in or accompanied by a prospectus that is registered by the Monetary Authority of Singapore (the “Authority”). Apart from being subjected to the general resale restriction under Section 257 of the SFA, any and all Shares to be issued hereunder shall therefore not be subsequently sold to any person, unless the offer resulting in such subsequent sale is made in compliance with Subdivisions (2) and (3) of Part XII Division (1), in reliance on subsection (8)(c) or any other exemption under any provision of Subdivision (4) of Part XII Division (1) (other than this subsection), or where at least 6 months have elapsed from the date the securities were acquired under the initial offer, in reliance on the exemption under this subsection.

Director Reporting. If you are a director or shadow director of a Singapore Subsidiary, you may be subject to special reporting requirements with regard to the acquisition of shares or rights over Shares. Please contact your personal legal advisor for further details if you are a director or shadow director.

Exit Tax / Deemed Exercise Rule. If you are deemed by the Singapore tax authorities to have received Options in relation to your employment in Singapore, notwithstanding the fact that you are not employed by the Company or any Parent or Subsidiary, please note that if, prior to the exercise of the Options, you are 1) a permanent resident of Singapore and leave Singapore permanently or are transferred out of Singapore; or 2) neither a Singapore citizen nor permanent resident and either cease employment in Singapore or leave Singapore for any period exceeding 3 months, you will likely be taxed on the Options on a “deemed exercise” basis, even if your Options have not yet vested. You should discuss your tax treatment with your personal tax advisor.

United Kingdom

The following supplements Section 6 of the Agreement:

Withholding of Tax. If payment or withholding of the Tax-Related Items is not made within ninety (90) days of the end of the UK tax year in which the event giving rise to the Tax-Related Items occurs (the “Due Date”) or such other period specified in Section 222(1)(c) of the U.K. Income Tax (Earnings and Pensions) Act 2003, the amount of any uncollected Tax-Related Items will constitute a loan owed by Participant to the Employer, effective on the Due Date. Participant agrees that the loan will bear interest at the then-current Official Rate of Her Majesty’s Revenue and Customs (“HMRC”), it will be immediately due and repayable, and the Company or the employer may recover it at any time thereafter by any of the means referred to in Section 6 of the Award Agreement. Notwithstanding the foregoing, if Participant is a director or executive officer of the Company (within the meaning of Section 13(k) of the U.S. Securities and Exchange Act of 1934, as amended), Participant will not be eligible for such a loan to cover the Tax-Related Items. In the event that Participant is a director or executive officer and the Tax-Related Items are not

collected from or paid by Participant by the Due Date, the amount of any uncollected Tax-Related Items will constitute a benefit to Participant on which additional income tax and national insurance contributions will be payable. Participant will be responsible for reporting and paying any income tax due on this additional benefit directly to HMRC under the self-assessment regime.

HMRC National Insurance Contributions. Participant agrees that (a) Tax-Related Items within Section 6 of the Award Agreement shall include any secondary class 1 (employer) National Insurance Contributions that (i) any employer (or former employer) of Participant is liable to pay (or reasonably believes it is liable to pay); and (ii) may be lawfully recovered from Participant; and (b) if required to do so by the Company (at any time when the relevant election can be made) Participant shall: (i) make a joint election (with the employer or former employer) in the form provided by the Company to transfer to Participant the whole or any part of the employer's liability; and (ii) enter into arrangements required by HM Revenue & Customs (or any other tax authority) to secure the payment of the transferred liability.

Restricted Securities Elections. Unless this requirement is waived by the Company, Participant shall enter into a joint election (with the appropriate employer) under section 431(1) or section 431(2) of Income Tax (Earnings & Pensions) Act 2003 in respect of:

- (a) any Shares acquired (or to be acquired) under this Award;
- (b) any securities acquired (or to be acquired) as a result of any surrender of the Award; and
- (c) any securities acquired (or to be acquired) as a result of holding either Shares acquired under this Award or securities specified in paragraph (b) above or this paragraph (c).

TWIST BIOSCIENCE CORPORATION

2018 EQUITY INCENTIVE PLAN

RESTRICTED STOCK UNIT AWARD AGREEMENT

Unless otherwise defined herein, the terms defined in the Twist Bioscience Corporation 2018 Equity Incentive Plan (the “*Plan*”) will have the same defined meanings in this Restricted Stock Unit Award Agreement (the “*Award Agreement*”).

I. NOTICE OF RESTRICTED STOCK UNIT GRANT

Participant Name:

You have been granted the right to receive an Award of Restricted Stock Units, subject to the terms and conditions of the Plan and this Award Agreement, as follows:

Grant Number	_____
Date of Grant	_____
Vesting Commencement Date	_____
Number of Restricted Stock Units	_____

Vesting Schedule:

Subject to Section 3 of the Award Agreement, the Restricted Stock Units will vest in accordance with the following schedule:

[Insert Vesting Schedule]

In the event Participant ceases to be a Service Provider (or gives or is given notice of such termination) for any or no reason before Participant vests in the Restricted Stock Unit, the Restricted Stock Unit and Participant’s right to acquire any Shares hereunder will terminate in accordance with Section 3 of the Award Agreement.

By Participant's signature and the signature of the representative of Twist Bioscience Corporation (the "**Company**") below, or by Participant otherwise accepting this Award, Participant and the Company agree that this Award of Restricted Stock Units is granted under and governed by the terms and conditions of the Plan and this Award Agreement, including the Terms and Conditions of Restricted Stock Unit Grant (including any country-specific addendum thereto), attached hereto as Exhibit A, all of which are made a part of this document. Participant has reviewed the Plan and this Award Agreement in their entirety, has had an opportunity to obtain the advice of counsel prior to executing this Award Agreement and fully understands all provisions of the Plan and Award Agreement. Participant hereby agrees to accept as binding, conclusive and final all decisions or interpretations of the Administrator upon any questions relating to the Plan and Award Agreement.

PARTICIPANT:

TWIST BIOSCIENCE CORPORATION

Signature

By

Print Name

Title

EXHIBIT A

TERMS AND CONDITIONS OF RESTRICTED STOCK UNIT GRANT

1. **Grant.** The Company hereby grants to the individual named in the Notice of Grant attached as Part I of this Award Agreement (the “**Participant**”) under the Plan an Award of Restricted Stock Units, subject to all of the terms and conditions in this Award Agreement and the Plan, which is incorporated herein by reference. Subject to Section 20 of the Plan, in the event of a conflict between the terms and conditions of the Plan and the terms and conditions of this Award Agreement, the terms and conditions of the Plan will prevail.

2. **Company’s Obligation to Pay.** Each Restricted Stock Unit represents the right to receive a Share on the date it vests. Unless and until the Restricted Stock Units will have vested in the manner set forth in Section 3, Participant will have no right to payment of any such Restricted Stock Units. Prior to actual payment of any vested Restricted Stock Units, such Restricted Stock Units will represent an unsecured obligation of the Company, payable (if at all) only from the general assets of the Company. Any Restricted Stock Units that vest in accordance with Section 3 will be paid to Participant (or in the event of Participant’s death, to his or her estate) in whole Shares as set forth herein, subject to Participant satisfying any Tax-Related Items as set forth in Section 7. Subject to the provisions of Section 4, such vested Restricted Stock Units will be paid in whole Shares as soon as practicable after vesting, but in each such case within the period ending no later than the date that is two and one-half (2 ½) months from the end of the Company’s tax year that includes the vesting date. In no event will Participant be permitted, directly or indirectly, to specify the taxable year of the payment of any Restricted Stock Units payable under this Award Agreement.

3. **Vesting Schedule.** Subject to Section 5, the Restricted Stock Units awarded by this Award Agreement will vest in accordance with the vesting provisions set forth in the Notice of Grant. Restricted Stock Units scheduled to vest on a certain date or upon the occurrence of a certain condition will not vest in accordance with any of the provisions of this Award Agreement, unless Participant will have been continuously a Service Provider from the Date of Grant until the date such vesting occurs. Service Provider status for purposes of this Award will end on the day that Participant is no longer actively providing services as an Employee, Director, or Independent Contractor and will not be extended by any notice period or “garden leave” that may be required contractually or under Applicable Laws. Notwithstanding the foregoing, the Administrator (or any delegate) shall have the sole and absolute discretion to determine when Participant is no longer providing active service for purposes of Service Provider status and participation in the Plan.

4. **Administrator Discretion.** Notwithstanding anything in the Plan or this Award Agreement to the contrary, if the vesting of the balance, or some lesser portion of the balance, of the Restricted Stock Units is accelerated in connection with Participant’s termination as a Service Provider (provided that such termination is a “separation from service” within the meaning of Section 409A, as determined by the Company), other than due to death, and if (x) Participant is a “specified employee” within the meaning of Section 409A at the time of such termination as a Service Provider and (y) the payment of such accelerated Restricted Stock Units will result in the imposition of additional tax under Section 409A if paid to Participant on or within the six (6) month period following Participant’s termination as a Service Provider, then the payment of such

accelerated Restricted Stock Units will not be made until the date six (6) months and one (1) day following the date of Participant's termination as a Service Provider, unless the Participant dies following his or her termination as a Service Provider, in which case, the Restricted Stock Units will be paid in Shares to the Participant's estate as soon as practicable following his or her death. It is the intent of this Award Agreement that it and all payments and benefits hereunder be exempt from, or comply with, the requirements of Section 409A so that none of the Restricted Stock Units provided under this Award Agreement or Shares issuable thereunder will be subject to the additional tax imposed under Section 409A, and any ambiguities herein will be interpreted to be so exempt or so comply. Each payment payable under this Award Agreement is intended to constitute a separate payment for purposes of U.S. Treasury Regulation Section 1.409A-2(b)(2). For purposes of this Award Agreement, "Section 409A" means Section 409A of the Code, and any final U.S. Treasury Regulations and U.S. Internal Revenue Service guidance thereunder, as each may be amended from time to time.

5. Forfeiture upon Termination of Status as a Service Provider. Notwithstanding any contrary provision of this Award Agreement, the balance of the Restricted Stock Units that have not vested as of the time Participant's status as a Service Provider ceases in accordance with Section 3 above and Participant's right to acquire any Shares hereunder will immediately terminate.

6. Death of Participant. Any distribution or delivery to be made to Participant under this Award Agreement will, if Participant is then deceased, be made to Participant's designated beneficiary, if so allowed by the Administrator in its sole discretion, or if no beneficiary survives Participant, the administrator or executor of Participant's estate. Any such transferee must furnish the Company with (a) written notice of his or her status as transferee, and (b) evidence satisfactory to the Company to establish the validity of the transfer and compliance with any Applicable Laws or regulations pertaining to said transfer.

7. Withholding of Taxes. Regardless of any action the Company or Participant's employer (the "**Employer**") takes with respect to any or all applicable national, local, or other tax or social contribution, withholding, required deductions, or other payments, if any, that arise upon the grant or vesting of the Restricted Stock Units or the holding or subsequent sale of Shares, and the receipt of dividends, if any, or otherwise in connection with the Restricted Stock Units or the Shares ("**Tax-Related Items**"), Participant acknowledges and agrees that the ultimate liability for all Tax-Related Items legally due by Participant is and remains Participant's responsibility and may exceed any amount actually withheld by the Company or the Employer. Participant further acknowledges and agrees that Participant is solely responsible for filing all relevant documentation that may be required in relation to the Restricted Stock Units or any Tax-Related Items (other than filings or documentation that is the specific obligation of the Company or a Parent, Subsidiary, or Employer pursuant to Applicable Law) such as but not limited to personal income tax returns or reporting statements in relation to the grant, vesting or settlement of the Restricted Stock Units, the holding of Shares or any bank or brokerage account, the subsequent sale of Shares, and the receipt of any dividends. Participant further acknowledges that the Company and the Employer (a) make no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of the Restricted Stock Units, including grant or vesting, the subsequent sale of Shares acquired under the Plan, and the receipt of dividends, if any; and (b) does not commit to and is under no obligation to structure the terms of the Restricted Stock Units

or any aspect of the Restricted Stock Units to reduce or eliminate Participant's liability for Tax-Related Items, or achieve any particular tax result. Participant also understands that Applicable Laws may require varying Share or Restricted Stock Unit valuation methods for purposes of calculating Tax-Related Items, and the Company assumes no responsibility or liability in relation to any such valuation or for any calculation or reporting of income or Tax-Related Items that may be required of Participant under Applicable Laws. Further, if Participant has become subject to tax in more than one jurisdiction between the date of grant and the date of any relevant taxable event, Participant acknowledges that the Company and/or the Employer (or former employer, as applicable) may be required to withhold or account for Tax-Related Items in more than one jurisdiction. Notwithstanding any contrary provision of this Award Agreement, no certificate representing the Shares will be issued to Participant, unless and until satisfactory arrangements (as determined by the Administrator) will have been made by Participant with respect to the payment of any Tax-Related Items which the Company determines must be withheld with respect to such Shares.

As a condition to the grant and vesting of the Restricted Stock Units and as set forth in Section 14 of the Plan, Participant hereby agrees to make adequate provision for the satisfaction of (and will indemnify the Company and any Parent or Subsidiary for) any Tax-Related Items. The Tax-Related Items shall be satisfied by the Company's withholding all or a portion of any Shares that otherwise would be issued to Participant upon payment of the vested Restricted Stock Units; provided that amounts withheld shall not exceed the amount necessary to satisfy the Company's minimum tax withholding obligations. Such withheld Shares shall be valued based on the Fair Market Value as of the date the withholding obligations are satisfied. Furthermore, Participant agrees to pay the Company or any Parent, Subsidiary, or Employer any Tax-Related Items that cannot be satisfied by the foregoing methods.¹

8. Rights as Stockholder. Neither Participant nor any person claiming under or through Participant will have any of the rights or privileges of a stockholder of the Company in respect of any Shares deliverable hereunder unless and until certificates representing such Shares will have been issued, recorded on the records of the Company or its transfer agents or registrars, and delivered to Participant. After such issuance, recordation and delivery, Participant will have all the rights of a stockholder of the Company with respect to voting such Shares and receipt of dividends and distributions on such Shares, but prior to such issuance, Participant will not have any rights to dividends and/or distributions on such Shares.

9. No Guarantee of Continued Service or Grants. PARTICIPANT ACKNOWLEDGES AND AGREES THAT THE VESTING OF THE RESTRICTED STOCK UNITS PURSUANT TO THE VESTING SCHEDULE HEREOF SHALL OCCUR ONLY BY CONTINUING AS A SERVICE PROVIDER AT THE WILL OF THE EMPLOYER OR CONTRACTING ENTITY (AS APPLICABLE) AND NOT THROUGH THE ACT OF BEING

¹ To exempt the withholding of shares upon payment of the RSUs to satisfy tax obligations from the requirements of Section 16 of the Securities Exchange Act of 1934, we recommend that the Company provide that taxes be satisfied through automatic share withholding. Alternatively, the withholding of shares to satisfy tax obligations may qualify for exemption if the participant may elect the method of tax withholding. Since RSUs will be paid out on a more regular basis than options will be exercised, for administrative ease, we recommend that the Company provide for automatic share withholding instead of allowing the participant to elect the method of tax withholding.

HIRE, BEING GRANTED THIS AWARD OF RESTRICTED STOCK UNITS OR ACQUIRING SHARES HEREUNDER. PARTICIPANT FURTHER ACKNOWLEDGES AND AGREES THAT THIS AWARD AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREUNDER AND THE VESTING SCHEDULE SET FORTH HEREIN DO NOT CONSTITUTE AN EXPRESS OR IMPLIED PROMISE OF CONTINUED ENGAGEMENT AS A SERVICE PROVIDER FOR THE VESTING PERIOD, FOR ANY PERIOD, OR AT ALL, AND WILL NOT INTERFERE IN ANY WAY WITH PARTICIPANT'S RIGHT OR THE RIGHT OF THE COMPANY (OR ANY PARENT, SUBSIDIARY, OR EMPLOYER) TO TERMINATE PARTICIPANT'S RELATIONSHIP AS A SERVICE PROVIDER AT ANY TIME, WITH OR WITHOUT CAUSE, SUBJECT TO APPLICABLE LAWS.

Participant also acknowledges and agrees that: (a) the Plan is established voluntarily by the Company, it is discretionary in nature and it may be modified, amended, suspended or terminated by the Company at any time; (b) the grant of Restricted Stock Units is voluntary and occasional and does not create any contractual or other right to receive future grants of Restricted Stock Units, or benefits in lieu of Restricted Stock Units even if Restricted Stock Units have been granted repeatedly in the past; (c) all decisions with respect to future awards of Restricted Stock Units, if any, will be at the sole discretion of the Company; (d) Participant's participation in the Plan is voluntary; (e) the Restricted Stock Units and the Shares subject to the Restricted Stock Units are extraordinary items that do not constitute regular compensation for services rendered to the Company or the Employer, and that are outside the scope of Participant's employment contract, if any; (f) the Restricted Stock Units and the Shares subject to the Restricted Stock Units are not intended to replace any pension rights or compensation; (g) the Restricted Stock Units and the Shares subject to the Restricted Stock Units are not part of normal or expected compensation or salary for any purposes, including, but not limited to, calculating any severance, resignation, termination, redundancy, dismissal, or end of service payments, bonuses, long-service awards, pension or retirement or welfare benefits or similar payments and in no event should be considered as compensation for, or relating in any way to, past services for the Company or the Employer, subject to Applicable Laws.

10. Address for Notices. Any notice to be given to the Company under the terms of this Award Agreement will be addressed to the Company, in care of its Secretary at Twist Bioscience Corporation, 455 Mission Bay Boulevard South, San Francisco, CA 94158, or at such other address as the Company may hereafter designate in writing.

11. Grant is Not Transferable. Except to the limited extent provided in Section 6, this grant and the rights and privileges conferred hereby may not be transferred, assigned, pledged or hypothecated in any way (whether by operation of Applicable Laws or otherwise) and may not be subject to sale under execution, attachment or similar process. Upon any attempt to transfer, assign, pledge, hypothecate or otherwise dispose of this grant, or any right or privilege conferred hereby, or upon any attempted sale under any execution, attachment or similar process, this grant and the rights and privileges conferred hereby immediately will become null and void.

12. Binding Agreement. Subject to the limitation on the transferability of this grant contained herein, this Award Agreement will be binding upon and inure to the benefit of the heirs, legatees, legal representatives, successors and assigns of the parties hereto.

13. Additional Conditions to Issuance of Stock and Imposition of Other Requirements. If at any time the Company will determine, in its discretion, that the listing, registration, qualification or rule compliance of the Shares upon any securities exchange or under any Applicable Laws, the tax code and related regulations or the consent or approval of any governmental regulatory authority is necessary or desirable as a condition to the issuance of Shares to Participant (or his or her estate) hereunder, such issuance will not occur unless and until such listing, registration, qualification, rule compliance, consent or approval will have been completed, effected or obtained free of any conditions not acceptable to the Company. Where the Company determines that the delivery of the payment of any Shares will violate any state, federal or foreign securities or exchange laws or other Applicable Laws, the Company will defer delivery until the earliest date at which the Company reasonably anticipates that the delivery of Shares will no longer cause such violation. The Company will make all reasonable efforts to meet the requirements of any Applicable Laws or securities exchange and to obtain any such consent or approval of any such governmental authority or securities exchange. The Company shall not be obligated to issue any Shares pursuant to the Restricted Stock Units at any time if the issuance of Shares violates or is not in compliance with any Applicable Laws, rules or regulations of the United States or any state or country.

Furthermore, the Company reserves the right to impose other requirements on Participant's participation in the Plan, on the Restricted Stock Units and on any Shares acquired under the Plan, to the extent the Company determines it is necessary or advisable in order to comply with any Applicable Laws or facilitate the administration of the Plan, and to require Participant to sign any additional agreements or undertakings that may be necessary to accomplish the foregoing. Furthermore, Participant understands that the Applicable Laws of the country in which he or she is resident at the time of grant or vesting of the Restricted Stock Units or the holding or disposition of Shares (including any rules or regulations governing securities, foreign exchange, tax, labor or other matters) may restrict or prevent the issuance of Shares or may subject Participant to additional procedural or regulatory requirements he or she is solely responsible for and will have to independently fulfill in relation to the Restricted Stock Units or the Shares. Notwithstanding any provision herein, the Restricted Stock Units and any Shares shall be subject to any special terms and conditions or disclosures as set forth in any addendum for Participant's country (the "Country-Specific Addendum," which forms part this Award Agreement). Participant also understands and agrees that if he works, resides, moves to, or otherwise is or becomes subject to Applicable Laws or company policies of another jurisdiction at any time, certain country-specific notices, disclaimers and/or terms and conditions may apply to him as from the date of grant, unless otherwise determined by the Company in its sole discretion.

14. Lock-Up Agreement. In connection with the initial public offering of the Company's securities, Participant hereby agrees not to offer, pledge, sell, contract to sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any securities of the Company however and whenever acquired (other than those included in the registration) without the prior written consent of the Company and the managing underwriters for such offering for such period of time (not to exceed 180 days) from the effective date of such registration as may be requested by the Company or such managing underwriters and to execute an agreement reflecting the foregoing as may be requested by the underwriters at the time of the Company's initial public offering. In addition, upon request of the Company or the underwriters managing a public offering of the Company's securities (other than the initial public offering), Participant

hereby agrees to be bound by similar restrictions, and to sign a similar agreement, in connection with no more than one additional registration statement filed within 12 months after the closing date of the initial public offering, provided that the duration of the lock-up period with respect to such additional registration shall not exceed 90 days from the effective date of such additional registration statement. Notwithstanding the foregoing, if during the last 17 days of the restricted period, the Company issues an earnings release or material news or a material event relating to the Company occurs, or prior to the expiration of the restricted period the Company announces that it will release earnings results during the 16-day period beginning on the last day of the restricted period, then, upon the request of the managing underwriter, to the extent required by any FINRA rules, the restrictions imposed by this subsection shall continue to apply until the end of the third trading day following the expiration of the 15-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event. In no event will the restricted period extend beyond 216 days after the effective date of the registration statement. In order to enforce the restriction set forth above, the Company may impose stop-transfer instructions with respect to the Shares acquired under this Agreement until the end of the applicable stand-off period. The Company's underwriters shall be beneficiaries of the agreement set forth in this Section.

If the underwriters release or waive any of the foregoing restrictions in connection with a transfer of shares of Common Stock, the underwriters shall notify the Company at least three business days before the effective date of any such release or waiver. Further, the Company will announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by the underwriters shall only be effective two business days after the publication date of such press release. The provisions of this paragraph will not apply if (x) the release or waiver is effected solely to permit a transfer not for consideration and (y) the transferee has agreed in writing to be bound by the same terms of the lock-up provisions applicable in general to the extent, and for the duration, that such lock-up provision remain in effect at the time of the transfer.

15. Plan Governs. This Award Agreement is subject to all terms and provisions of the Plan. In the event of a conflict between one or more provisions of this Award Agreement and one or more provisions of the Plan, the provisions of the Plan will govern. Capitalized terms used and not defined in this Award Agreement will have the meaning set forth in the Plan.

16. Administrator Authority. The Administrator will have the power to interpret the Plan and this Award Agreement and to adopt such rules for the administration, interpretation and application of the Plan as are consistent therewith and to interpret or revoke any such rules (including, but not limited to, the determination of whether or not any Restricted Stock Units have vested). All actions taken and all interpretations and determinations made by the Administrator in good faith will be final and binding upon Participant, the Company and all other interested persons. No member of the Administrator will be personally liable for any action, determination or interpretation made in good faith with respect to the Plan or this Award Agreement.

17. Electronic Delivery and Acceptance; Translation. The Company may, in its sole discretion, decide to deliver any documents related to Restricted Stock Units awarded under the Plan or future Restricted Stock Units that may be awarded under the Plan by electronic means or request Participant's consent to participate in the Plan by electronic means. Participant hereby consents to receive such documents by electronic delivery and agrees to participate in the Plan

through any on-line or electronic system established and maintained by the Company or another third party designated by the Company. If Participant has received this Award Agreement, including appendices, or any other document related to the Plan translated into a language other than English, and the meaning of the translated version is different than the English version, the English version will control.

18. **Captions.** Captions provided herein are for convenience only and are not to serve as a basis for interpretation or construction of this Award Agreement.

19. **Agreement Severable.** In the event that any provision in this Award Agreement will be held invalid or unenforceable, such provision will be severable from, and such invalidity or unenforceability will not be construed to have any effect on, the remaining provisions of this Award Agreement.

20. **Modifications to the Award Agreement.** This Award Agreement constitutes the entire understanding of the parties on the subjects covered. Participant expressly warrants that he or she is not accepting this Award Agreement in reliance on any promises, representations, or inducements other than those contained herein. Modifications to this Award Agreement or the Plan can be made only in an express written contract executed by a duly authorized officer of the Company. Notwithstanding anything to the contrary in the Plan or this Award Agreement, the Company reserves the right to revise this Award Agreement as it deems necessary or advisable, in its sole discretion and without the consent of Participant, to comply with Section 409A or to otherwise avoid imposition of any additional tax or income recognition under Section 409A in connection to this Award of Restricted Stock Units.

21. **Data Privacy.** *Participant hereby explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of Participant's Personal Data (as described below) by and among, as applicable, the Company, any Parent, Subsidiary, or affiliate, or third parties as may be selected by the Company for the exclusive purpose of implementing, administering and managing Participant's participation in the Plan. Participant understands that refusal or withdrawal of consent will affect Participant's ability to participate in the Plan; without providing consent, Participant will not be able to participate in the Plan or realize benefits (if any) from the Restricted Stock Unit.*

Participant understands that the Company and any Parent, Subsidiary, affiliate, or designated third parties may hold personal information about Participant, including, but not limited to, Participant's name, home address and telephone number, date of birth, social insurance number or other identification number, salary, nationality, job title, any shares of stock or directorships held in the Company or any Parent, Subsidiary, or affiliate, details of all Restricted Stock Units or any other entitlement to Shares awarded, canceled, exercised, vested, unvested or outstanding in Participant's favor ("Personal Data"). Participant understands that Personal Data may be transferred to any Parent, Subsidiary, affiliate, or third parties assisting in the implementation, administration and management of the Plan, that these recipients may be located in the United States, Participant's country (if different than the United States), or elsewhere, and that the recipient's country may have different data privacy laws and protections than Participant's country. In particular, the Company may transfer Personal Data to the broker or stock plan administrator assisting with the Plan, to its legal counsel and tax/accounting advisor, and to the affiliate or entity that is Participant's employer and its payroll provider.

Participant should also refer to any data privacy policy implemented by the Company (which will be available to Participant separately and may be updated from time to time) for more information regarding the collection, use, storage, and transfer of Participant's Personal Data.

22. Foreign Exchange Fluctuations and Restrictions. Participant understands and agrees that the future value of the underlying Shares is unknown and cannot be predicted with certainty and may decrease. Participant also understands that neither the Company, nor any affiliate is responsible for any foreign exchange fluctuation between local currency and the United States Dollar or the selection by the Company or any affiliate in its sole discretion of an applicable foreign currency exchange rate that may affect the value of the Restricted Stock Units or Shares received (or the calculation of income or Tax-Related Items thereunder). Participant understands and agrees that any cross-border remittance made to transfer proceeds received upon the sale of Shares must be made through a locally authorized financial institution or registered foreign exchange agency and may require the Participant to provide such entity with certain information regarding the transaction.

23. Amendment, Suspension or Termination of the Plan. By accepting this Award, Participant expressly warrants that he or she has received an Award of Restricted Stock Units under the Plan, and has received, read and understood a description of the Plan. Participant understands that the Plan is discretionary in nature and may be amended, suspended or terminated by the Company at any time.

24. Governing Law and Venue. This Award Agreement will be governed by the laws of the State of California, without giving effect to the conflict of law principles thereof. For purposes of litigating any dispute that arises under this Award of Restricted Stock Units or this Award Agreement, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of San Francisco County, California, or the federal courts for the United States for the Northern District of California, and no other courts.

Country-Specific Addendum

This Addendum includes additional country-specific notices, disclaimers, and/or terms and conditions that apply to individuals who are working or residing in the countries listed below and that may be material to Participant's participation in the Plan. Such notices, disclaimers, and/or terms and conditions may also apply, as from the date of grant, if Participant moves to or otherwise is or becomes subject to the Applicable Laws or company policies of the country listed. However, because foreign exchange regulations and other local laws are subject to frequent change, Participant is advised to seek advice from his or her own personal legal and tax advisor prior to accepting the Restricted Stock Units or holding or selling Shares acquired under the Plan. The Company is not providing any tax, legal or financial advice, nor is the Company making any recommendations regarding Participant's acceptance of the Restricted Stock Units or participation in the Plan. Unless otherwise noted below, capitalized terms shall have the same meaning assigned to them under the Plan, the Notice of Restricted Stock Unit Grant and the Award Agreement. This Addendum forms part of the Award Agreement and should be read in conjunction with the Award Agreement and the Plan.

Securities Law Notice: Unless otherwise noted, neither the Company nor the Shares are registered with any local stock exchange or under the control of any local securities regulator outside the United States. The Award Agreement (of which this Addendum is a part), the Notice of Restricted Stock Unit Grant, the Plan, and any other communications or materials that you may receive regarding participation in the Plan do not constitute advertising or an offering of securities outside the United States, and the issuance of securities described in any Plan-related documents is not intended for public offering or circulation in your jurisdiction.

European Union and Switzerland

Data Privacy. *Where Participant is a resident of the EU, the following provision applies and supplements Section 21 of the Award Agreement. Participant understands and acknowledges that:*

- *The data controller is the Company; queries or requests regarding the Participant's Personal Data should be made in writing to the Company's representative relating to the Plan or Restricted Stock Unit matters, who may be contacted at: Paula Green, VP Human Resources;*
- *The legal basis for the processing of Personal Data is that the processing is necessary for the performance of a contract to which the Participant is a party (namely, this Award Agreement);*
- *Personal Data will be held only as long as is necessary to implement, administer and manage Participant's participation in the Plan;*
- *He or she may, at any time, access his or her Personal Data, request additional information about the storage and processing of Personal Data, require any necessary amendments to Personal Data without cost or exercise any other rights they may have in relation to their Personal Data under applicable law, including the right to make a complaint to an EU data protection regulator.*

Denmark

Foreign Account Reporting. Danish resident holders of non-Danish bank accounts or accounts with non-Danish brokers should submit certain forms to the Danish tax authorities:

Erklæring V regarding shares deposited with a non-Danish bank or broker
(<https://www.skat.dk/SKAT.aspx?oId=90030>)

Erklæring K regarding money deposited with a non-Danish bank or broker
(<https://www.skat.dk/SKAT.aspx?oId=73344>)

France

Foreign Ownership Reporting. Residents of France with foreign account balances in excess of EUR 1 million or its equivalent must report monthly to the Bank of France.

Consent to Receive Information in English. By accepting the Restricted Stock Units, you confirm having read and understood the Plan and the Agreement, which were provided in the English language. You accept the terms of those documents accordingly. En acceptant cette attribution gratuite d'actions, vous confirmez avoir lu et comprenez le Plan et ce Contrat, incluant tous leurs termes et conditions, qui ont été transmis en langue anglaise. Vous acceptez les dispositions de ces documents en connaissance de cause.

Israel

Israel Sub-Plan. This grant is also subject to the Sub-Plan for Israeli Participants and is hereby designated as follows:

- 102 Capital Gain Track Award
- 102 Ordinary Income Track Award
- 102 Non-Trustee Award
- 3(9) Award

The terms used herein shall have the meaning ascribed to them in the Plan and Israeli Sub-Plan. In the event of any conflict, whether explicit or implied, between the provision of this Award Agreement and the Sub-Plan, the provisions set out in the Sub-Plan shall prevail. By accepting this grant, you acknowledge that a copy of the Israeli Sub-Plan has been provided to you. The Israeli Sub-Plan may also be obtained by contacting the Manager HR, Tel Aviv.

To the extent the Restricted Stock Unit is designated above as either a 102 Capital Gain Track Award or a 102 Ordinary Income Track Award, Participant declares and acknowledges that he or she: (i) fully understands that Section 102 applies to the Restricted Stock Unit specified in this Notice of Restricted Stock Unit Grant and Award Agreement; (ii) understands the provisions of Section 102, the tax track chosen and the implications thereof; (iii) agrees to the terms of the Trust Agreement between the Company and the Trustee, as well as the

requirements of the Israeli Tax Authority, (iv) understands that releasing the Shares from the control or holding of the Trustee prior to the termination of the Required Holding Period constitutes a violation of the terms of Section 102 and agrees to bear the relevant sanctions; (v) authorizes the Company and/or the applicable Parent, Subsidiary, or affiliate to provide the Trustee with any information required for the purpose of administering the Plan including executing its obligations under the Ordinance, the trust deed and the Trust Agreement, including without limitation information about his/her Shares, income tax rates, salary bank account, contact details and identification number; and (vii) declares that he/she is a resident of the State of Israel for tax purposes on the Grant Date and agrees to notify the Company upon any change in the residence address indicated above and acknowledges that if he/she ceases to be an Israeli resident or if his/her engagement with the Company or a Parent, Subsidiary, or affiliate is terminated, the Shares shall remain subject to Section 102, the Trust Agreement, the Plan, the Sub-Plan, and this Agreement.

The grant of the Restricted Stock Unit is conditioned upon Participant signing all documents requested by the Company, the Parent, Subsidiary, or affiliate, or the Trustee, in accordance with the Trust Agreement.

A copy of the Trust Agreement is available for Participant's review, during normal working hours at his or her local entity's offices.

With respect to 102 Trustee Award, the Shares issued upon exercise or vesting of such 102 Trustee Award shall be issued to and in the name of the Trustee on behalf of Participant, and shall be held by the Trustee in trust on behalf of Participant; *provided, however*, that in the event Participant elects to receive the Shares directly to his/her possession, the transfer from the Trustee shall be subject to the payment of any and all applicable taxes by Participant, to the satisfaction of each of the Trustee and the Company, until the full payment of required taxes, as applicable.

Further to Section 11 of the Award Agreement, with respect to 102 Trustee Award, Participant shall not sell, assign, transfer, pledge, give as a collateral, or grant any right to any third party or release from trust any Restricted Stock Unit and any Share received and/or any additional rights, including bonus shares that may be distributed to Participant in connection with such 102 Trustee Award (the "Additional Rights"), which will be allocated to the Trustee on behalf of Participant and shall be held in trust or controlled by the Trustee for the benefit of Participant, until at least the lapse of the Required Holding Period. Notwithstanding the above, if any such sale or release occurs during the Required Holding Period, the sanctions under Section 102 shall apply to and shall be borne by Participant. At the end of the Required Holding Period, the Restricted Stock Units or Shares underlying the Restricted Stock Units or any Additional Rights may be transferred to Participant upon his or her demand, but only under the condition that the tax due in accordance with Section 102 is paid

to the satisfaction of the Trustee and the Company. With respect to any Award granted by the Company pursuant to Section 102(c) of the Ordinance (which provides for ordinary income Awards administered by the Trustee), the Award and all rights (if any) that accrue thereon shall be allocated or issued to the Trustee, who shall hold such Award and all rights accrued thereon (if any) in trust for the benefit of Participant and/or the Company, as the case may be, until the full payment of required taxes arising from such Award and/or rights accrued thereon (if any).

Any fees associated with any vesting, exercise, sale, transfer or any act in relation to the Awards shall be borne by the Participant, and the Trustee, the Company, and/or any Parent, Subsidiary, or affiliate shall be entitled to withhold or deduct such fees from payments otherwise due to the Participant from the Company, a Parent, Subsidiary, or affiliate, or the Trustee.

Notwithstanding Section 24 of the Award Agreement, the Ordinance will apply to the tax treatment of grants made under the Israeli Sub-Plan (and requirements and restrictions related thereto).

Securities Law Notice. If required under applicable law, the Company shall use reasonable efforts to receive a securities exemption from the Israeli Securities Authority to avoid the requirement to file an Israeli securities prospectus in relation to the Plan. If such exemption is obtained, copies of the Plan and the Form S-8 or S-1 registration statement for the Plan as filed with the U.S. Securities and Exchange Commission will be made available by request from Manager HR, Tel Aviv. A Hebrew translation may be provided upon request.

Japan

Securities Law Notice. With respect to the Restricted Stock Units, the Company hereby informs you that (a) a filing under the provisions of Article 4, Paragraph 1 of the Financial Instruments and Exchange Law of Japan (“FIEL”) has not been made, as any solicitation of Restricted Stock Units constitutes a private placement to a small number of investors (*shoninzu muke kanyu*) as provided under Article 23-13, Paragraph 4, Item 1 (i) of the FIEL, and (b) this Restricted Stock Unit may not be transferred (including a transfer thereof in whole) other than by will or by the laws of descent or distribution (subject to compliance with Applicable Laws).

告知事項. 本制限付株式ユニット（RSU）に関しては、(a) 本制限付株式ユニット（RSU）の発行に係る取得の申込みの勧誘が、金融商品取引法第23条の13第4項第1号イに規定する少人数向け勧誘に該当することにより、当該取得の申込みの勧誘に関し、金融商品取引法第4条第1項の規定による届出は行われていないこと、及び(b) 本制限付株式ユニット（RSU）は、（適用法令を遵守して）遺言若しくは相続・遺産分配法に

よる場合を除き、譲渡（一括譲渡を含みます。）できないことを、当会社はここに告知致します。

Share Ownership and Payment Reporting. If you acquire Shares valued at more than ¥100,000,000 total, you must file a Securities Acquisition Report with the Ministry of Finance (“MOF”) through the Bank of Japan within 20 days of the acquisition of the Shares.

Exit Tax. Please note that you may be subject to tax on your Restricted Stock Units, even prior to vesting, if you relocate from Japan if you (1) hold financial assets with an aggregate value of ¥100,000,000 or more upon departure from Japan and (2) maintained a principle place of residence (*jusho*) or temporary place of abode (*kyosho*) in Japan for 5 years or more during the 10-year period immediately prior to departing Japan. You should discuss your tax treatment with your personal tax advisor.

Singapore

Securities Law Notice. This offer and the Shares to be issued hereunder shall be made available through this platform/facility and are offered to you in reliance on the exemption under section 272A (1) of the Securities and Futures Act (Chapter 289) of Singapore (the “SFA”). These offers are not made in or accompanied by a prospectus that is registered by the Monetary Authority of Singapore (the “Authority”). Apart from being subjected to the general resale restriction under Section 257 of the SFA, any and all Shares to be issued hereunder shall therefore not be subsequently sold to any person, unless the offer resulting in such subsequent sale is made in compliance with Subdivisions (2) and (3) of Part XII Division (1), in reliance on subsection (8)(c) or any other exemption under any provision of Subdivision (4) of Part XII Division (1) (other than this subsection), or where at least 6 months have elapsed from the date the securities were acquired under the initial offer, in reliance on the exemption under this subsection.

Director Reporting. If you are a director or shadow director of a Singapore Subsidiary, you may be subject to special reporting requirements with regard to the acquisition of shares or rights over Shares. Please contact your personal legal advisor for further details if you are a director or shadow director.

Exit Tax / Deemed Exercise Rule. If you are deemed by the Singapore tax authorities to have received Restricted Stock Units in relation to your employment in Singapore, notwithstanding the fact that you are not employed by the Company or any Parent or Subsidiary, please note that if, prior to the vesting of the Restricted Stock Units, you are 1) a permanent resident of Singapore and leave Singapore permanently or are transferred out of Singapore; or 2) neither a Singapore citizen nor permanent resident and either cease employment in Singapore or leave Singapore for any period exceeding 3 months, you will likely be taxed on the Restricted Stock Units on a “deemed exercise” basis, even if your Restricted Stock Units have not yet vested. You should discuss your tax treatment with your personal tax advisor.

Withholding of Tax. If payment or withholding of the Tax-Related Items is not made within ninety (90) days of the end of the UK tax year in which the event giving rise to the Tax-Related Items occurs (the “Due Date”) or such other period specified in Section 222(1)(c) of the U.K. Income Tax (Earnings and Pensions) Act 2003, the amount of any uncollected Tax-Related Items will constitute a loan owed by Participant to the Employer, effective on the Due Date. Participant agrees that the loan will bear interest at the then-current Official Rate of Her Majesty’s Revenue and Customs (“HMRC”), it will be immediately due and repayable, and the Company or the employer may recover it at any time thereafter by any of the means referred to in Section 5(b) of the Award Agreement. Notwithstanding the foregoing, if Participant is a director or executive officer of the Company (within the meaning of Section 13(k) of the U.S. Securities and Exchange Act of 1934, as amended), Participant will not be eligible for such a loan to cover the Tax-Related Items. In the event that Participant is a director or executive officer and the Tax-Related Items are not collected from or paid by Participant by the Due Date, the amount of any uncollected Tax-Related Items will constitute a benefit to Participant on which additional income tax and national insurance contributions will be payable. Participant will be responsible for reporting and paying any income tax due on this additional benefit directly to HMRC under the self-assessment regime.

HMRC National Insurance Contributions. Participant agrees that (a) Tax-Related Items within Section 5(a) of the Award Agreement shall include any secondary class 1 (employer) National Insurance Contributions that (i) any employer (or former employer) of Participant is liable to pay (or reasonably believes it is liable to pay); and (ii) may be lawfully recovered from Participant; and (b) if required to do so by the Company (at any time when the relevant election can be made) Participant shall: (i) make a joint election (with the employer or former employer) in the form provided by the Company to transfer to Participant the whole or any part of the employer’s liability; and (ii) enter into arrangements required by HM Revenue & Customs (or any other tax authority) to secure the payment of the transferred liability.

TWIST BIOSCIENCE CORPORATION

2018 EQUITY INCENTIVE PLAN

STOCK OPTION AWARD AGREEMENT

Unless otherwise defined herein, the terms defined in the Twist Bioscience Corporation 2018 Equity Incentive Plan (the “**Plan**”) will have the same defined meanings in this Stock Option Award Agreement (the “**Award Agreement**”).

I. NOTICE OF STOCK OPTION GRANT

Participant Name:

You have been granted an Option to purchase Common Stock of Twist Bioscience Corporation (the “**Company**”), subject to the terms and conditions of the Plan and this Award Agreement, as follows:

Grant Number	_____
Date of Grant	_____
Vesting Commencement Date	_____
Exercise Price per Share	USD \$ _____
Total Number of Shares	_____
Total Exercise Price	USD \$ _____
Type of Option:	<input type="checkbox"/> U.S. Incentive Stock Option <input type="checkbox"/> Nonstatutory Stock Option
Term/Expiration Date:	_____

Vesting Schedule:

Subject to Section 2 of the Award Agreement, this Option may be exercised, in whole or in part, in accordance with the following schedule:

[Insert Vesting Schedule]

Termination Period:

This Option will be exercisable for three (3) months after Participant ceases to be a Service Provider, unless such termination is due to Participant’s death, Disability or Cause. In the event Participant’s relationship as a Service Provider is terminated as a result of death or Disability, this

Option will be exercisable for twelve (12) months after Participant ceases to be a Service Provider. In the event Participant's relationship as a Service Provider is terminated for Cause, this Option (including any vested portion thereof) shall immediately terminate in its entirety upon the Participant's being first notified such termination for Cause and Participant will be prohibited from exercising this Option from and after the date of such termination. Notwithstanding the foregoing, in no event may this Option be exercised after the Term/Expiration Date as provided above and may be subject to earlier termination as provided in Section 13 of the Plan.

By Participant's signature and the signature of the Company's representative below, or by Participant's otherwise accepting or exercising this Option, Participant and the Company agree that this Option is granted under and governed by the terms and conditions of the Plan and this Award Agreement, including the Terms and Conditions of Stock Option Grant (including any country-specific addendum thereto), attached hereto as Exhibit A, all of which are made a part of this document. Participant has reviewed the Plan and this Award Agreement in their entirety, has had an opportunity to obtain the advice of counsel prior to executing this Award Agreement and fully understands all provisions of the Plan and Award Agreement. Participant hereby agrees to accept as binding, conclusive and final all decisions or interpretations of the Administrator on any questions relating to the Plan and Award Agreement.

PARTICIPANT:

TWIST BIOSCIENCE CORPORATION

Signature

By

Print Name

Title

EXHIBIT A

TERMS AND CONDITIONS OF STOCK OPTION GRANT

1. **Grant of Option.** The Company hereby grants to the Participant named in the Notice of Stock Option Grant attached as Part I of this Award Agreement (the "**Participant**") an option (the "**Option**") to purchase the number of Shares set forth in the Notice of Stock Option Grant, at the exercise price per Share set forth in the Notice of Stock Option Grant (the "**Exercise Price**"), subject to all of the terms and conditions set forth in the Notice of Stock Option Grant and in this Award Agreement and the Plan, which is incorporated herein by reference. Subject to Section 20 of the Plan, in the event of a conflict between the terms and conditions of the Plan and the terms and conditions of this Award Agreement, the terms and conditions of the Plan will prevail.

If designated in the Notice of Stock Option Grant as an Incentive Stock Option ("**ISO**"), this Option is intended to qualify as an ISO under Section 422 of the U.S. Internal Revenue Code of 1986, as amended (the "**Code**"). However, if this Option is intended to be an ISO, to the extent that it exceeds the USD \$100,000 rule of Code Section 422(d) it will be treated as a Nonstatutory Stock Option ("**NSO**"). Further, if for any reason this Option (or portion thereof) will not qualify as an ISO, then, to the extent of such non-qualification, such Option (or portion thereof) shall be regarded as a NSO granted under the Plan. In no event will the Administrator, the Company or any Parent or Subsidiary or any of their respective employees or directors have any liability to Participant (or any other person) due to the failure of the Option to qualify for any reason as an ISO.

2. **Vesting Schedule.** Except as provided in Section 3, the Option awarded by this Award Agreement will vest in accordance with the vesting provisions set forth in the Notice of Stock Option Grant. Shares scheduled to vest on a certain date or upon the occurrence of a certain condition will not vest in accordance with any of the provisions of this Award Agreement unless Participant will have been continuously a Service Provider from the Date of Grant until the date such vesting occurs. Service Provider status for purposes of the Plan will end on the day that Participant is no longer actively providing services as an Employee, Director, or Independent Contractor and will not be extended by any notice period or "garden leave" that may be required contractually or under any Applicable Laws. Notwithstanding the foregoing, the Administrator (or any delegate) shall have the sole and absolute discretion to determine when Participant is no longer providing active service for purposes of Service Provider status and participation in the Plan.

3. **Exercise of Option.**

(a) **Right to Exercise.** This Option may be exercised only within the term set forth in the Notice of Stock Option Grant, and may be exercised during such term only in accordance with the Plan and the terms of this Award Agreement.

(b) Method of Exercise. This Option is exercisable by delivery of an exercise notice, in the form attached as Exhibit B (the “**Exercise Notice**”) or in a manner and pursuant to such procedures as the Administrator may determine, which will state the election to exercise the Option, the number of Shares in respect of which the Option is being exercised (the “**Exercised Shares**”), and such other representations and agreements as may be required by the Company pursuant to the provisions of the Plan. The Exercise Notice will be completed by Participant and delivered to the Company. The Exercise Notice will be accompanied by payment of the aggregate Exercise Price as to all Exercised Shares together with any Tax-Related Items (as defined below) required to be withheld by any Applicable Laws. This Option will be deemed to be exercised upon receipt by the Company of such fully executed Exercise Notice accompanied by such aggregate Exercise Price and any other requirements or restrictions that may be imposed by the Company to comply with Applicable Laws or facilitate administration of the Plan. Notwithstanding the above, Participant understands that the Applicable Laws of the country in which Participant is residing or working at the time of grant, vesting, and/or exercise of this Option (including any rules or regulations governing securities, foreign exchange, tax, labor or other matters) may restrict or prevent exercise of this Option, and neither the Company nor any Parent or Subsidiary assumes any liability in relation to this Option in such case.

4. Method of Payment. Payment of the aggregate Exercise Price will be by any of the following, or a combination thereof, at the election of Participant unless otherwise specified by the Company in its sole discretion:

- (a) cash (U.S. dollars); or
- (b) check (denominated in U.S. dollars); or
- (c) consideration received by the Company under a formal cashless exercise program adopted by the Company in connection with the Plan.

Participant understands and agrees that, unless otherwise permitted by the Company, any cross-border remittance made to exercise this Option or transfer proceeds received upon the sale of Shares must be made through a locally authorized financial institution or registered foreign exchange agency and may require the Participant to provide such entity with certain information regarding the transaction.

5. Tax Obligations.

(a) Withholding Taxes. Regardless of any action the Company or Participant’s employer (the “**Employer**”) takes with respect to any or all applicable national, local, or other tax or social contribution, withholding, required deductions, or other payments, if any, that arise upon the grant, vesting, or exercise of this Option, the holding or subsequent sale of Shares, and the receipt of dividends, if any, or otherwise in connection with this Option or the Shares (“**Tax-Related Items**”), Participant acknowledges and agrees that the ultimate liability for all Tax-Related Items legally due by Participant is and remains Participant’s responsibility and may exceed any amount actually withheld by the Company or the Employer. Participant further acknowledges and agrees that Participant is solely responsible for filing all relevant documentation that may be required in relation to this Option or any Tax-Related Items (other than filings or documentation that is the specific obligation of the Company or a Parent, Subsidiary, or Employer pursuant to

Applicable Law) such as but not limited to personal income tax returns or reporting statements in relation to the grant, vesting or exercise of this Option, the holding of Shares or any bank or brokerage account, the subsequent sale of Shares, and the receipt of any dividends. Participant further acknowledges that the Company and/or the Employer (a) makes no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of the Option, including the grant, vesting, or exercise of the Option, the subsequent sale of Shares acquired under the Plan and the receipt of dividends, if any; and (b) does not commit to and is under no obligation to structure the terms of the Option or any aspect of the Option to reduce or eliminate Participant's liability for Tax-Related Items, or achieve any particular tax result. Participant also understands that Applicable Laws may require varying Share or Option valuation methods for purposes of calculating Tax-Related Items, and the Company assumes no responsibility or liability in relation to any such valuation or for any calculation or reporting of income or Tax-Related Items that may be required of Participant under Applicable Laws. Further, if Participant has become subject to tax in more than one jurisdiction between the date of grant and the date of any relevant taxable event, Participant acknowledges that the Company and/or the Employer (or former employer, as applicable) may be required to withhold or account for Tax-Related Items in more than one jurisdiction.

(b) Satisfaction of Tax-Related Items. As a condition to the grant, vesting and exercise of this Option and as set forth in Section 14 of the Plan, Participant hereby agrees to make adequate provision for the satisfaction of (and will indemnify the Company and any Parent or Subsidiary for) any Tax-Related Items. No payment will be made to Participant (or his or her estate or beneficiary) for an Option unless and until satisfactory arrangements (as determined by the Company) have been made by Participant with respect to the payment of any Tax-Related Items obligations of the Company and/or any Parent, Subsidiary, or Employer with respect to the Option. In this regard, Participant authorizes the Company and/or any Parent, Subsidiary, or Employer, or their respective agents, at their discretion, to satisfy the obligations with regard to all Tax-Related Items by one or a combination of the following:

(i) withholding from Participant's wages or other cash compensation paid to Participant by the Company or the Employer; or

(ii) withholding from proceeds of the sale of Shares acquired upon exercise of the Option, either through a voluntary sale or through a mandatory sale arranged by the Company (on Participant's behalf pursuant to this authorization); or

(iii) withholding in Shares to be issued upon exercise of the Option.

If the obligation for Tax-Related Items is satisfied by withholding Shares, the Participant is deemed to have been issued the full number of Shares purchased for tax purposes, notwithstanding that a number of the Shares is held back solely for the purpose of paying the Tax-Related Items due as a result of the Participant's participation in the Plan. Participant shall pay to the Company or a Parent, Subsidiary, or Employer any amount of Tax-Related Items that the Company may be required to withhold as a result of Participant's participation in the Plan that cannot be satisfied by one or more of the means previously described in this paragraph 5. Participant acknowledges and agrees that the Company may refuse to honor the exercise and refuse to issue or deliver the Shares or the proceeds of the sale of Shares if Participant fails to comply with his or her obligations in connection with the Tax-Related Items.

(c) Notice of Disqualifying Disposition of ISO Shares. If the Option granted to Participant herein is an ISO, and if Participant sells or otherwise disposes of any of the Shares acquired pursuant to the ISO on or before the later of (i) the date two (2) years after the Date of Grant, or (ii) the date one (1) year after the date of exercise, Participant will immediately notify the Company in writing of such disposition.

(d) Code Section 409A (Applicable Only to Participants Subject to U.S. Taxes). Under Code Section 409A, an option that is granted with a per Share exercise price that is determined by the Internal Revenue Service (the “**IRS**”) to be less than the Fair Market Value of a Share on the date of grant (a “**Discount Option**”) may be considered “deferred compensation.” A Discount Option may result in (i) income recognition by Participant prior to the exercise of the option, (ii) an additional twenty percent (20%) federal income tax, and (iii) potential penalty and interest charges. The Discount Option may also result in additional state income, penalty and interest charges to the Participant. Participant acknowledges that the Company cannot and has not guaranteed that the IRS will agree that the per Share exercise price of this Option equals or exceeds the Fair Market Value of a Share on the Date of Grant in a later examination. Participant agrees that if the IRS determines that the Option was granted with a per Share exercise price that was less than the Fair Market Value of a Share on the date of grant, Participant will be solely responsible for Participant’s costs related to such a determination.

6. Rights as Stockholder. Neither Participant nor any person claiming under or through Participant will have any of the rights or privileges of a stockholder of the Company in respect of any Shares until such Shares will have been issued (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company). After such issuance, Participant will have all the rights of a stockholder of the Company with respect to voting such Shares and receipt of dividends and distributions on such Shares, but prior to such issuance, Participant will not have any rights to dividends and/or distributions on such Shares.

7. No Guarantee of Continued Service. PARTICIPANT ACKNOWLEDGES AND AGREES THAT THE VESTING OF SHARES PURSUANT TO THE VESTING SCHEDULE HEREOF SHALL OCCUR ONLY BY CONTINUING AS A SERVICE PROVIDER AT THE WILL OF THE EMPLOYER OR CONTRACTING ENTITY (AS APPLICABLE) AND NOT THROUGH THE ACT OF BEING HIRED, BEING GRANTED THE OPTION OR ACQUIRING SHARES HEREUNDER. PARTICIPANT FURTHER ACKNOWLEDGES AND AGREES THAT THIS AWARD AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREUNDER AND THE VESTING SCHEDULE SET FORTH HEREIN DO NOT CONSTITUTE AN EXPRESS OR IMPLIED PROMISE OF CONTINUED ENGAGEMENT AS A SERVICE PROVIDER FOR THE VESTING PERIOD, FOR ANY PERIOD, OR AT ALL, AND WILL NOT INTERFERE IN ANY WAY WITH PARTICIPANT’S RIGHT OR THE RIGHT OF THE EMPLOYER OR THE COMPANY, PARENT, OR SUBSIDIARY TO TERMINATE PARTICIPANT’S RELATIONSHIP AS A SERVICE PROVIDER AT ANY TIME, WITH OR WITHOUT CAUSE (SUBJECT TO APPLICABLE LOCAL LAWS).

8. Nature of Grant. In accepting the Option, Participant acknowledges, understands and agrees that:

- (a) the Plan is established voluntarily by the Company, it is discretionary in nature and it may be modified, amended, suspended or terminated by the Company at any time;
- (b) the grant of the Option is voluntary and occasional and does not create any contractual or other right to receive future grants of Options, or benefits in lieu of Options even if Options have been granted repeatedly in the past;
- (c) all decisions with respect to future awards of Options, if any, will be at the sole discretion of the Company;
- (d) Participant's participation in the Plan is voluntary;
- (e) the Option and the Shares subject to the Option are extraordinary items that do not constitute regular compensation for services rendered to the Company or the Employer, and that are outside the scope of Participant's employment contract, if any;
- (f) the Option and the Shares subject to the Option are not intended to replace any pension rights or compensation;
- (g) the Option and the Shares subject to the Option are not part of normal or expected compensation or salary for any purposes, including, but not limited to, calculating any severance, resignation, termination, redundancy, dismissal, or end of service payments, bonuses, long-service awards, pension or retirement or welfare benefits or similar payments and in no event should be considered as compensation for, or relating in any way to, past services for the Company or the Employer, subject to Applicable Laws;
- (h) the future value of the underlying Shares is unknown and cannot be predicted with certainty; further, if Participant exercises the Option and obtains Shares, the value of the Shares acquired upon exercise may increase or decrease in value, even below the Exercise Price;
- (i) Participant also understands that neither the Company nor any affiliate is responsible for any foreign exchange fluctuation between local currency and the United States Dollar or the selection by the Company or any affiliate in its sole discretion of an applicable foreign currency exchange rate that may affect the value of the Option (or the calculation of income or Tax-Related Items thereunder);
- (j) in consideration of the grant of the Option, no claim or entitlement to compensation or damages shall arise from forfeiture of the Option resulting from termination of employment by the Employer (for any reason whatsoever and whether or not in breach of Applicable Laws, including, without limitation, applicable local labor laws), and Participant irrevocably releases the Employer from any such claim that may arise; if, notwithstanding the foregoing, any such claim is found by a court of competent jurisdiction to have arisen, Participant shall be deemed irrevocably to have waived his or her entitlement to pursue such claim; and

(k) the Option and the benefits under the Plan, if any, will not automatically transfer to another company in the case of a merger, take-over or transfer of liability.

9. **No Advice Regarding Grant.** The Company is not providing any tax, legal or financial advice, nor is the Company making any recommendations regarding Participant's participation in the Plan, or Participant's acquisition or sale of the underlying Shares. Participant is hereby advised to consult with his or her own personal tax, legal and financial advisors regarding Participant's participation in the Plan before taking any action related to the Plan.

10. **Data Privacy.** *Participant hereby explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of Participant's Personal Data (as described below) by and among, as applicable, the Company, any Parent, Subsidiary, or affiliate, or third parties as may be selected by the Company for the exclusive purpose of implementing, administering and managing Participant's participation in the Plan. Participant understands that refusal or withdrawal of consent will affect Participant's ability to participate in the Plan; without providing consent, Participant will not be able to participate in the Plan or realize benefits (if any) from the Option.*

Participant understands that the Company and any Parent, Subsidiary, affiliate, or designated third parties may hold personal information about Participant, including, but not limited to, Participant's name, home address and telephone number, date of birth, social insurance number or other identification number, salary, nationality, job title, any shares of stock or directorships held in the Company or any Parent, Subsidiary, or affiliate, details of all Options or any other entitlement to Shares awarded, canceled, exercised, vested, unvested or outstanding in Participant's favor ("Personal Data"). Participant understands that Personal Data may be transferred to any Parent, Subsidiary, affiliate, or third parties assisting in the implementation, administration and management of the Plan, that these recipients may be located in the United States, Participant's country (if different than the United States), or elsewhere, and that the recipient's country may have different data privacy laws and protections than Participant's country. In particular, the Company may transfer Personal Data to the broker or stock plan administrator assisting with the Plan, to its legal counsel and tax/accounting advisor, and to the affiliate or entity that is Participant's employer and its payroll provider.

Participant should also refer to any data privacy policy implemented by the Company (which will be available to Participant separately and may be updated from time to time) for more information regarding the collection, use, storage, and transfer of Participant's Personal Data.

11. **Address for Notices.** Any notice to be given to the Company under the terms of this Award Agreement will be addressed to the Company, in care of its Secretary at Twist Bioscience Corporation, 455 Mission Bay Boulevard South, San Francisco, CA 94158, or at such other address as the Company may hereafter designate in writing.

12. Non-Transferability of Option. This Option may not be transferred in any manner otherwise than by will or by the laws of descent or distribution and may be exercised during the lifetime of Participant only by Participant.

13. Binding Agreement. Subject to the limitation on the transferability of this Option contained herein, this Award Agreement will be binding upon and inure to the benefit of the heirs, legatees, legal representatives, successors and assigns of the parties hereto.

14. Additional Conditions to Issuance of Stock. If at any time the Company will determine, in its discretion, that the listing, registration, qualification or rule compliance of the Shares upon any securities exchange or under any Applicable Laws, the tax code and related regulations or the consent or approval of any governmental regulatory authority is necessary or desirable as a condition to the grant or vesting of the Option or purchase by, or issuance of Shares to, Participant (or his or her estate) hereunder, such purchase or issuance will not occur unless and until such listing, registration, qualification, rule compliance, consent or approval will have been completed, effected or obtained free of any conditions not acceptable to the Company. The Company will make all reasonable efforts to meet the requirements of any such state, federal or foreign law or securities exchange and to obtain any such consent or approval of any such governmental authority or securities exchange. Assuming such compliance, for purposes of the Tax-Related Items, the Exercised Shares will be considered transferred to Participant on the date the Option is exercised with respect to such Exercised Shares. The Company shall not be obligated to issue any Shares pursuant to this Option at any time if the issuance of Shares, or the exercise of an Option by Participant, violates or is not in compliance with any Applicable Laws.

15. Lock-Up Agreement. In connection with the initial public offering of the Company's securities, Participant hereby agrees not to offer, pledge, sell, contract to sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any securities of the Company however and whenever acquired (other than those included in the registration) without the prior written consent of the Company and the managing underwriters for such offering for such period of time (not to exceed 180 days) from the effective date of such registration as may be requested by the Company or such managing underwriters and to execute an agreement reflecting the foregoing as may be requested by the underwriters at the time of the Company's initial public offering. In addition, upon request of the Company or the underwriters managing a public offering of the Company's securities (other than the initial public offering), Participant hereby agrees to be bound by similar restrictions, and to sign a similar agreement, in connection with no more than one additional registration statement filed within 12 months after the closing date of the initial public offering, provided that the duration of the lock-up period with respect to such additional registration shall not exceed 90 days from the effective date of such additional registration statement. Notwithstanding the foregoing, if during the last 17 days of the restricted period, the Company issues an earnings release or material news or a material event relating to the Company occurs, or prior to the expiration of the restricted period the Company announces that it will release earnings results during the 16-day period beginning on the last day of the restricted period, then, upon the request of the managing underwriter, to the extent required by any FINRA rules, the restrictions imposed by this subsection shall continue to apply until the end of the third trading day following the expiration of the 15-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event. In no event will the restricted

period extend beyond 216 days after the effective date of the registration statement. In order to enforce the restriction set forth above, the Company may impose stop-transfer instructions with respect to the Shares acquired under this Agreement until the end of the applicable stand-off period. The Company's underwriters shall be beneficiaries of the agreement set forth in this Section.

If the underwriters release or waive any of the foregoing restrictions in connection with a transfer of shares of Common Stock, the underwriters shall notify the Company at least three business days before the effective date of any such release or waiver. Further, the Company will announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by the underwriters shall only be effective two business days after the publication date of such press release. The provisions of this paragraph will not apply if (x) the release or waiver is effected solely to permit a transfer not for consideration and (y) the transferee has agreed in writing to be bound by the same terms of the lock-up provisions applicable in general to the extent, and for the duration, that such lock-up provisions remain in effect at the time of the transfer.

16. Plan Governs. This Award Agreement is subject to all terms and provisions of the Plan. In the event of a conflict between one or more provisions of this Award Agreement and one or more provisions of the Plan, the provisions of the Plan will govern. Capitalized terms used and not defined in this Award Agreement will have the meaning set forth in the Plan.

17. Administrator Authority. The Administrator will have the power to interpret the Plan and this Award Agreement and to adopt such rules for the administration, interpretation and application of the Plan as are consistent therewith and to interpret or revoke any such rules (including, but not limited to, the determination of whether or not any Shares subject to the Option have vested). All actions taken and all interpretations and determinations made by the Administrator in good faith will be final and binding upon Participant, the Company and all other interested persons. No member of the Administrator will be personally liable for any action, determination or interpretation made in good faith with respect to the Plan or this Award Agreement.

18. Electronic Delivery and Acceptance. The Company may, in its sole discretion, decide to deliver any documents related to Participant's current or future participation in the Plan, this Option, the Shares subject to this Option, any other securities of the Company or any other Company-related documents, by electronic means. By accepting this Option, whether electronically or otherwise, Participant hereby (i) consents to receive such documents by electronic means, (ii) consents to the use of electronic signatures, and (iii) agrees to participate in the Plan and/or receive any such documents through an on-line or electronic system established and maintained by the Company or a third party designated by the Company, including but not limited to the use of electronic signatures or click-through electronic acceptance of terms and conditions.

19. Translation. If Participant has received this Award Agreement, including appendices, or any other document related to the Plan translated into a language other than English, and the meaning of the translated version is different than the English version, the English version will control.

20. Imposition of Other Requirements. The Company reserves the right to impose other requirements on Participant's participation in the Plan, on the Option and on any Shares acquired under the Plan, to the extent the Company determines it is necessary or advisable in order to comply with any Applicable Laws or facilitate the administration of the Plan, and to require Participant to sign any additional agreements or undertakings that may be necessary to accomplish the foregoing. Furthermore, Participant understands that the Applicable Laws of the country in which he or she is resident at the time of grant, vesting, and/or exercise of this Option or the holding or disposition of Shares (including any rules or regulations governing securities, foreign exchange, tax, labor or other matters) may restrict or prevent exercise of this Option or may subject Participant to additional procedural or regulatory requirements he or she is solely responsible for and will have to independently fulfill in relation to this Option or the Shares. Notwithstanding any provision herein, this Option and any Shares shall be subject to any special terms and conditions or disclosures as set forth in any addendum for Participant's country (the "Country-Specific Addendum," which forms part of this Award Agreement). Participant also understands and agrees that if he works, resides, moves to, or otherwise is or becomes subject to Applicable Laws or company policies of another jurisdiction at any time, certain country-specific notices, disclaimers and/or terms and conditions may apply to him as from the date of grant, unless otherwise determined by the Company in its sole discretion.

21. Captions. Captions provided herein are for convenience only and are not to serve as a basis for interpretation or construction of this Award Agreement.

22. Agreement Severable. In the event that any provision in this Award Agreement will be held invalid or unenforceable, such provision will be severable from, and such invalidity or unenforceability will not be construed to have any effect on, the remaining provisions of this Award Agreement.

23. Modifications to the Agreement. This Award Agreement constitutes the entire understanding of the parties on the subjects covered. Participant expressly warrants that he or she is not accepting this Award Agreement in reliance on any promises, representations, or inducements other than those contained herein. Modifications to this Award Agreement or the Plan can be made only in an express written contract executed by a duly authorized officer of the Company. Notwithstanding anything to the contrary in the Plan or this Award Agreement, the Company reserves the right to revise this Award Agreement as it deems necessary or advisable, in its sole discretion and without the consent of Participant, to comply with Code Section 409A or to otherwise avoid imposition of any additional tax or income recognition under Section 409A of the Code in connection to this Option.

24. Amendment, Suspension or Termination of the Plan. By accepting this Award, Participant expressly warrants that he or she has received an Option under the Plan, and has received, read and understood a description of the Plan. Participant understands that the Plan is discretionary in nature and may be amended, suspended or terminated by the Company at any time.

25. Governing Law and Venue. This Award Agreement will be governed by the laws of the State of California, without giving effect to the conflict of law principles thereof. For purposes of litigating any dispute that arises under this Award Agreement, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of San Francisco County, California, or the federal courts for the United States for the Northern District of California, and no other courts.

Country-Specific Addendum

This Addendum includes additional country-specific notices, disclaimers, and/or terms and conditions that apply to individuals who are working or residing in the countries listed below and that may be material to Participant's participation in the Plan. Such notices, disclaimers, and/or terms and conditions may also apply, as from the date of grant, if Participant moves to or otherwise is or becomes subject to the Applicable Laws or company policies of the country listed. However, because foreign exchange regulations and other local laws are subject to frequent change, Participant is advised to seek advice from his or her own personal legal and tax advisor prior to accepting or exercising an Option or holding or selling Shares acquired under the Plan. The Company is not providing any tax, legal or financial advice, nor is the Company making any recommendations regarding Participant's acceptance of the Option or participation in the Plan. Unless otherwise noted below, capitalized terms shall have the same meaning assigned to them under the Plan, the Notice of Stock Option Grant and the Award Agreement. This Addendum forms part of the Award Agreement and should be read in conjunction with the Award Agreement and the Plan.

Securities Law Notice: Unless otherwise noted, neither the Company nor the Shares are registered with any local stock exchange or under the control of any local securities regulator outside the United States. The Award Agreement (of which this Addendum is a part), the Notice of Stock Option Grant, the Plan, and any other communications or materials that you may receive regarding participation in the Plan do not constitute advertising or an offering of securities outside the United States, and the issuance of securities described in any Plan-related documents is not intended for public offering or circulation in your jurisdiction.

European Union and Switzerland

Data Privacy. *Where Participant is a resident of the EU, the following provision applies and supplements Section 10 of the Award Agreement. Participant understands and acknowledges that:*

- *The data controller is the Company; queries or requests regarding the Participant's Personal Data should be made in writing to the Company's representative relating to the Plan or Option matters, who may be contacted at: Paula Green, VP Human Resources;*
- *The legal basis for the processing of Personal Data is that the processing is necessary for the performance of a contract to which the Participant is a party (namely, this Award Agreement);*
- *Personal Data will be held only as long as is necessary to implement, administer and manage Participant's participation in the Plan;*
- *He or she may, at any time, access his or her Personal Data, request additional information about the storage and processing of Personal Data, require any necessary amendments to Personal Data without cost or exercise any other rights they may have in relation to their Personal Data under applicable law, including the right to make a complaint to an EU data protection regulator.*

Belgium **Belgium Option Acceptance.** For Belgian tax purposes you are not permitted to accept this Option grant until after the 60th day following the Offer Date, which is defined under Belgian tax law as the date that the grant (including this Agreement and other relevant documentation) is communicated to you. Any acceptance of this option shall be automatically deemed to be accepted after the 60th day following such Offer Date. You should consult with your personal tax advisor regarding the Option and your liability for income taxes and social contributions.

Denmark **Foreign Account Reporting.** Danish resident holders of non-Danish bank accounts or accounts with non-Danish brokers should submit certain forms to the Danish tax authorities:

Erklæring V regarding shares deposited with a non-Danish bank or broker
(<https://www.skat.dk/SKAT.aspx?oId=90030>)
Erklæring K regarding money deposited with a non-Danish bank or broker
(<https://www.skat.dk/SKAT.aspx?oId=73344>)

France **Foreign Ownership Reporting.** Residents of France with foreign account balances in excess of EUR 1 million or its equivalent must report monthly to the Bank of France.

Consent to Receive Information in English. By accepting the Stock Options, you confirm having read and understood the Plan and the Agreement, which were provided in the English language. You accept the terms of those documents accordingly. *En acceptant ces options, vous confirmez avoir lu et compris les termes du Plan et ce Contrat, qui comprennent tous leurs termes et conditions et qui ont été transmis en langue anglaise. Vous acceptez les dispositions de ces documents en connaissance de cause.*

Israel **Israel Sub-Plan.** This grant is also subject to the Sub-Plan for Israeli Participants and is hereby designated as follows:

102 Capital Gain Track Award
 102 Ordinary Income Track Award
 102 Non-Trustee Award
 3(9) Award

The terms used herein shall have the meaning ascribed to them in the Plan and Israeli Sub-Plan. In the event of any conflict, whether explicit or implied, between the provision of this Award Agreement and the Sub-Plan, the provisions set out in the Sub-Plan shall prevail. By accepting this grant, you acknowledge that a copy of the Israeli Sub-Plan has been provided to you. The Israeli Sub-Plan may also be obtained by contacting Manager HR, Tel Aviv.

To the extent the Option is designated above as either a 102 Capital Gain Track Award or a 102 Ordinary Income Track Award, Participant declares and acknowledges that he or she: (i) fully understands that Section 102 applies to the Option specified in this Notice of Option Grant and Award Agreement; (ii) understands the provisions of Section 102, the tax track chosen and the implications thereof; (iii) agrees to the terms of the Trust Agreement between the Company and the Trustee, as well as the requirements of the Israeli Tax Authority, (iv) understands that releasing the Shares from the control or holding of the Trustee prior to the termination of the Required Holding Period constitutes a violation of the terms of Section 102 and agrees to bear the relevant sanctions; (v) authorizes the Company and/or the applicable Parent, Subsidiary, or affiliate to provide the Trustee with any information required for the purpose of administering the Plan including executing its obligations under the Ordinance, the trust deed and the Trust Agreement, including without limitation information about his/her Shares, income tax rates, salary bank account, contact details and identification number; and (vii) declares that he/she is a resident of the State of Israel for tax purposes on the Grant Date and agrees to notify the Company upon any change in the residence address indicated above and acknowledges that if he/she ceases to be an Israeli resident or if his/her engagement with the Company or a Parent, Subsidiary, or affiliate is terminated, the Shares shall remain subject to Section 102, the Trust Agreement, the Plan, the Sub-Plan, and this Agreement.

The grant of the Option is conditioned upon Participant signing all documents requested by the Company, the Parent, Subsidiary, or affiliate, or the Trustee, in accordance with the Trust Agreement.

A copy of the Trust Agreement is available for Participant's review, during normal working hours at his or her local entity's offices.

With respect to 102 Trustee Award, the Shares issued upon exercise or vesting of such 102 Trustee Award shall be issued to and in the name of the Trustee on behalf of Participant, and shall be held by the Trustee in trust on behalf of Participant; *provided, however*, that in the event Participant elects to receive the Shares directly to his/her possession, the transfer from the Trustee shall be subject to the payment of any and all applicable taxes by Participant, to the satisfaction of each of the Trustee and the Company, until the full payment of required taxes, as applicable.

Further to Section 12 of the Award Agreement, with respect to 102 Trustee Award, Participant shall not sell, assign, transfer, pledge, give as a collateral, or grant any right to any third party or release from trust any Option and any Share received and/or any additional rights, including bonus shares that may be distributed to Participant in connection with such 102 Trustee Award (the "Additional Rights"), which will be allocated to the Trustee on behalf of Participant and shall be held in trust or controlled by the Trustee for the benefit of Participant, until at least the lapse of the Required Holding Period. Notwithstanding the above, if any such sale or release occurs during the Required Holding Period, the sanctions under Section 102 shall apply to and shall be borne by Participant. At the end of the Required Holding Period, the Options or Shares underlying the Options or any Additional Rights may be transferred to Participant upon his or her demand, but only under the condition that the tax due in accordance with Section 102 is paid to the satisfaction of the Trustee and the Company. With respect to any Award granted by the Company pursuant to Section 102(c) of the Ordinance (which provides for ordinary income Awards administered by the Trustee), the Award and all rights (if any) that accrue thereon shall be allocated or issued to the Trustee, who shall hold such Award and all rights accrued thereon (if any) in trust for the benefit of Participant and/or the Company, as the case may be, until the full payment of required taxes arising from such Award and/or rights accrued thereon (if any).

Any fees associated with any vesting, exercise, sale, transfer or any act in relation to the Awards shall be borne by the Participant, and the Trustee, the Company, and/or any Parent, Subsidiary, or affiliate shall be entitled to withhold or deduct such fees from payments otherwise due to the Participant from the Company, a Parent, Subsidiary, or affiliate, or the Trustee.

Notwithstanding Section 25 of the Award Agreement, the Ordinance will apply to the tax treatment of grants made under the Israeli Sub-Plan (and requirements and restrictions related thereto).

Securities Law Notice. If required under applicable law, the Company shall use reasonable efforts to receive a securities exemption from the Israeli Securities Authority to avoid the requirement to file an Israeli securities prospectus in relation to the Plan. If such exemption is obtained, copies of the Plan and the Form S-8 or S-1 registration statement for the Plan as filed with the U.S. Securities and Exchange Commission will be made available by request from Manager HR, Tel Aviv. A Hebrew translation may be provided upon request.

Securities Law Notice. With respect to this Option, the Company hereby informs you that (a) the filing under the provisions of Article 4, Paragraph 1 of the Financial Instruments and Exchange Law of Japan (“FIEL”) has not been made as any solicitation of an application to acquire this Option in relation to the issuance thereof constitutes a private placement to a small number of investors (shoninzu muke kanyu) as provided under Article 23-13, Paragraph 4, Item 1 (i) of the FIEL, and (b) this Option may not be transferred (including a transfer thereof in whole) other than by will or by the laws of descent or distribution (subject to compliance with Applicable Laws).

Securities Law 告知事項. 本オプションに関しては、(a)本オプションの発行に係る取得の申込みの勧誘が、金融商品取引法第23条の13第4項第1号イに規定する少人数向け勧誘に該当することにより、当該取得の申込みの勧誘に関し、金融商品取引法第4条第1項の規定による届出は行われていないこと、及び(b)本オプションは、(適用法令を遵守して)遺言若しくは相続・遺産分配法による場合を除き、譲渡（一括譲渡を含みます。）できないことを、当会社はここに告知致します。

Share Ownership and Payment Reporting. If you acquire Shares valued at more than ¥100,000,000 total, you must file a Securities Acquisition Report with the Ministry of Finance (“MOF”) through the Bank of Japan within 20 days of the acquisition of the Shares.

In addition, if you pay more than ¥30,000,000 in a single transaction for the Shares at exercise of the Option, you must file a Payment Report with the MOF through the Bank of Japan by the 20th day of the month following the month in which the payment was made. The precise reporting requirements may vary depending on the bank handling the payment.

A Payment Report is required independently of a Securities Acquisition Report. Consequently, if the total amount that you pay on a one-time basis at exercise of the Option exceeds ¥100,000,000, you must file both a Payment Report and a Securities Acquisition Report.

Exit Tax. Please note that you may be subject to tax on your Options, even prior to vesting or exercise, if you relocate from Japan if you (1) hold financial assets with an aggregate value of ¥100,000,000 or more upon departure from Japan and (2) maintained a principle place of residence (*jusho*) or temporary place of abode (*kyosho*) in Japan for 5 years or more during the 10-year period immediately prior to departing Japan. You should discuss your tax treatment with your personal tax advisor.

Singapore

Securities Law Notice. This offer and the Shares to be issued hereunder shall be made available through this platform/facility and are offered to you in reliance on the exemption under section 272A (1) of the Securities and Futures Act (Chapter 289) of Singapore (the “SFA”). These offers are not made in or accompanied by a prospectus that is registered by the Monetary Authority of Singapore (the “Authority”). Apart from being subjected to the general resale restriction under Section 257 of the SFA, any and all Shares to be issued hereunder shall therefore not be subsequently sold to any person, unless the offer resulting in such subsequent sale is made in compliance with Subdivisions (2) and (3) of Part XII Division (1), in reliance on subsection (8)(c) or any other exemption under any provision of Subdivision (4) of Part XII Division (1) (other than this subsection), or where at least 6 months have elapsed from the date the securities were acquired under the initial offer, in reliance on the exemption under this subsection.

Director Reporting. If you are a director or shadow director of a Singapore Subsidiary, you may be subject to special reporting requirements with regard to the acquisition of shares or rights over Shares. Please contact your personal legal advisor for further details if you are a director or shadow director.

Exit Tax / Deemed Exercise Rule. If you are deemed by the Singapore tax authorities to have received Options in relation to your employment in Singapore, notwithstanding the fact that you are not employed by the Company or any Parent or Subsidiary, please note that if, prior to the exercise of the Options, you are 1) a permanent resident of Singapore and leave Singapore permanently or are transferred out of Singapore; or 2) neither a Singapore citizen nor permanent resident and either cease employment in Singapore or leave Singapore for any period exceeding 3 months, you will likely be taxed on the Options on a “deemed exercise” basis, even if your Options have not yet vested. You should discuss your tax treatment with your personal tax advisor.

United Kingdom

The following supplements Section 5 of the Agreement:

Withholding of Tax. If payment or withholding of the Tax-Related Items is not made within ninety (90) days of the end of the UK tax year in which the event giving rise to the Tax-Related Items occurs (the “Due Date”) or such other period specified in Section 222(1)(c) of the U.K. Income Tax (Earnings and Pensions) Act 2003, the amount of any uncollected Tax-Related Items will constitute a loan owed by Participant to the Employer, effective on the Due Date. Participant agrees that the loan will bear interest at the then-current Official Rate of Her Majesty’s Revenue and Customs (“HMRC”), it will be immediately due and repayable, and

the Company or the employer may recover it at any time thereafter by any of the means referred to in Section 5(b) of the Award Agreement. Notwithstanding the foregoing, if Participant is a director or executive officer of the Company (within the meaning of Section 13(k) of the U.S. Securities and Exchange Act of 1934, as amended), Participant will not be eligible for such a loan to cover the Tax-Related Items. In the event that Participant is a director or executive officer and the Tax-Related Items are not collected from or paid by Participant by the Due Date, the amount of any uncollected Tax-Related Items will constitute a benefit to Participant on which additional income tax and national insurance contributions will be payable. Participant will be responsible for reporting and paying any income tax due on this additional benefit directly to HMRC under the self-assessment regime.

HMRC National Insurance Contributions. Participant agrees that (a) Tax-Related Items within Section 5(a) of the Award Agreement shall include any secondary class 1 (employer) National Insurance Contributions that (i) any employer (or former employer) of Participant is liable to pay (or reasonably believes it is liable to pay); and (ii) may be lawfully recovered from Participant; and (b) if required to do so by the Company (at any time when the relevant election can be made) Participant shall: (i) make a joint election (with the employer or former employer) in the form provided by the Company to transfer to Participant the whole or any part of the employer's liability; and (ii) enter into arrangements required by HM Revenue & Customs (or any other tax authority) to secure the payment of the transferred liability.

EXHIBIT B

TWIST BIOSCIENCE CORPORATION

2018 EQUITY INCENTIVE PLAN

EXERCISE NOTICE

Twist Bioscience Corporation
455 Mission Bay Boulevard South
San Francisco, CA 94158
Attention: Stock Administration

1. **Exercise of Option.** Effective as of today, _____, the undersigned ("**Purchaser**") hereby elects to purchase _____ shares (the "**Shares**") of the Common Stock of Twist Bioscience Corporation (the "**Company**") under and pursuant to the 2018 Equity Incentive Plan (the "**Plan**") and the Stock Option Award Agreement dated _____ (the "**Award Agreement**"). The purchase price for the Shares will be USD \$ _____, as required by the Award Agreement.

2. **Delivery of Payment.** Purchaser herewith delivers to the Company, or otherwise makes adequate arrangements satisfactory to the Company, the full purchase price of the Shares and any Tax-Related Items (as defined in the Agreement) to be paid in connection with the exercise of the Option.

3. **Representations of Purchaser.** Purchaser acknowledges that Purchaser has received, read and understood the Plan and the Award Agreement and agrees to abide by and be bound by their terms and conditions.

4. **Rights as Stockholder.** Until the issuance (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company) of the Shares, no right to vote or receive dividends or any other rights as a stockholder will exist with respect to the Shares subject to the Option, notwithstanding the exercise of the Option. The Shares so acquired will be issued to Purchaser as soon as practicable after exercise of the Option. No adjustment will be made for a dividend or other right for which the record date is prior to the date of issuance, except as provided in Section 13 of the Plan.

5. **Tax Consultation.** Purchaser understands that Purchaser may suffer adverse tax consequences as a result of Purchaser's purchase or disposition of the Shares. Purchaser represents that Purchaser has consulted with any tax consultants Purchaser deems advisable in connection with the purchase or disposition of the Shares and that Purchaser is not relying on the Company for any tax advice.

6. Entire Agreement; Governing Law. The Plan and Award Agreement are incorporated herein by reference. This Exercise Notice, the Plan and the Award Agreement constitute the entire agreement of the parties with respect to the subject matter hereof and supersede in their entirety all prior undertakings and agreements of the Company and Purchaser with respect to the subject matter hereof, and may not be modified adversely to the Purchaser's interest except by means of a writing signed by the Company and Purchaser. This agreement is governed by the internal substantive laws, but not the choice of law rules, of the State of California.

Submitted by:

Accepted by:

PURCHASER:

TWIST BIOSCIENCE CORPORATION

Signature

By

Print Name

Title

Date Received

TWIST BIOSCIENCE CORPORATION

2018 EMPLOYEE STOCK PURCHASE PLAN

ADOPTED BY THE BOARD OF DIRECTORS: SEPTEMBER 26, 2018

APPROVED BY THE STOCKHOLDERS: [], 2018

1. General Purpose.

(a) The Plan provides a means by which Eligible Employees and/or Eligible Service Providers of either the Company or a Designated Company may be given an opportunity to purchase shares of Common Stock. The Plan permits the Company to grant a series of Purchase Rights to Eligible Employees and/or Eligible Service Providers.

(b) The Company, by means of the Plan, seeks to retain and assist its Related Corporations or Affiliates in retaining the services of such Eligible Employees and Eligible Service Providers, to secure and retain the services of new Eligible Employees and Eligible Service Providers and to provide incentives for such persons to exert maximum efforts for the success of the Company and its Related Corporations and Affiliates.

(c) The Plan includes two components: a 423 Component and a Non-423 Component. The Company intends (but makes no undertaking or representation to maintain) the 423 Component to qualify as an Employee Stock Purchase Plan. The provisions of the 423 Component, accordingly, will be construed in a manner that is consistent with the requirements of Section 423 of the Code, including without limitation, to extend and limit Plan participation in a uniform and non-discriminating basis. In addition, this Plan authorizes grants of Purchase Rights under the Non-423 Component that do not meet the requirements of an Employee Stock Purchase Plan. Except as otherwise provided in the Plan or determined by the Board, the Non-423 Component will operate and be administered in the same manner as the 423 Component. In addition, the Company may make separate Offerings which vary in terms (provided that such terms are not inconsistent with the provisions of the Plan or the requirements of an Employee Stock Purchase Plan, except in each case with respect to a Non-423 Component), and the Company will designate which Designated Company is participating in each separate Offering and if any Eligible Service Providers will be eligible to participate in a separate Offering. Eligible Employees will be able to participate in the 423 Component or Non-423 Component of the Plan. Eligible Service Providers will only be able to participate in the Non-423 Component of the Plan.

2. Administration.

(a) The Board will administer the Plan unless and until the Board delegates administration of the Plan to a Committee or Committees, as provided in Section 2(c).

(b) The Board will have the power, subject to, and within the limitations of, the express provisions of the Plan:

(i) To determine how and when Purchase Rights will be granted and the provisions of each Offering (which need not be identical).

(ii) To designate from time to time which Related Corporations of the Company will be eligible to participate in the Plan as Designated 423 Corporations or as Designated Non-423 Corporations, which Affiliates may be excluded from participation in the Plan, and which Designated Companies will participate in each separate Offering (to the extent that the Company makes separate Offerings).

(iii) To designate from time to time which persons will be Eligible Service Providers and which Eligible Service Providers will participate in each separate Offering (to the extent that the Company makes separate Offerings).

(iv) To construe and interpret the Plan and Purchase Rights, and to establish, amend and revoke rules and regulations for its administration. The Board, in the exercise of this power, may correct any defect, omission or inconsistency in the Plan, in a manner and to the extent it deems necessary or expedient to make the Plan fully effective.

(v) To settle all controversies regarding the Plan and Purchase Rights granted under the Plan.

(vi) To suspend or terminate the Plan at any time as provided in Section 12.

(vii) To amend the Plan at any time as provided in Section 12.

(viii) Generally, to exercise such powers and to perform such acts as it deems necessary or expedient to promote the best interests of the Company, its Related Corporations, and Affiliates and to carry out the intent that the 423 Component be treated as an Employee Stock Purchase Plan.

(ix) To adopt such rules, procedures and sub-plans relating to the operation and administration of the Plan as are necessary or appropriate under applicable local laws, regulations and procedures to permit or facilitate participation in the Plan by Employees or Eligible Service Providers who are foreign nationals or employed or providing services or located or otherwise subject to the laws of a jurisdiction outside the United States. Without limiting the generality of, but consistent with, the foregoing, the Board specifically is authorized to adopt rules, procedures, and sub-plans, which, for purposes of the Non-423 Component, may be beyond the scope of Section 423 of the Code, regarding, without limitation, eligibility to participate in the Plan, handling and making of Contributions, establishment of bank or trust accounts to hold Contributions, payment of interest, conversion of local currency, obligations to pay payroll tax, determination of beneficiary designation requirements, withholding procedures and handling of share issuances, any of which may vary according to applicable requirements.

(c) The Board may delegate some or all of the administration of the Plan to a Committee or Committees. If administration is delegated to a Committee, the Committee will have, in connection with the administration of the Plan, the powers theretofore possessed by the Board that have been delegated to the Committee, including the power to delegate to a subcommittee any of the administrative powers the Committee is authorized to exercise (and references in this Plan to the Board

will thereafter be to the Committee or subcommittee), subject, however, to such resolutions, not inconsistent with the provisions of the Plan, as may be adopted from time to time by the Board. The Board may retain the authority to concurrently administer the Plan with the Committee and may, at any time, revert in the Board some or all of the powers previously delegated. Whether or not the Board has delegated administration of the Plan to a Committee, the Board will have the final power to determine all questions of policy and expediency that may arise in the administration of the Plan.

(d) All determinations, interpretations and constructions made by the Board in good faith will not be subject to review by any person and will be final, binding and conclusive on all persons.

3. Shares of Common Stock Subject to the Plan.

(a) Subject to the provisions of Section 11(a) relating to Capitalization Adjustments, the maximum number of shares of Common Stock that may be issued under the Plan will not exceed 275,225 shares of Common Stock, plus the number of shares of Common Stock that are automatically added on the first day of each Fiscal Year beginning with the 2019 Fiscal Year and ending on (and including) the first day of the 2029 Fiscal Year, in an amount equal to the lesser of (i) one percent (1%) of the total number of shares of Common Stock outstanding on the last day of the calendar month prior to the date of such automatic increase, and (ii) 249,470 shares of Common Stock. Notwithstanding the foregoing, the Board may act prior to the first day of any fiscal year to provide that there will be no January 1st increase in the share reserve for such fiscal year or that the increase in the share reserve for such fiscal year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the preceding sentence.

(b) If any Purchase Right granted under the Plan terminates without having been exercised in full, the shares of Common Stock not purchased under such Purchase Right will again become available for issuance under the Plan.

(c) The stock purchasable under the Plan will be shares of authorized but unissued or reacquired Common Stock, including shares repurchased by the Company on the open market.

4. Grant of Purchase Rights; Offering.

(a) The Board may from time to time grant or provide for the grant of Purchase Rights to Eligible Employees and/or Eligible Service Providers under an Offering (consisting of one or more Purchase Periods) on an Offering Date or Offering Dates selected by the Board. Each Offering will be in such form and will contain such terms and conditions as the Board will deem appropriate, and, with respect to the 423 Component, will comply with the requirement of Section 423(b) (5) of the Code that all Employees granted Purchase Rights will have the same rights and privileges. The terms and conditions of an Offering will be incorporated by reference into the Plan and treated as part of the Plan. The provisions of separate Offerings need not be identical, but each Offering will include (through incorporation of the provisions of this Plan by reference in the Offering Document or otherwise) the period during which the Offering will be effective, which period will not exceed 27 months beginning with the Offering Date, and the substance of the provisions contained in Sections 5 through 8, inclusive.

(b) If a Participant has more than one Purchase Right outstanding under the Plan, unless he or she otherwise indicates in forms delivered to the Company: (i) each form will apply to all of his or her Purchase Rights under the Plan, and (ii) a Purchase Right with a lower exercise price (or an earlier-granted Purchase Right, if different Purchase Rights have identical exercise prices) will be exercised to the fullest possible extent before a Purchase Right with a higher exercise price (or a later-granted Purchase Right if different Purchase Rights have identical exercise prices) will be exercised.

(c) The Board will have the discretion to structure an Offering so that if the Fair Market Value of a share of Common Stock on the first Trading Day of a new Purchase Period within that Offering is less than or equal to the Fair Market Value of a share of Common Stock on the Offering Date for that Offering, then (i) that Offering will terminate immediately as of that first Trading Day, and (ii) the Participants in such terminated Offering will be automatically enrolled in a new Offering beginning on the first Trading Day of such new Purchase Period.

5. Eligibility.

(a) Purchase Rights may be granted only to Employees of the Company or, as the Board may designate in accordance with Section 2(b), to Employees of a Related Corporation or an Affiliate or, solely with respect to the Non-423 Component, Eligible Service Providers.

(b) An Employee will not be eligible to be granted Purchase Rights unless, on the Offering Date, the Employee has been employed by the Company, a Related Corporation, or an Affiliate, as the case may be, for such continuous period preceding such Offering Date as the Board may require, but in no event will the required period of continuous employment be equal to or greater than two years. In addition, the Board may provide that no Employee will be eligible to be granted Purchase Rights under the Plan unless, on the Offering Date, such Employee's customary employment with the Company, the Related Corporation, or the Affiliate, as applicable, is more than 20 hours per week and more than five months per calendar year or such other criteria as the Board may determine consistent with Section 423 of the Code.

(c) No Employee will be eligible for the grant of any Purchase Rights if, immediately after any such Purchase Rights are granted, such Employee owns stock possessing five percent or more of the total combined voting power or value of all classes of stock of the Company or of any Related Corporation. For purposes of this Section 5(c), the rules of Section 424(d) of the Code will apply in determining the stock ownership of any Employee, and stock which such Employee may purchase under all outstanding Purchase Rights and options will be treated as stock owned by such Employee.

(d) As specified by Section 423(b)(8) of the Code, an Eligible Employee may be granted Purchase Rights only if such Purchase Rights, together with any other rights granted under all Employee Stock Purchase Plans of the Company and any Related Corporations or Affiliates, do not permit such Eligible Employee's rights to purchase stock of the Company or any Related Corporation or Affiliates to accrue at a rate which, when aggregated, exceeds U.S. \$25,000 of Fair Market Value of such stock (determined at the time such rights are granted, and which, with respect to the Plan, will be determined as of their respective Offering Dates) for each calendar year in which such rights are outstanding at any time.

(e) Officers of the Company and any Designated Company, if they are otherwise Eligible Employees, will be eligible to participate in Offerings under the Plan. Notwithstanding the foregoing, the Board may provide in an Offering that Employees who are highly compensated Employees within the meaning of Section 423(b)(4)(D) of the Code will not be eligible to participate.

(f) An Eligible Service Provider will not be eligible to be granted Purchase Rights unless the Eligible Service Provider is providing bonafide services to the Company or a Designated Company on the applicable Offering Date. Eligible Service Providers may also be subject to whatever additional eligibility criteria as the Board may determine even if such criteria is not consistent with Section 423 of the Code.

6. Purchase Rights; Purchase Price.

(a) On each Offering Date, each Eligible Employee or Eligible Service Provider, pursuant to an Offering made under the Plan, will be granted a Purchase Right to purchase up to that number of shares of Common Stock (rounded down to the nearest whole share) purchasable either with a percentage or with a maximum dollar amount, as designated by the Board; provided however, that in the case of Eligible Employees, such percentage or maximum dollar amount will in either case not exceed 15% of such Employee's earnings (as defined by the Board in each Offering) during the period that begins on the Offering Date (or such later date as the Board determines for a particular Offering) and ends on the date stated in the Offering, which date will be no later than the end of the Offering, unless otherwise provided for in an Offering.

(b) The Board will establish one or more Purchase Dates during an Offering on which Purchase Rights granted for that Offering will be exercised and shares of Common Stock will be purchased in accordance with such Offering.

(c) In connection with each Offering made under the Plan, the Board may specify (i) a maximum number of shares of Common Stock that may be purchased by any Participant on any Purchase Date during such Offering, (ii) a maximum aggregate number of shares of Common Stock that may be purchased by all Participants pursuant to such Offering, and (iii) a maximum aggregate number of shares of Common Stock that may be purchased by all Participants on any Purchase Date under the Offering. If the aggregate purchase of shares of Common Stock issuable on exercise of Purchase Rights granted under the Offering would exceed any such maximum aggregate number, then, in the absence of any Board action otherwise, a pro rata (based on each Participant's accumulated Contributions) allocation of the shares of Common Stock (rounded down to the nearest whole share) available will be made in as nearly a uniform manner as will be practicable and equitable.

(d) The purchase price of shares of Common Stock acquired pursuant to Purchase Rights will be not less than the lesser of:

- (i) an amount equal to 85% of the Fair Market Value of the shares of Common Stock on the Offering Date; or
- (ii) an amount equal to 85% of the Fair Market Value of the shares of Common Stock on the applicable Purchase Date.

7. Participation; Withdrawal; Termination.

(a) An Eligible Employee may elect to authorize payroll deductions as the means of making Contributions by completing and delivering to the Company, within the time specified in the Offering, an enrollment form provided by the Company or any third party designated by the Company (each, a “Company Designee”). The enrollment form will specify the amount of Contributions not to exceed the maximum amount specified by the Board. Each Participant’s Contributions will be credited to a bookkeeping account for such Participant under the Plan and will be deposited with the general funds of the Company except where applicable laws or regulations require that Contributions be deposited with a Company Designee or otherwise be segregated.

(b) If permitted in the Offering, a Participant may begin Contributions with the first payroll or payment date occurring on or after the Offering Date (or, in the case of a payroll date or payment date that occurs after the end of the prior Offering but before the Offering Date of the next new Offering, Contributions from such payroll or payment will be included in the new Offering) or on such other date as set forth in the Offering. If permitted in the Offering, a Participant may thereafter reduce (including to zero) or increase his or her Contributions. If required under applicable laws or regulations or if specifically provided in the Offering, in addition to or instead of making Contributions by payroll deductions, a Participant may make Contributions through a payment by cash, check, or wire transfer prior to a Purchase Date, in a manner directed by the Company or a Company Designee.

(c) During an Offering, a Participant may cease making Contributions and withdraw from the Offering by delivering to the Company or a Company Designee a withdrawal form provided by the Company. The Company may impose a deadline before a Purchase Date for withdrawing. On such withdrawal, such Participant’s Purchase Right in that Offering will immediately terminate and the Company will distribute as soon as practicable to such Participant all of his or her accumulated but unused Contributions without interest and such Participant’s Purchase Right in that Offering will then terminate. A Participant’s withdrawal from that Offering will have no effect on his or her eligibility to participate in any other Offerings under the Plan, but such Participant will be required to deliver a new enrollment form to participate in subsequent Offerings.

(d) Purchase Rights granted pursuant to any Offering under the Plan will terminate immediately if the Participant either (i) is no longer an Eligible Employee or Eligible Service Provider for any reason or for no reason, or (ii) is otherwise no longer eligible to participate. The Company shall have the exclusive discretion to determine when Participant is no longer actively providing services and the date of the termination of employment or service for purposes of the Plan. As soon as practicable, the Company will distribute to such individual all of his or her accumulated but unused Contributions without interest.

(e) During a Participant’s lifetime, Purchase Rights will be exercisable only by such Participant. Purchase Rights are not transferable by a Participant, except by will, by the laws of descent and distribution, or, if permitted by the Company, by a beneficiary designation as described in Section 10.

(f) Unless otherwise specified in the Offering or required by applicable law, the Company will have no obligation to pay interest on Contributions.

8. Exercise of Purchase Rights.

(a) On each Purchase Date, each Participant's accumulated Contributions will be applied to the purchase of shares of Common Stock (rounded down to the nearest whole share), up to the maximum number of shares of Common Stock permitted by the Plan and the applicable Offering, at the purchase price specified in the Offering. No fractional shares will be issued unless specifically provided for in the Offering.

(b) Unless otherwise provided in the Offering, if any amount of accumulated Contributions remains in a Participant's account after the purchase of shares of Common Stock on the final Purchase Date in an Offering, then such remaining amount will not roll over to the next Offering and will instead be distributed in full to such Participant as soon as practicable after the final Purchase Date of such Offering without interest.

(c) No Purchase Rights may be exercised to any extent unless the shares of Common Stock to be issued on such exercise under the Plan are covered by an effective registration statement pursuant to the Securities Act and the Plan is in material compliance with all applicable U.S. federal and state, foreign and other securities, exchange control, and other laws applicable to the Plan. If on a Purchase Date the shares of Common Stock are not so registered or the Plan is not in such compliance, no Purchase Rights will be exercised on such Purchase Date, and the Purchase Date will be delayed until the shares of Common Stock are subject to such an effective registration statement and the Plan is in material compliance, except that the Purchase Date will in no event be more than three (3) months from the Offering Date. If, on the Purchase Date, as delayed to the maximum extent permissible, the shares of Common Stock are not registered and the Plan is not in material compliance with all applicable laws or regulations, as determined by the Company in its sole discretion, no Purchase Rights will be exercised and all accumulated but unused Contributions will be distributed as soon as practicable to the Participants without interest.

9. Covenants of the Company. The Company will seek to obtain from each U.S. federal or state, foreign or other regulatory commission or agency having jurisdiction over the Plan such authority as may be required to grant Purchase Rights and issue and sell shares of Common Stock thereunder unless the Company determines, in its sole discretion, that doing so would cause the Company to incur costs that are unreasonable. If, after commercially reasonable efforts, the Company is unable to obtain the authority that counsel for the Company deems necessary for the grant of Purchase Rights or the lawful issuance and sale of Common Stock under the Plan, and at a commercially reasonable cost, the Company will be relieved from any liability for failure to grant Purchase Rights or to issue and sell Common Stock on exercise of such Purchase Rights.

10. Designation of Beneficiary.

(a) The Company may, but is not obligated to, permit a Participant to submit a form designating a beneficiary who will receive any shares of Common Stock or Contributions from the Participant's account under the Plan if the Participant dies before such shares or Contributions are delivered to the Participant. The Company may, but is not obligated to, permit the Participant to change such designation of beneficiary. Any such designation or change must be on a form approved by the Company or as approved by the Company for use by a Company Designee.

(b) If a Participant dies, in the absence of a valid beneficiary designation, the Company will deliver any shares of Common Stock and Contributions to the executor or administrator of the estate of the Participant. If no executor or administrator has been appointed (to the knowledge of the Company), the Company, in its sole discretion, may deliver such shares of Common Stock and Contributions, without interest, to the Participant's spouse, dependents or relatives, or if no spouse, dependent or relative is known to the Company, then to such other person as the Company may designate.

11. Capitalization Adjustments; Dissolution or Liquidation; Corporate Transactions.

(a) In the event of a Capitalization Adjustment, the Board will appropriately and proportionately adjust: (i) the class(es) and maximum number of securities subject to the Plan pursuant to Section 3(a), (ii) the class(es) and maximum number of securities by which the share reserve is to increase automatically each year pursuant to Section 3(a), (iii) the class(es) and number of securities subject to, and the purchase price applicable to outstanding Offerings and Purchase Rights, and (iv) the class(es) and number of securities that are the subject of the purchase limits under each ongoing Offering. The Board will make these adjustments, and its determination will be final, binding, and conclusive.

(b) In the event of a dissolution or liquidation of the Company, the Board will shorten any Offering then in progress by setting a New Purchase Date prior to the consummation of such proposed dissolution or liquidation. The Board will notify each Participant in writing, prior to the New Purchase Date that the Purchase Date for the Participant's Purchase Rights has been changed to the New Purchase Date and that such Purchase Rights will be automatically exercised on the New Purchase Date, unless prior to such date the Participant has withdrawn from the Offering as provided in Section 7.

(c) In the event of a Corporate Transaction, then: (i) any surviving corporation or acquiring corporation (or the surviving or acquiring corporation's parent company) may assume or continue outstanding Purchase Rights or may substitute similar rights (including a right to acquire the same consideration paid to the stockholders in the Corporate Transaction) for outstanding Purchase Rights, or (ii) if any surviving or acquiring corporation (or its parent company) does not assume or continue such Purchase Rights or does not substitute similar rights for such Purchase Rights, then the Participants' accumulated Contributions will be used to purchase shares of Common Stock (rounded down to the nearest whole share) prior to the Corporate Transaction under the outstanding Purchase Rights (with such actual date to be determined by the Board in its sole discretion), and the Purchase Rights will terminate immediately after such purchase. The Board will notify each Participant in writing, prior to the New Purchase Date that the Purchase Date for the Participant's Purchase Rights has been changed to the New Purchase Date and that such Purchase Rights will be automatically exercised on the New Purchase Date, unless prior to such date the Participant has withdrawn from the Offering as provided in Section 7.

12. Amendment, Termination or Suspension of the Plan.

(a) The Board may amend the Plan at any time in any respect the Board deems necessary or advisable. However, except as provided in Section 11(a) relating to Capitalization Adjustments, stockholder approval will be required for any amendment of the Plan for which

stockholder approval is required by applicable laws, regulations or listing requirements, including any amendment that either (i) materially increases the number of shares of Common Stock available for issuance under the Plan, (ii) materially expands the class of individuals eligible to become Participants and receive Purchase Rights, (iii) materially increases the benefits accruing to Participants under the Plan or materially reduces the price at which shares of Common Stock may be purchased under the Plan, (iv) materially extends the term of the Plan, or (v) expands the types of awards available for issuance under the Plan, but in each of (i) through (v) above only to the extent stockholder approval is required by applicable laws, regulations, or listing requirements.

(b) The Board may suspend or terminate the Plan at any time. No Purchase Rights may be granted under the Plan while the Plan is suspended or after it is terminated.

(c) Any benefits, privileges, entitlements, and obligations under any outstanding Purchase Rights granted before an amendment, suspension, or termination of the Plan will not be materially impaired by any such amendment, suspension, or termination except (i) with the consent of the person to whom such Purchase Rights were granted, (ii) as necessary to comply with any laws, listing requirements, or governmental regulations (including, without limitation, the provisions of Section 423 of the Code and the regulations and other interpretive guidance issued thereunder relating to Employee Stock Purchase Plans) including without limitation any such regulations or other guidance that may be issued or amended after the date the Plan is adopted by the Board, or (iii) as necessary to obtain or maintain any special tax, listing, or regulatory treatment. To be clear, the Board may amend outstanding Purchase Rights without a Participant's consent if such amendment is necessary to ensure that the Purchase Right or the 423 Component complies with the requirements of Section 423 of the Code.

13. Section 409A of the Code; Tax Qualification.

(a) Purchase Rights granted under the 423 Component are intended to be exempt from the application of Section 409A of the Code under U.S. Treasury Regulation Section 1.409A-1(b)(5)(ii). Purchase Rights granted under the Non-423 Component to U.S. taxpayers are intended to be exempt from the application of Section 409A of the Code under the short-term deferral exception and any ambiguities will be construed and interpreted in accordance with such intent. Subject to Section 13(b) below, Purchase Rights granted to U.S. taxpayers under the Non-423 Component will be subject to such terms and conditions that will permit such Purchase Rights to satisfy the requirements of the short-term deferral exception available under Section 409A of the Code, including the requirement that the shares subject to a Purchase Right be delivered within the short-term deferral period. Subject to Section 13(b) below, in the case of a Participant who would otherwise be subject to Section 409A of the Code, to the extent the Board determines that a Purchase Right or the exercise, payment, settlement, or deferral thereof is subject to Section 409A of the Code, the Purchase Right will be granted, exercised, paid, settled, or deferred in a manner that will comply with Section 409A of the Code, including U.S. Department of Treasury regulations and other interpretive guidance issued thereunder, including, without limitation, any such regulations or other guidance that may be issued after the adoption of the Plan. Notwithstanding the foregoing, the Company will have no liability to a Participant or any other party if the Purchase Right that is intended to be exempt from or compliant with Section 409A of the Code is not so exempt or compliant or for any action taken by the Board with respect thereto.

(b) Although the Company may endeavor to (i) qualify a Purchase Right for special tax treatment under the laws of the United States or jurisdictions outside of the United States, or (ii) avoid adverse tax treatment (*e.g.*, under Section 409A of the Code), the Company makes no representation to that effect and expressly disavows any covenant to maintain special or to avoid unfavorable tax treatment, notwithstanding anything to the contrary in this Plan, including Section 13(a) above. The Company will be unconstrained in its corporate activities without regard to the potential negative tax impact on Participants under the Plan.

14. Effective Date of Plan. The Plan will become effective on the Effective Date. No Purchase Rights will be exercised unless and until the Plan has been approved by the stockholders of the Company, which approval must be within 12 months before or after the date the Plan is adopted (or if required under Section 12(a) above, materially amended) by the Board.

15. Miscellaneous Provisions.

(a) Proceeds from the sale of shares of Common Stock pursuant to Purchase Rights will constitute general funds of the Company.

(b) A Participant will not be deemed to be the holder of, or to have any of the rights of a holder with respect to, shares of Common Stock subject to Purchase Rights unless and until the Participant's shares of Common Stock acquired on exercise of Purchase Rights are recorded in the books of the Company (or its transfer agent).

(c) The Plan and Offering do not constitute an employment or service contract. Nothing in the Plan or in the Offering will in any way alter the at-will nature of a Participant's employment, if applicable, or be deemed to create in any way whatsoever any obligation on the part of any Participant to continue his or her employment or service relationship with the Company, a Related Corporation, or an Affiliate, or on the part of the Company, a Related Corporation, or an Affiliate to continue the employment or service of a Participant.

(d) The provisions of the Plan will be governed by the laws of the State of Delaware without resort to that state's conflicts of laws rules. For purposes of litigating any dispute that may arise directly or indirectly from the Plan or any Offering, the parties hereby submit and consent to the exclusive jurisdiction of the State of California and agree that any such litigation shall be conducted only in the courts of California or the federal courts of the United States located in California and no other courts.

(e) If any particular provision of the Plan is found to be invalid or otherwise unenforceable, such provision will not affect the other provisions of the Plan, but the Plan will be construed in all respects as if such invalid provision were omitted.

(f) If any provision of the Plan does not comply with applicable law or regulations, such provision will be construed in such a manner as to comply with applicable law or regulations.

16. Definitions. As used in the Plan, the following definitions will apply to the capitalized terms indicated below:

- (a) “423 Component” means the part of the Plan, which excludes the Non-423 Component, pursuant to which Purchase Rights that satisfy the requirements for an Employee Stock Purchase Plan may be granted to Eligible Employees.
- (b) “Affiliate” means any entity, other than a Related Corporation, in which the Company has an equity or other ownership interest or that is directly or indirectly controlled by, controls, or is under common control with the Company, in all cases, as determined by the Board, whether now or hereafter existing.
- (c) “Board” means the Board of Directors of the Company.
- (d) “Capitalization Adjustment” means, with respect to the Common Stock subject to the Plan or subject to any Purchase Right after the date the Plan is adopted by the Board, a stock split, reverse stock split, stock dividend, combination, consolidation, recapitalization (including a recapitalization through a large nonrecurring cash dividend) or reclassification of the Common Stock, subdivision of the Common Stock, a rights offering, a reorganization, merger, spin-off, split-up, repurchase, or exchange of Common Stock or other securities of the Company or other significant corporate transaction, or other change affecting the Common Stock occurs.
- (e) “Code” means the U.S. Internal Revenue Code of 1986, as amended, including any applicable regulations and guidance thereunder.
- (f) “Committee” means a committee of one or more members of the Board to whom authority has been delegated by the Board in accordance with Section 2(c).
- (g) “Common Stock” means the common stock of the Company.
- (h) “Company” means Twist Bioscience Corporation, a Delaware corporation.
- (i) “Contributions” means the payroll deductions or other payments specifically provided for in the Offering that a Participant contributes to fund the exercise of a Purchase Right. A Participant may make additional payments into his or her account if specifically provided for in the Offering, and then only if the Participant has not already contributed the maximum permitted amount of payroll deductions and other payments during the Offering.
- (j) “Corporate Transaction” means the consummation, in a single transaction or in a series of related transactions, of any one or more of the following events:
 - (i) a transfer of all or substantially all of the Company’s assets;
 - (ii) a merger, consolidation or other capital reorganization or business combination transaction of the Company with or into another corporation, entity or person; or
 - (iii) the consummation of a transaction, or series of related transactions, in which any “person” (as such term is used in Sections 13(d) and 14(d) of the Exchange Act) becomes the “beneficial owner” (as defined in Rule 13d-3 of the Exchange Act), directly or indirectly, of more than 50% of the Company’s then outstanding capital stock.

(k) “Designated 423 Corporation” means any Related Corporation selected by the Board as participating in the 423 Component.

(l) “Designated Company” means any Designated Non-423 Corporation or Designated 423 Corporation, provided, however, that at any given time, a Related Corporation participating in the 423 Component will not be a Related Corporation participating in the Non-423 Component.

(m) “Designated Non-423 Corporation” means any Related Corporation or Affiliate selected by the Board as participating in the Non-423 Component.

(n) “Director” means a member of the Board.

(o) “Effective Date” means the day immediately prior to the Registration Date.

(p) “Eligible Employee” means an Employee who meets the requirements set forth in the document(s) governing the Offering for eligibility to participate in the Offering, provided that such Employee also meets the requirements for eligibility to participate set forth in the Plan. For purposes of the Plan, the employment relationship will be treated as continuing intact while the Employee is on sick leave or other leave of absence approved by the Company or a Related Corporation (including an Affiliate) that directly employs the Employee. Where the period of leave exceeds three (3) months and the Employee’s right to reemployment is not guaranteed either by statute or by contract, the employment relationship will be deemed to have terminated three (3) months and one (1) day following the commencement of such leave.

(q) “Eligible Service Provider” means a natural person other than an Employee or Director who (i) is designated by the Committee to be an “Eligible Service Provider, (ii) provides bonafide services to the Company or a Related Corporation, (iii) is not a U.S. taxpayer and (iv) meets the requirements set forth in the document(s) governing the Offering for eligibility to participate in the Offering, provided that such person also meets the requirements for eligibility to participate set forth in the Plan.

(r) “Employee” means any person, including an Officer or Director, who is treated as an employee in the records of the Company or a Related Corporation (including an Affiliate). However, service solely as a Director, or payment of a fee for such services, will not cause a Director to be considered an “Employee” for purposes of the Plan.

(s) “Employee Stock Purchase Plan” means a plan that grants Purchase Rights intended to be options issued under an “employee stock purchase plan,” as that term is defined in Section 423(b) of the Code.

(t) “Exchange Act” means the U.S. Securities Exchange Act of 1934, as amended and the rules and regulations promulgated thereunder.

(u) “Fair Market Value” means, as of any date, the value of the Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or a national market system, its Fair Market Value will be the closing sales price for such stock (or the closing bid, if no sales were reported) as quoted on such exchange or system on the date of determination, as reported in such source as the Board deems reliable;

(ii) If the Common Stock is regularly quoted by a recognized securities dealer but selling prices are not reported, its Fair Market Value will be the mean of the closing bid and asked prices for the Common Stock on the date of determination, as reported in such source as the Board deems reliable;

(iii) In the absence of an established market for the Common Stock, the Fair Market Value will be determined in good faith by the Board in compliance with applicable laws and regulations and in a manner that complies with Sections 409A of the Code; or

(iv) Notwithstanding the foregoing, for any Offering that commences on the Registration Date, the Fair Market Value of the shares of Common Stock on the Offering Date will be the price per share at which shares are first sold to the public in the Company's initial public offering as specified in the final prospectus for that initial public offering.

(v) "Fiscal Year" means the fiscal year of the Company.

(w) "New Purchase Date" means a new Purchase Date set by shortening any Offering then in progress.

(x) "Non-423 Component" means the part of the Plan, which excludes the 423 Component, pursuant to which Purchase Rights that are not intended to satisfy the requirements for an Employee Stock Purchase Plan may be granted to Eligible Employees and Eligible Service Providers.

(y) "Offering" means the grant to Eligible Employees or Eligible Service Providers of Purchase Rights, with the exercise of those Purchase Rights automatically occurring at the end of one or more Purchase Periods. The terms and conditions of an Offering will generally be set forth in the "Offering Document" approved by the Board for that Offering.

(z) "Offering Date" means a date selected by the Board for an Offering to commence.

(aa) "Officer" means a person who is an officer of the Company or a Related Corporation or Affiliate within the meaning of Section 16 of the Exchange Act.

(bb) "Participant" means an Eligible Employee or Eligible Service Provider who holds an outstanding Purchase Right.

(cc) "Plan" means this Twist Bioscience Corporation 2018 Employee Stock Purchase Plan, including both the 423 Component and the Non-423 Component, as amended from time to time.

(dd) "Purchase Date" means one or more dates during an Offering selected by the Board on which Purchase Rights will be exercised and on which purchases of shares of Common Stock will be carried out in accordance with such Offering.

(ee) "Purchase Period" means a period of time specified within an Offering, generally beginning on the Offering Date or on the first Trading Day following a Purchase Date, and ending on a Purchase Date. An Offering may consist of one or more Purchase Periods.

(ff) "Purchase Right" means an option to purchase shares of Common Stock granted pursuant to the Plan.

(gg) "Registration Date" means the effective date of the first registration statement that is filed by the Company and declared effective pursuant to Section 12(g) of the Exchange Act, with respect to any class of the Company's securities.

(hh) "Related Corporation" means any "parent corporation" or "subsidiary corporation" of the Company whether now or subsequently established, as those terms are defined in Sections 424(e) and (f), respectively, of the Code.

(ii) "Securities Act" means the U.S. Securities Act of 1933, as amended.

(jj) "Trading Day" means any day on which the exchange or market on which shares of Common Stock are listed is open for trading.

o O o

TWIST BIOSCIENCE CORPORATION

INDEMNIFICATION AGREEMENT

This Indemnification Agreement (this "Agreement") is made as of _____, by and between Twist Bioscience Corporation, a Delaware corporation (the "Company"), and _____ ("Indemnitee").

RECITALS

The Company and Indemnitee recognize the increasing difficulty in obtaining liability insurance for directors, officers and key employees, the significant increases in the cost of such insurance and the general reductions in the coverage of such insurance. The Company and Indemnitee further recognize the substantial increase in corporate litigation in general, subjecting directors, officers and key employees to expensive litigation risks at the same time as the availability and coverage of liability insurance has been severely limited. Indemnitee does not regard the current protection available as adequate under the present circumstances, and Indemnitee may not be willing to continue to serve in Indemnitee's current capacity with the Company without additional protection. The Company desires to attract and retain the services of highly qualified individuals, such as Indemnitee, and to indemnify its directors, officers and key employees so as to provide them with the maximum protection permitted by law.

AGREEMENT

In consideration of the mutual promises made in this Agreement, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Company and Indemnitee hereby agree as follows:

1. Indemnification.

(a) **Third-Party Proceedings.** To the fullest extent permitted by applicable law, as such may be amended from time to time, the Company shall indemnify Indemnitee, if Indemnitee was, is or is threatened to be made, a party to or a participant (as a witness or otherwise) in any Proceeding (other than a Proceeding by or in the right of the Company to procure a judgment in the Company's favor), against all Expenses, judgments, fines and amounts paid in settlement (if such settlement is approved in advance by the Company, which approval shall not be unreasonably withheld) actually and reasonably incurred by Indemnitee in connection with such Proceeding if Indemnitee acted in good faith and in a manner Indemnitee reasonably believed to be in or not opposed to the best interests of the Company and, in the case of a criminal Proceeding, had no reasonable cause to believe Indemnitee's conduct was unlawful.

(b) **Proceedings By or in the Right of the Company.** To the fullest extent permitted by applicable law, the Company shall indemnify Indemnitee, if Indemnitee was, is or is threatened to be made a party to or a participant (as a witness or otherwise) in any Proceeding by or in the right of the Company to procure a judgment in the Company's favor, against all Expenses actually and reasonably incurred by Indemnitee in connection with such Proceeding if

Indemnitee acted in good faith and in a manner Indemnitee reasonably believed to be in or not opposed to the best interests of the Company, except that no indemnification shall be made in respect of any claim, issue or matter as to which Indemnitee shall have been finally adjudicated by court order or judgment to be liable to the Company unless and only to the extent that the Court of Chancery or the court in which such Proceeding is or was pending shall determine upon application that, in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnity for such expenses which such court shall deem proper.

(c) **Success on the Merits.** To the fullest extent permitted by applicable law and to the extent that Indemnitee has been successful on the merits or otherwise in defense of any Proceeding referred to in Section 1(a) or Section 1(b) or the defense of any claim, issue or matter therein, in whole or in part, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee in connection therewith. Without limiting the generality of the foregoing, if Indemnitee is successful on the merits or otherwise as to one or more but less than all claims, issues or matters in a Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee in connection with such successfully resolved claims, issues or matters to the fullest extent permitted by applicable law. If any Proceeding is disposed of on the merits or otherwise (including a disposition without prejudice), without (i) the disposition being adverse to Indemnitee, (ii) an adjudication that Indemnitee was liable to the Company, (iii) a plea of guilty by Indemnitee, (iv) an adjudication that Indemnitee did not act in good faith and in a manner Indemnitee reasonably believed to be in or not opposed to the best interests of the Company, and (v) with respect to any criminal Proceeding, an adjudication that Indemnitee had reasonable cause to believe Indemnitee's conduct was unlawful, Indemnitee shall be considered for the purposes hereof to have been wholly successful with respect thereto.

(d) **Witness Expenses.** To the fullest extent permitted by applicable law and to the extent that Indemnitee is a witness or otherwise asked to participate in any Proceeding to which Indemnitee is not a party, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee in connection with such Proceeding.

2. Indemnification Procedure.

(a) **Advancement of Expenses.** To the fullest extent permitted by applicable law, the Company shall advance all Expenses actually and reasonably incurred by Indemnitee in connection with a Proceeding within thirty (30) days after receipt by the Company of a statement requesting such advances from time to time, whether prior to or after final disposition of any Proceeding. Such advances shall be unsecured and interest free and shall be made without regard to Indemnitee's ability to repay the Expenses and without regard to Indemnitee's ultimate entitlement to indemnification under the other provisions of this Agreement. Indemnitee shall be entitled to continue to receive advancement of Expenses pursuant to this Section 2(a) unless and until the matter of Indemnitee's entitlement to indemnification hereunder has been finally adjudicated by court order or judgment from which no further right of appeal exists. Indemnitee hereby undertakes to repay such amounts advanced only if, and to the extent that, it ultimately is determined that Indemnitee is not entitled to be indemnified by the Company under the other provisions of this Agreement. Indemnitee shall qualify for advances upon the execution and delivery of this Agreement, which shall constitute the requisite undertaking with respect to repayment of advances made hereunder and no other form of undertaking shall be required to qualify for advances made hereunder other than the execution of this Agreement.

(b) **Notice and Cooperation by Indemnitee.** Indemnitee shall promptly notify the Company in writing upon being served with any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter for which indemnification will or could be sought under this Agreement. Such notice to the Company shall include a description of the nature of, and facts underlying, the Proceeding, shall be directed to the Chief Executive Officer of the Company and shall be given in accordance with the provisions of Section 13(e) below. In addition, Indemnitee shall give the Company such additional information and cooperation as the Company may reasonably request. Indemnitee's failure to so notify, provide information and otherwise cooperate with the Company shall not relieve the Company of any obligation that it may have to Indemnitee under this Agreement, except to the extent that the Company is adversely affected by such failure.

(c) **Determination of Entitlement.**

(i) **Final Disposition.** Notwithstanding any other provision in this Agreement, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding.

(ii) **Determination and Payment.** Subject to the foregoing, promptly after receipt of a statement requesting payment with respect to the indemnification rights set forth in Section 1, to the extent required by applicable law, the Company shall take the steps necessary to authorize such payment in the manner set forth in Section 145 of the Delaware General Corporation Law. The Company shall pay any claims made under this Agreement, under any statute, or under any provision of the Company's Certificate of Incorporation or Bylaws providing for indemnification or advancement of Expenses, within thirty (30) days after a written request for payment thereof has first been received by the Company, and if such claim is not paid in full within such thirty (30) day-period, Indemnitee may, but need not, at any time thereafter bring an action against the Company in the Delaware Court of Chancery to recover the unpaid amount of the claim and, subject to Section 12, Indemnitee shall also be entitled to be paid for all Expenses actually and reasonably incurred by Indemnitee in connection with bringing such action. It shall be a defense to any such action (other than an action brought to enforce a claim for advancement of Expenses under Section 2(a)) that Indemnitee has not met the standards of conduct which make it permissible under applicable law for the Company to indemnify Indemnitee for the amount claimed. In making a determination with respect to entitlement to indemnification hereunder, the person or persons or entity making such determination shall presume that Indemnitee is entitled to indemnification under this Agreement and the Company shall have the burden of proof to overcome that presumption with clear and convincing evidence to the contrary. The termination of any Proceeding by judgment, order, settlement, conviction, or upon a plea of *nolo contendere* or its equivalent, shall not, of itself, create a presumption that Indemnitee did not act in good faith and in a manner which Indemnitee reasonably believed to be in or not opposed to the best interests of the Company, or, in the case of a criminal Proceeding, that Indemnitee had reasonable cause to believe that Indemnitee's conduct was unlawful. In addition, it is the parties' intention that if the Company contests Indemnitee's right to indemnification, the question of Indemnitee's right to indemnification shall

be for the court to decide, and neither the failure of the Company (including its Board of Directors, any committee or subgroup of the Board of Directors, independent legal counsel, or its stockholders) to have made a determination that indemnification of Indemnitee is proper in the circumstances because Indemnitee has met the applicable standard of conduct required by applicable law, nor an actual determination by the Company (including its Board of Directors, any committee or subgroup of the Board of Directors, independent legal counsel, or its stockholders) that Indemnitee has not met such applicable standard of conduct, shall create a presumption that Indemnitee has or has not met the applicable standard of conduct. If any requested determination with respect to entitlement to indemnification hereunder has not been made within ninety (90) days after the final disposition of the Proceeding, the requisite determination that Indemnitee is entitled to indemnification shall be deemed to have been made.

(iii) **Change of Control.** Notwithstanding any other provision in this Agreement, if a Change of Control has occurred, any person or body appointed by the Board of Directors in accordance with applicable law to review the Company's obligations hereunder and under applicable law shall be Independent Counsel selected by Indemnitee and approved by the Company (which approval shall not be unreasonably withheld). Such counsel, among other things, will render its written opinion to the Company and Indemnitee as to whether and to what extent Indemnitee would be entitled to be indemnified hereunder under applicable law and the Company agrees to abide by such opinion. The Company agrees to pay the reasonable fees of the Independent Counsel referred to above and to indemnify fully such counsel against any and all expenses (including attorneys' fees), claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto. Notwithstanding any other provision of this Agreement, the Company shall not be required to pay Expenses of more than one Independent Counsel in connection with all matters concerning a single Indemnitee, and such Independent Counsel shall be the Independent Counsel for any or all other Indemnitees unless (i) the Company otherwise determines or (ii) any Indemnitee shall provide a written statement setting forth in detail a reasonable objection to such Independent Counsel representing other indemnitees under agreements similar to this Agreement.

(d) **Payment Directions.** To the extent payments are required to be made hereunder, the Company shall, in accordance with Indemnitee's request (but without duplication), (i) pay such Expenses on behalf of Indemnitee, (b) advance to Indemnitee funds in an amount sufficient to pay such Expenses, or (c) reimburse Indemnitee for such Expenses.

(e) **Notice to Insurers.** If, at the time of the receipt of a notice of a claim pursuant to Section 2(b) hereof, the Company has director and officer liability insurance in effect, the Company shall give prompt notice of the commencement of such Proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such Proceeding in accordance with the terms of such policies. The Company shall provide to Indemnitee: (i) copies of all potentially applicable directors' and officers' liability insurance policies, (ii) a copy of such notice delivered to the applicable insurers, and (iii) copies of all subsequent correspondence between the Company and such insurers regarding the Proceeding, in each case substantially concurrently with the delivery or receipt thereof by the Company.

(f) **Defense of Claim and Selection of Counsel.** In the event the Company shall be obligated under Section 2(a) hereof to advance Expenses with respect to any Proceeding, the Company, if appropriate, shall be entitled to assume the defense of such Proceeding, with counsel reasonably acceptable to Indemnitee, upon the delivery to Indemnitee of written notice of its election so to do, and upon Indemnitee providing signed, written consent to such assumption, which shall not be unreasonably withheld. After delivery of such notice, approval of such counsel by Indemnitee and the retention of such counsel by the Company, the Company will not be liable to Indemnitee under this Agreement for any fees of counsel subsequently incurred by Indemnitee with respect to the same Proceeding, provided that (i) Indemnitee shall have the right to employ counsel in any such Proceeding at Indemnitee's expense; and (ii) if (A) the employment of counsel by Indemnitee has been previously authorized by the Company, (B) Indemnitee shall have reasonably concluded that there may be a conflict of interest between the Company and Indemnitee in the conduct of any such defense or (C) the Company shall not, in fact, have employed counsel to assume the defense of such Proceeding, then the fees and expenses of Indemnitee's counsel shall be at the expense of the Company. In addition, if there exists a potential, but not an actual conflict of interest between the Company and Indemnitee, the actual and reasonable legal fees and expenses incurred by Indemnitee for separate counsel retained by Indemnitee to monitor the Proceeding (so that such counsel may assume Indemnitee's defense if the conflict of interest between the Company and Indemnitee becomes an actual conflict of interest) shall be deemed to be Expenses that are subject to indemnification hereunder. The existence of an actual or potential conflict of interest, and whether such conflict may be waived, shall be determined pursuant to the rules of attorney professional conduct and applicable law. The Company shall not be required to obtain the consent of Indemnitee for the settlement of any Proceeding the Company has undertaken to defend if the Company assumes full and sole responsibility for each such settlement; provided, however, that the Company shall be required to obtain Indemnitee's prior written approval, which shall not be unreasonably withheld, before entering into any settlement which (1) does not grant Indemnitee a complete release of liability, (2) would impose any penalty or limitation on Indemnitee, or (3) would admit any liability or misconduct by Indemnitee.

3. **Additional Indemnification Rights.**

(a) **Scope.** Notwithstanding any other provision of this Agreement, the Company hereby agrees to indemnify Indemnitee to the fullest extent permitted by law, notwithstanding that such indemnification is not specifically authorized by the other provisions of this Agreement, the Company's Certificate of Incorporation, the Company's Bylaws or by statute. In the event of any change, after the date of this Agreement, in any applicable law, statute, or rule which expands the right of a Delaware corporation to indemnify a member of its board of directors or an officer, such changes shall be deemed to be within the purview of Indemnitee's rights and the Company's obligations under this Agreement. In the event of any change in any applicable law, statute or rule which narrows the right of a Delaware corporation to indemnify a member of its board of directors or an officer, such changes, to the extent not otherwise required by such law, statute or rule to be applied to this Agreement shall have no effect on this Agreement or the parties' rights and obligations hereunder.

(b) **Nonexclusivity.** The indemnification provided by this Agreement shall not be deemed exclusive of any rights to which Indemnitee may be entitled under the Company's Certificate of Incorporation, its Bylaws, any agreement, any vote of stockholders or disinterested members of the Company's Board of Directors, the Delaware General Corporation Law, or otherwise, both as to action in Indemnitee's official capacity and as to action in another capacity while holding such office.

(c) **Interest on Unpaid Amounts.** If any payment to be made by the Company to Indemnitee hereunder is delayed by more than ninety (90) days from the date the duly prepared request for such payment is received by the Company, interest shall be paid by the Company to Indemnitee at the legal rate under Delaware law for amounts which the Company indemnifies or is obligated to indemnify for the period commencing with the date on which Indemnitee actually incurs such Expense or pays such judgment, fine or amount in settlement and ending with the date on which such payment is made to Indemnitee by the Company.

(d) **Third-Party Indemnification.** The Company hereby acknowledges that Indemnitee has or may from time to time obtain certain rights to indemnification, advancement of expenses and/or insurance provided by one or more third parties (collectively, the "Third-Party Indemnitors"). The Company hereby agrees that it is the indemnitor of first resort (*i.e.*, its obligations to Indemnitee are primary and any obligation of the Third-Party Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by Indemnitee are secondary), and that the Company will not assert that the Indemnitee must seek expense advancement or reimbursement, or indemnification, from any Third-Party Indemnitor before the Company must perform its expense advancement and reimbursement, and indemnification obligations, under this Agreement. No advancement or payment by the Third-Party Indemnitors on behalf of Indemnitee with respect to any claim for which Indemnitee has sought indemnification from the Company shall affect the foregoing. The Third-Party Indemnitors shall be subrogated to the extent of such advancement or payment to all of the rights of recovery which Indemnitee would have had against the Company if the Third-Party Indemnitors had not advanced or paid any amount to or on behalf of Indemnitee. If for any reason a court of competent jurisdiction determines that the Third-Party Indemnitors are not entitled to the subrogation rights described in the preceding sentence, the Third-Party Indemnitors shall have a right of contribution by the Company to the Third-Party Indemnitors with respect to any advance or payment by the Third-Party Indemnitors to or on behalf of the Indemnitee.

4. **Partial Indemnification.** If Indemnitee is entitled under any provision of this Agreement to indemnification by the Company for some or a portion of the Expenses, judgments, fines or amounts paid in settlement, actually and reasonably incurred in connection with a Proceeding, but not, however, for the total amount thereof, the Company shall nevertheless indemnify Indemnitee for the portion of such Expenses, judgments, fines and amounts paid in settlement to which Indemnitee is entitled.

5. **Director and Officer Liability Insurance.**

(a) **D&O Policy.** The Company shall, from time to time, make the good faith determination whether or not it is practicable for the Company to obtain and maintain a policy or policies of insurance with reputable insurance companies providing the directors and officers of the Company with coverage for losses from wrongful acts, or to ensure the Company's

performance of its indemnification obligations under this Agreement. Among other considerations, the Company will weigh the costs of obtaining such insurance coverage against the protection afforded by such coverage. In all policies of director and officer liability insurance, Indemnitee shall be named as an insured in such a manner as to provide Indemnitee the same rights and benefits as are accorded to the most favorably insured of the Company's directors, if Indemnitee is a director; or of the Company's officers, if Indemnitee is not a director of the Company but is an officer; or of the Company's key employees, if Indemnitee is not an officer or director but is a key employee. Notwithstanding the foregoing, the Company shall have no obligation to obtain or maintain such insurance if the Company determines in good faith that such insurance is not reasonably available, if the premium costs for such insurance are disproportionate to the amount of coverage provided, if the coverage provided by such insurance is limited by exclusions so as to provide an insufficient benefit, or if Indemnitee is covered by similar insurance maintained by a parent or subsidiary of the Company.

(b) **Tail Coverage.** In the event of a Change of Control or the Company's becoming insolvent (including being placed into receivership or entering the federal bankruptcy process and the like), the Company shall maintain in force any and all insurance policies then maintained by the Company in providing insurance (directors' and officers' liability, fiduciary, employment practices or otherwise) in respect of Indemnitee, for a period of six years thereafter.

6. **Severability.** Nothing in this Agreement is intended to require or shall be construed as requiring the Company to do or fail to do any act in violation of applicable law. The Company's inability, pursuant to court order, to perform its obligations under this Agreement shall not constitute a breach of this Agreement. If this Agreement or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the Company shall nevertheless indemnify Indemnitee to the full extent permitted by any applicable portion of this Agreement that shall not have been invalidated, and the balance of this Agreement not so invalidated shall be enforceable in accordance with its terms.

7. **Exclusions.** Any other provision herein to the contrary notwithstanding, the Company shall not be obligated pursuant to the terms of this Agreement:

(a) **Claims Initiated by Indemnitee.** To indemnify or advance Expenses to Indemnitee with respect to Proceedings initiated or brought voluntarily by Indemnitee and not by way of defense, except with respect to Proceedings brought to establish, enforce or interpret a right to indemnification under this Agreement or any other statute or law or otherwise as required under Section 145 of the Delaware General Corporation Law, but such indemnification or advancement of Expenses may be provided by the Company in specific cases if the Board of Directors finds it to be appropriate; provided, however, that the exclusion set forth in the first clause of this subsection shall not be deemed to apply to any investigation initiated or brought by Indemnitee to the extent reasonably necessary or advisable in support of Indemnitee's defense of a Proceeding to which Indemnitee was, is or is threatened to be made, a party;

(b) **Lack of Good Faith.** To indemnify Indemnitee for any Expenses incurred by Indemnitee with respect to any Proceeding instituted by Indemnitee to establish, enforce or interpret a right to indemnification under this Agreement or any other statute or law or otherwise as required under Section 145 of the Delaware General Corporation Law, if a court of competent jurisdiction determines that each of the material assertions made by Indemnitee in such proceeding was not made in good faith or was frivolous;

(c) **Unlawful Payments.** To indemnify Indemnitee for Expenses to the extent it is determined by a final court order or judgment by a court of competent jurisdiction, to which all rights of appeal have either lapsed or been exhausted, that such indemnification is unlawful;

(d) **Certain Conduct.** To indemnify Indemnitee for Expenses on account of Indemnitee's conduct that is established by a final court order or judgment by a court of competent jurisdiction, to which all rights of appeal have either lapsed or been exhausted, as knowingly fraudulent;

(e) **Insured Claims.** To indemnify Indemnitee for Expenses to the extent such Expenses have been paid directly to Indemnitee by an insurance carrier under an insurance policy maintained by the Company; or

(f) **Certain Exchange Act Claims.** To indemnify Indemnitee in connection with any claim made against Indemnitee for (i) an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the Company within the meaning of Section 16(b) of the Exchange Act or any similar successor statute or any similar provisions of state statutory law or common law, or (ii) any reimbursement of the Company by Indemnitee of any bonus or other incentive-based or equity-based compensation or of any profits realized by Indemnitee from the sale of securities of the Company, as required in each case under the Exchange Act (including any such reimbursements that arise from an accounting restatement of the Company pursuant to Section 304 of the Sarbanes-Oxley Act of 2002 (the "Sarbanes-Oxley Act") or Section 954 of the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the payment to the Company of profits arising from the purchase and sale by Indemnitee of securities in violation of Section 306 of the Sarbanes-Oxley Act); provided, however, that to the fullest extent permitted by applicable law and to the extent Indemnitee is successful on the merits or otherwise with respect to any such Proceeding, the Expenses actually and reasonably incurred by Indemnitee in connection with any such Proceeding shall be deemed to be Expenses that are subject to indemnification hereunder.

8. Contribution Claims.

(a) If the indemnification provided in Section 1 is unavailable in whole or in part and may not be paid to Indemnitee for any reason other than those set forth in Section 7, then in respect to any Proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such Proceeding), to the fullest extent permitted by applicable law, the Company, in lieu of indemnifying Indemnitee, shall pay, in the first instance, the entire amount incurred by Indemnitee, whether for Expenses, judgments, fines or amounts paid in settlement, in connection with any Proceeding without requiring Indemnitee to contribute to such payment, and the Company hereby waives and relinquishes any right of contribution it may have at any time against Indemnitee.

(b) Without diminishing or impairing the obligations of the Company set forth in the preceding Section 8(a), if, for any reason, Indemnitee shall elect or be required to pay all or any portion of any Expenses, judgment or settlement in any Proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such Proceeding), the Company shall contribute to the amount of Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred and paid or payable by Indemnitee in proportion to the relative benefits received by the Company and all officers, directors or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such Proceeding), on the one hand, and Indemnitee, on the other hand, from the transaction or events from which such Proceeding arose; provided, however, that the proportion determined on the basis of relative benefit may, to the extent necessary to conform to law, be further adjusted by reference to the relative fault of the Company and all officers, directors or employees of the Company other than Indemnitee who are jointly liable with Indemnitee (or would be if joined in such Proceeding), on the one hand, and Indemnitee, on the other hand, in connection with the transaction or events that resulted in such Expenses, judgments, fines or settlement amounts, as well as any other equitable considerations which applicable law may require to be considered. The relative fault of the Company and all officers, directors or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such Proceeding), on the one hand, and Indemnitee, on the other hand, shall be determined by reference to, among other things, the degree to which their actions were motivated by intent to gain personal profit or advantage, the degree to which their liability is primary or secondary and the degree to which their conduct is active or passive.

(c) With respect to a Proceeding brought against directors, officers, employees or agents of the Company (other than Indemnitee), to the fullest extent permitted by applicable law, the Company shall indemnify Indemnitee from any claims for contribution that may be brought by any such directors, officers, employees or agents of the Company (other than Indemnitee) who may be jointly liable with Indemnitee, to the same extent Indemnitee would have been entitled to such indemnification under this Agreement if such Proceeding had been brought against Indemnitee.

9. **No Imputation.** The knowledge and/or actions, or failure to act, of any director, officer, agent or employee of the Company or the Company itself shall not be imputed to Indemnitee for purposes of determining any rights under this Agreement.

10. **Determination of Good Faith.** For purposes of any determination of good faith, Indemnitee shall be deemed to have acted in good faith if Indemnitee's action is based on the records or books of account of the Enterprise, including financial statements, or on information supplied to Indemnitee by the officers of the Enterprise in the course of their duties, or on the advice of legal counsel for the Enterprise or the Board of Directors of the Enterprise or any counsel selected by any committee of the Board of Directors of the Enterprise or on information or records given or reports made to the Enterprise by an independent certified public accountant or by an appraiser, investment banker, compensation consultant, or other expert selected with reasonable care by the Enterprise or the Board of Directors of the Enterprise or any committee thereof. The provisions of this Section 10 shall not be deemed to be exclusive or to limit in any way the other circumstances in which the Indemnitee may be deemed to have met the applicable standard of conduct. Whether or not the foregoing provisions of this Section are satisfied, it shall in any event be presumed that Indemnitee has at all times acted in good faith and in a manner Indemnitee reasonably believed to be in or not opposed to the best interests of the Company.

11. **Defined Terms and Phrases.** For purposes of this Agreement, the following terms shall have the following meanings:

(a) “**Beneficial Owner**” and “**Beneficial Ownership**” shall have the meanings set forth in Rule 13d-3 promulgated under the Exchange Act as in effect on the date hereof.

(b) “**Change of Control**” shall be deemed to occur upon the earliest of any of the following events:

(i) **Acquisition of Stock by Third Party.** Any Person is or becomes the Beneficial Owner, directly or indirectly, of securities of the Company representing 15% or more of the combined voting power of the Company’s then outstanding securities entitled to vote generally in the election of directors, unless (1) the change in the relative Beneficial Ownership of the Company’s securities by any Person results solely from a reduction in the aggregate number of outstanding shares of securities entitled to vote generally in the election of directors, or (2) such acquisition was approved in advance by the Continuing Directors and such acquisition would not constitute a Change of Control under part (iii) of this definition.

(ii) **Change in Board of Directors.** Individuals who, as of the date of this Agreement, constitute the Company’s Board of Directors (the “**Board**”), and any new director whose election by the Board or nomination for election by the Company’s stockholders was approved by a vote of at least two thirds of the directors then still in office who were directors on the date of this Agreement (collectively, the “**Continuing Directors**”), cease for any reason to constitute at least a majority of the members of the Board.

(iii) **Corporate Transaction.** The effective date of a reorganization, merger, or consolidation of the Company (a “**Business Combination**”), in each case, unless, following such Business Combination: (1) all or substantially all of the individuals and entities who were the Beneficial Owners of securities entitled to vote generally in the election of directors immediately prior to such Business Combination beneficially own, directly or indirectly, more than 51% of the combined voting power of the then outstanding securities of the Company entitled to vote generally in the election of directors resulting from such Business Combination (including a corporation which as a result of such transaction owns the Company or all or substantially all of the Company’s assets either directly or through one or more subsidiaries) in substantially the same proportions as their ownership, immediately prior to such Business Combination, of the securities entitled to vote generally in the election of directors and with the power to elect at least a majority of the Board or other governing body of the surviving entity; (2) no Person (excluding any corporation resulting from such Business Combination) is the Beneficial Owner, directly or indirectly, of 15% or more of the combined voting power of the then outstanding securities entitled to vote generally in the election of directors of such corporation except to the extent that such ownership existed prior to the Business Combination; and (3) at least a majority of the Board of Directors of the corporation resulting from such Business Combination were Continuing Directors at the time of the execution of the initial agreement, or of the action of the Board of Directors, providing for such Business Combination.

(iv) Liquidation. The approval by the Company's stockholders of a complete liquidation of the Company or an agreement or series of agreements for the sale or disposition by the Company of all or substantially all of the Company's assets, other than factoring the Company's current receivables or escrows due (or, if such approval is not required, the decision by the Board to proceed with such a liquidation, sale or disposition in one transaction or a series of related transactions).

(v) Other Events. There occurs any other event of a nature that would be required to be reported in response to Item 6(e) of Schedule 14A of Regulation 14A (or a response to any similar item or any similar schedule or form) promulgated under the Exchange Act whether or not the Company is then subject to such reporting requirement.

(c) "Company" shall include, in addition to the resulting corporation, any constituent corporation (including any constituent of a constituent) absorbed in a consolidation or merger which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers, and employees or agents, so that if Indemnitee is or was a director, officer, employee or agent of such constituent corporation, or is or was serving at the request of such constituent corporation as a director, officer, trustee, general partner, managing member, fiduciary, employee or agent of any other enterprise, Indemnitee shall stand in the same position under the provisions of this Agreement with respect to the resulting or surviving corporation as Indemnitee would have with respect to such constituent corporation if its separate existence had continued.

(d) "Enterprise" means the Company and any other enterprise that Indemnitee was or is serving at the request of the Company as a director, officer, partner (general, limited or otherwise), member (managing or otherwise), trustee, fiduciary, employee or agent.

(e) "Exchange Act" means the Securities Exchange Act of 1934, as amended.

(f) "Expenses" shall include all direct and indirect costs, fees and expenses of any type or nature whatsoever, including all attorneys' fees and costs, retainers, court costs, transcript costs, fees of experts, witness fees, travel expenses, fees of private investigators and professional advisors, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, any federal, state, local or foreign taxes imposed on Indemnitee as a result of the actual or deemed receipt of any payment under this Agreement (including taxes that may be imposed upon the actual or deemed receipt of payments under this Agreement with respect to the imposition of federal, state, local or foreign taxes), fax transmission charges, secretarial services and all other disbursements, obligations or expenses in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, settlement or appeal of, or otherwise participating in a Proceeding. Expenses also shall include any of the forgoing expenses incurred in connection with any appeal resulting from any Proceeding, including the principal, premium, security for, and other costs relating to any costs bond, supersedes bond, or other appeal bond or its equivalent. Expenses also shall include any interest, assessment or other charges imposed thereon and costs incurred in preparing statements in support of payment requests hereunder. Expenses, however, shall not include amounts paid in settlement by Indemnitee or the amount of judgments or fines against Indemnitee.

(g) “Independent Counsel” means an attorney or firm of attorneys, selected in accordance with the provisions of Section 2(c)(iii), who will not have otherwise performed services for the Company or Indemnitee within the last three years (other than with respect to matters concerning the rights of Indemnitee under this Agreement, or of other indemnitees under similar indemnity agreements).

(h) “Person” shall have the meaning as set forth in Section 13(d) and 14(d) of the Exchange Act as in effect on the date hereof; provided, however, that “Person” shall exclude: (i) the Company; (ii) any direct or indirect majority owned subsidiaries of the Company; (iii) any employee benefit plan of the Company or any direct or indirect majority owned subsidiaries of the Company or of any corporation owned, directly or indirectly, by the Company’s stockholders in substantially the same proportions as their ownership of stock of the Company (an “Employee Benefit Plan”); and (iv) any trustee or other fiduciary holding securities under an Employee Benefit Plan.

(i) “Proceeding” shall include any actual, threatened, pending or completed action, suit, arbitration, mediation, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought by a third party, a government agency, the Company or its Board of Directors or a committee thereof, whether in the right of the Company or otherwise and whether of a civil (including intentional or unintentional tort claims), criminal, administrative, legislative or investigative (formal or informal) nature, including any appeal therefrom, in which Indemnitee was, is, will or might be involved as a party, potential party, non-party witness or otherwise by reason of the fact that Indemnitee is or was a director, officer, employee or agent of the Company, by reason of any action (or failure to act) taken by Indemnitee or of any action (or failure to act) on Indemnitee’s part while acting as a director, officer, employee or agent of the Company, or by reason of the fact that Indemnitee is or was serving at the request of the Company as a director, officer, partner (general, limited or otherwise), member (managing or otherwise), trustee, fiduciary, employee or agent of any other enterprise, in each case whether or not serving in such capacity at the time any liability or expense is incurred for which indemnification, reimbursement or advancement of expenses can be provided under this Agreement.

(j) In addition, references to “other enterprise” shall include another corporation, partnership, limited liability company, joint venture, trust, employee benefit plan or any other enterprise; references to “fines” shall include any excise taxes assessed on Indemnitee with respect to an employee benefit plan; references to “serving at the request of the Company” shall include any service as a director, officer, employee or agent of the Company which imposes duties on, or involves services by Indemnitee with respect to an employee benefit plan, its participants, or beneficiaries; and if Indemnitee acted in good faith and in a manner Indemnitee reasonably believed to be in the interest of the participants and beneficiaries of an employee benefit plan, Indemnitee shall be deemed to have acted in a manner “not opposed to the best interests of the Company” as referred to in this Agreement; references to “include” or “including” shall mean include or including, without limitation; and references to Sections, paragraphs or clauses are to Sections, paragraphs or clauses in this Agreement unless otherwise specified.

12. **Attorneys' Fees.** In the event that any Proceeding is instituted by Indemnitee under this Agreement to enforce or interpret any of the terms hereof, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee in connection with such Proceeding, unless a court of competent jurisdiction determines that each of the material assertions made by Indemnitee as a basis for such Proceeding were not made in good faith or were frivolous. In the event of a Proceeding instituted by or in the name of the Company under this Agreement or to enforce or interpret any of the terms of this Agreement, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee in connection with such Proceeding (including with respect to Indemnitee's counterclaims and cross-claims made in such action), unless a court of competent jurisdiction determines that each of Indemnitee's material defenses to such action were made in bad faith or were frivolous.

13. **Miscellaneous.**

(a) **Governing Law.** The validity, interpretation, construction and performance of this Agreement, and all acts and transactions pursuant hereto and the rights and obligations of the parties hereto shall be governed, construed and interpreted in accordance with the laws of the state of Delaware, without giving effect to principles of conflicts of law.

(b) **Entire Agreement; Binding Effect.** Without limiting any of the rights of Indemnitee described in Section 3(b), this Agreement sets forth the entire agreement and understanding of the parties relating to the subject matter herein and merges all prior discussions and supersedes any and all previous agreements between them covering the subject matter herein. The indemnification provided under this Agreement applies with respect to events occurring before or after the effective date of this Agreement, and shall continue to apply even after Indemnitee has ceased to serve the Company in any and all indemnified capacities.

(c) **Amendments and Waivers.** No modification of or amendment to this Agreement, nor any waiver of any rights under this Agreement, shall be effective unless in writing signed by the parties to this Agreement. No delay or failure to require performance of any provision of this Agreement shall constitute a waiver of that provision as to that or any other instance.

(d) **Successors and Assigns.** This Agreement shall be binding upon the Company and its successors (including any direct or indirect successor by purchase, merger, consolidation or otherwise to all or substantially all of the business and/or assets of the Company) and assigns, and inure to the benefit of Indemnitee and Indemnitee's heirs, executors, administrators, legal representatives and assigns. The Company shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company, by written agreement in form and substance satisfactory to Indemnitee, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place.

(e) **Notices.** Any notice, demand or request required or permitted to be given under this Agreement shall be in writing and shall be deemed sufficient when delivered personally or by overnight courier or sent by email, or 48 hours after being deposited in the U.S. mail as certified or registered mail with postage prepaid, addressed to the party to be notified at such party's address as set forth on the signature page, as subsequently modified by written notice, or if no address is specified on the signature page, at the most recent address set forth in the Company's books and records.

(f) **Severability.** If one or more provisions of this Agreement are held to be unenforceable under applicable law, the parties agree to renegotiate such provision in good faith. In the event that the parties cannot reach a mutually agreeable and enforceable replacement for such provision, then (i) such provision shall be excluded from this Agreement, (ii) the balance of the Agreement shall be interpreted as if such provision were so excluded and (iii) the balance of the Agreement shall be enforceable in accordance with its terms.

(g) **Construction.** This Agreement is the result of negotiations between and has been reviewed by each of the parties hereto and their respective counsel, if any; accordingly, this Agreement shall be deemed to be the product of all of the parties hereto, and no ambiguity shall be construed in favor of or against any one of the parties hereto.

(h) **Counterparts.** This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be deemed an original, and all of which together shall constitute one and the same agreement. Execution of a facsimile or scanned copy will have the same force and effect as execution of an original, and a facsimile or scanned signature will be deemed an original and valid signature.

(i) **No Employment Rights.** Nothing contained in this Agreement is intended to create in Indemnitee any right to continued employment.

(j) **Company Position.** The Company shall be precluded from asserting, in any Proceeding brought for purposes of establishing, enforcing or interpreting any right to indemnification under this Agreement, that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court that the Company is bound by all the provisions of this Agreement and is precluded from making any assertion to the contrary.

(k) **Subrogation.** Subject to Section 3(d), in the event of payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee, who shall execute all documents required and shall do all acts that may be necessary to secure such rights and to enable the Company to effectively bring suit to enforce such rights.

[Signature Page Follows]

The parties have executed this Indemnification Agreement as of the date first set forth above.

THE COMPANY:

TWIST BIOSCIENCE CORPORATION

By: _____
(Signature)

Name: _____
Title: _____

Address:
455 Mission Bay Blvd South
San Francisco, CA 94158
United States

AGREED TO AND ACCEPTED:

INDEMNITEE:

(PRINT NAME)

(Signature)

Address:

Email: _____

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the use in this Registration Statement on Form S-1 of Twist Bioscience Corporation of our report dated February 8, 2018, except for the effects of the change in the manner in which the Company accounts for revenue from contracts with customers as discussed in Note 2 to the consolidated financial statements, as to which the date is September 11, 2018, and except for the effects of the reverse stock split as discussed in Note 2 to the consolidated financial statements, as to which the date is October 17, 2018 relating to the financial statements of Twist Bioscience Corporation, which appears in this Registration Statement. We also consent to the reference to us under the heading “Experts” in such Registration Statement.

/s/ PricewaterhouseCoopers LLP

San Jose, California

October 17, 2018