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

FORM 10-K/A

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended September 30, 2022

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission File Number: 001-38720

Twist Bioscience Corporation
(Exact Name of Registrant as Specified in its Charter)

Delaware	**46-2058888**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

681 Gateway Blvd, South San Francisco, CA 94080
(Address of principal executive offices and zip code)

(800) 719-0671
(Registrant's telephone number, including area code)

Securities Registered Pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock	**TWST**	**The Nasdaq Global Select Market**

Securities Registered Pursuant to Section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes ☒ No ☐

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 Exchange Act. (Check one):

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Small 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 pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☒

As of March 31, 2022, the aggregate market value of shares of common stock held by non-affiliates of the registrant was approximately $2.39 billion based upon the closing sale price on the Nasdaq Global Select Market reported for such date. Shares of Common Stock held by each officer and director and by each person who owns 10% or more of the outstanding Common Stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The number of shares of the Registrant's common stock outstanding as of November 23, 2022, was 56,568,420.

DOCUMENTS INCORPORATED BY REFERENCE

None.

EXPLANATORY NOTE

This amendment (this “Amendment No. 1) on Form 10-K/A amends the Annual Report on Form 10-K for the year ended September 30, 2022 (the “Original Form 10-K”) of Twist Bioscience Corporation (the “Company”) solely to correct typographical errors related to the date on the audit opinion of the Company’s previous independent registered public accounting firm, PricewaterhouseCoopers LLP, contained in Part II, Item 8 of the Original Form 10-K from November 28, 2022 to November 22, 2021, and the typeset signature of PricewaterhouseCoopers LLP on such opinion.

In accordance with Rule 12b-15 (“Rule 12b-15”) under the Securities Exchange Act of 1934, as amended, the Company has included the entire text of Part II, Item 8 “Financial Statements and Supplementary Data” in this Amendment No. 1. However, there have been no changes made to the text of such item other than the corrections stated in the immediately preceding paragraph. In addition, the Company is including in this Amendment No. 1 new certifications of its (i) Chief Executive Officer and (ii) Chief Financial Officer, as required by Rule 12b-15, as Exhibits 31.3, 31.4, 32.3 and 32.4, respectively, and currently dated consents from the independent registered public accounting firms as Exhibits 23.3 and 23.4.

Except as expressly set forth above, this Amendment No. 1 speaks as of the filing date of the Original Form 10-K, and does not reflect events that may have occurred subsequent to that date, nor does it modify or update in any way disclosure made in the Original Form 10-K.

TWIST BIOSCIENCE CORPORATION
AMENDMENT NO. 1 TO ANNUAL REPORT ON FORM 10-K/A
FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 2022

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PART II

Item 8. ***Consolidated financial statements and supplementary data***

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Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors of Twist Bioscience Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Twist Bioscience Corporation (the Company) as of September 30, 2022, the related consolidated statements of operations and comprehensive loss, stockholders' equity and cash flows for the year then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at September 30, 2022, and the results of its operations and its cash flows for the year then ended, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of September 30, 2022, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated November 28, 2022 expressed an adverse opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audit included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

	Valuation of intangible assets acquired in a business combination
Description of the Matter	As described in Note 14, on December 1, 2021, the Company acquired all of the outstanding stock of AbX Biologics, Inc. (“Abveris”), which was accounted for as a business combination using the acquisition method of accounting. The acquired intangible assets principally consisted of developed technology and customer relationships, which had estimated acquisition-date fair values of $30.9 million and $14.7 million, respectively. Auditing the acquisition date fair values of the acquired developed technology and customer relationships was complex due to the significant judgment required in estimating their fair values. In particular, the fair value estimates required the use of valuation methodologies that were sensitive to significant assumptions (e.g., projected revenue growth rates, including forecasted selling prices and unit volumes, and discount rates applied to each intangible asset), which were affected by expected future market or economic conditions.
How We Addressed the Matter in Our Audit	We tested controls that address the risks of material misstatement relating to the valuation of the intangible assets which were primarily comprised of developed technology and customer relationships. For example, we tested controls over management’s review of the significant assumptions, such as the acquired business’s projected revenue growth rates, including forecasted selling prices and unit volumes, and the discount rate applied to each intangible asset. To test the estimated fair value of the acquired developed technology and customer relationship intangible assets, our audit procedures included, among others, assessing the appropriateness of the valuation methodologies and testing the significant assumptions discussed above and the completeness and accuracy of the underlying data used by the Company. For example, we evaluated the reasonableness of assumptions used to determine the projected revenue growth rates by comparing the forecasted assumptions to historical performance, projected industry growth rates, and other factors considered by management in developing the model. We involved our valuation specialist to assist in evaluating the valuation methodologies and discount rates used to value the developed technology and customer relationships. We also performed sensitivity analyses to evaluate the changes in the fair value of the acquired developed technology and customer relationship intangible assets that would result from changes in the significant assumptions.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2022.
San Mateo, California
November 28, 2022

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Twist Bioscience Corporation

Opinion on the Financial Statements

We have audited the consolidated balance sheet of Twist Bioscience Corporation and its subsidiaries (the "Company") as of September 30, 2021, and the related consolidated statements of operations and comprehensive loss, of redeemable convertible preferred stock and stockholders' equity and of cash flows for each of the two years in the period ended September 30, 2021, including the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of September 30, 2021, and the results of its operations and its cash flows for each of the two years in the period ended September 30, 2021 in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits of these consolidated financial statements in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP
San Jose, California
November 22, 2021

We served as the Company's auditor from 2015 to 2021.

Twist Bioscience Corporation
Consolidated Balance Sheets

(In thousands except per share data)	September 30, 2022	September 30, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 378,687	$ 465,829
Short-term investments	126,281	12,034
Accounts receivable, net	40,294	28,549
Inventories	39,307	31,800
Prepaid expenses and other current assets	11,914	8,283
Total current assets	$ 596,483	$ 546,495
Property and equipment, net	139,441	44,122
Operating lease right-of-use assets	74,948	61,580
Goodwill	85,811	22,434
Intangible assets, net	59,738	18,262
Restricted cash, non-current	1,572	1,530
Other non-current assets	3,385	7,674
Total assets	$ 961,378	$ 702,097
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 20,092	$ 14,900
Accrued expenses	10,169	6,437
Accrued compensation	27,023	22,327
Current portion of operating lease liability	13,642	8,213
Current portion of long-term debt	—	1,552
Other current liabilities	19,737	9,623
Total current liabilities	$ 90,663	$ 63,052
Operating lease liability, net of current portion	81,270	53,156
Other non-current liabilities	60	5,068
Total liabilities	$ 171,993	$ 121,276
Commitments and contingencies (Note 7)		
Stockholders' equity		
Common stock, $0.00001 par value — 100,000 and 100,000 shares authorized at September 30, 2022 and 2021, respectively; 56,523 and 49,499 shares issued and outstanding at September 30, 2022 and 2021, respectively	$ —	$ —
Additional paid-in capital	1,619,644	1,190,828
Accumulated other comprehensive (loss)/income	(1,843)	546
Accumulated deficit	(828,416)	(610,553)
Total stockholders' equity	$ 789,385	$ 580,821
Total liabilities and stockholders' equity	$ 961,378	$ 702,097

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 per share data)	Year ended September 30, 2022	2021	2020
Revenues	$ 203,565	$ 132,333	$ 90,100
Operating expenses:			
Cost of revenues	$ 119,330	$ 80,620	$ 61,406
Research and development	120,307	69,072	43,006
Selling, general and administrative	212,949	135,901	103,267
Change in fair value of contingent considerations and holdbacks	(14,245)	(534)	—
Litigation settlement	—	—	22,500
Total operating expenses	$ 438,341	$ 285,059	$ 230,179
Loss from operations	$ (234,776)	$ (152,726)	$ (140,079)
Interest income	3,062	435	1,499
Interest expense	(80)	(367)	(787)
Gain on deconsolidation of subsidiary	4,607	—	—
Other income (expense), net	(1,087)	(1,370)	(182)
Loss before income taxes	$ (228,274)	$ (154,028)	$ (139,549)
Benefit from (provision for) income taxes	10,411	1,930	(382)
Net loss attributable to common stockholders	$ (217,863)	$ (152,098)	$ (139,931)
Other comprehensive loss:			
Change in unrealized gain (loss) on investments	$ (1,594)	$ (14)	$ (34)
Foreign currency translation adjustment	(795)	473	(60)
Comprehensive loss	$ (220,252)	$ (151,639)	$ (140,025)
Net loss per share attributable to common stockholders—basic and diluted	$ (4.04)	$ (3.15)	$ (3.57)
Weighted average shares used in computing net loss per share attributable to common stockholders—basic and diluted	53,885	48,251	39,190

The accompanying notes are an integral part of these consolidated financial statements.

Twist Bioscience Corporation
Consolidated Statements of Stockholders' Equity

(In thousands)	Common stock Shares	Common stock Amount	Additional paid-in capital	Accumulated other comprehensive income	Accumulated deficit	Total stockholders' equity
Balances as of September 30, 2019	32,873	$ —	$ 470,425	$ 181	$ (318,524)	$ 152,082
Issuance of common stock in public offerings, net of underwriting discounts, commissions and offering expenses of $18,916	11,064	—	295,563	—	—	295,563
Vesting of restricted stock units	178	—	—	—	—	—
Issuance of shares under the employee stock purchase plan	126	—	3,428	—	—	3,428
Exercise of stock options	915	—	10,539	—	—	10,539
Repurchase of early exercised stock options	(2)	—	—	—	—	—
Stock-based compensation	—	—	17,096	—	—	17,096
Other comprehensive loss	—	—	—	(94)	—	(94)
Repurchase of common stock for income tax withholdings	(71)	—	(2,421)	—	—	(2,421)
Net loss	—	—	—	—	(139,931)	(139,931)
Balances as of September 30, 2020	45,083	$ —	$ 794,630	$ 87	$ (458,455)	$ 336,262
Issuance of common stock in public offerings, net of underwriting discounts, commissions and offering expenses of $21,139	3,136	—	323,861	—	—	323,861
Vesting of restricted stock units	237	—	—	—	—	—
Issuance of shares under the employee stock purchase plan	74	—	4,944	—	—	4,944
Exercise of stock options	804	—	14,471	—	—	14,471
Repurchase of early exercised stock options	(2)	—	—	—	—	—
Business acquisition	237	—	26,773	—	—	26,773
Stock-based compensation	—	—	36,998	—	—	36,998
Net exercise of stock warrants	22	—	—	—	—	—
Other comprehensive income	—	—	—	459	—	459
Repurchase of common stock for income tax withholdings	(92)	—	(10,849)	—	—	(10,849)
Net loss	—	—	—	—	(152,098)	(152,098)
Balances as of September 30, 2021	49,499	$ —	$ 1,190,828	$ 546	$ (610,553)	$ 580,821
Issuance of common stock in public offering, net of underwriting discounts and commissions and offering expenses of $17,678	5,227	—	269,822	—	—	269,822
Vesting of restricted stock units	365	—	—	—	—	—
Issuance of shares under the employee stock purchase plan	97	—	4,010	—	—	4,010
Exercise of stock options	486	—	5,952	—	—	5,952
Business acquisition	988	—	77,122	—	—	77,122
Stock-based compensation	—	—	79,664	—	—	79,664
Other comprehensive loss	—	—	—	(2,389)	—	(2,389)
Repurchase of common stock for income tax withholdings	(139)	—	(7,754)	—	—	(7,754)
Net loss	—	—	—	—	(217,863)	(217,863)
Balances as of September 30, 2022	56,523	$ —	$ 1,619,644	$ (1,843)	$ (828,416)	$ 789,385

The accompanying notes are an integral part of these consolidated financial statements.

Twist Bioscience Corporation
Consolidated Statements of Cash Flows

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
Cash flows from operating activities			
Net loss	$ (217,863)	$ (152,098)	$ (139,931)
Adjustments to reconcile net loss to net cash used in operating activities			
Depreciation and amortization	16,514	9,750	6,677
Non-cash lease expense, net of tenant improvement allowance	20,127	2,243	(1,043)
Gain on deconsolidation of Revelar	(4,607)	—	—
Loss on disposal of property and equipment	—	2	—
Stock-based compensation	79,664	36,998	17,096
Discount (premium) accretion on investment securities	1,315	593	(214)
Realized gain on investments	—	(5)	—
Allowance for doubtful accounts	(11)	40	—
Change in fair value of contingent considerations and holdbacks	(14,245)	(534)	—
Non-cash interest expense	3	67	152
Amortization of debt discount	4	81	184
Write off property and equipment	70	—	—
Changes in assets and liabilities:			
Accounts receivable, net	(9,622)	(2,202)	(14,272)
Inventories	(7,536)	(19,489)	(4,956)
Prepaid expenses and other current assets	(2,551)	(2,058)	(3,683)
Other non-current assets	7,273	(4,653)	(554)
Accounts payable	7,383	8,542	(5,506)
Accrued expenses	2,269	3,115	(2,648)
Accrued compensation	4,852	7,392	4,465
Other liabilities	(7,424)	(28)	1,978
Net cash used in operating activities	(124,385)	(112,244)	(142,255)
Cash flows from investing activities			
Purchases of property and equipment	(101,857)	(27,061)	(9,868)
Business acquisition, net of cash acquired	(8,160)	(483)	—
Deconsolidation of cash and cash equivalent relating to Revelar	(5,755)	—	—
Purchases of investments	(217,639)	(58,795)	(202,882)
Proceeds from maturity of investments	100,481	242,494	98,100
Net cash provided by (used in) investing activities	(232,930)	156,155	(114,650)
Cash flows from financing activities			
Proceeds from exercise of stock options	6,014	14,559	10,495
Proceeds from public offerings, net of underwriting discounts, commissions and offering expenses	269,822	323,861	295,563
Proceeds from issuance under employee stock purchase plan	4,010	4,944	3,428
Repayments of long-term debt	(1,558)	(3,333)	(3,333)
Repurchases of common stock for income tax withholding	(7,754)	(10,849)	(2,421)
Net cash provided by financing activities	270,534	329,182	303,732
Effect of exchange rates on cash, cash equivalents and restricted cash	(319)	20	21
Net increase (decrease) in cash, cash equivalents and restricted cash	(87,100)	373,113	46,848
Cash, cash equivalents, and restricted cash at beginning of year	467,359	94,246	47,398
Cash, cash equivalents, and restricted cash at end of year	$ 380,259	$ 467,359	$ 94,246
Supplemental disclosure of cash flow information			
Interest paid	$ 9	$ 167	$ 438
Income taxes paid, net of refunds	246	101	172
Non-cash investing and financing activities			
Property and equipment additions included in accrued expenses and accounts payable	$ 6,297	$ 2,011	$ 1,333
Operating lease right-of-use assets obtained in exchange for operating lease liabilities	21,367	33,617	3,718
Issuance of common stock in connection with the business acquisition	77,122	26,773	—

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/materials, academic, healthcare and food/agriculture.

The core of the Company's platform is a proprietary technology that pioneers a new method of manufacturing synthetic DNA by "writing" DNA on a silicon chip. The Company has combined this technology with proprietary software, scalable commercial infrastructure and an e-commerce platform to create an integrated technology platform that enables the Company to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost than its competitors. The Company is leveraging its 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.

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, 2022, the Company had an accumulated deficit of $828.4 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.

Since its inception, the Company has received an aggregate of $1,333.7 million in net proceeds from the issuance of equity securities and an aggregate of $13.8 million from debt. Management believes that these proceeds combined with existing cash balances on hand will be sufficient to fund operations for at least one year from the issuance of these consolidated financial statements. However, if the Company needs to obtain additional financing to fund operations beyond this period, there can be no assurance that it will be successful in raising additional financing on terms which are acceptable to the Company.

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 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, transaction price and progress toward completion of performance obligation under the contracts with customers, determination of the net realizable value of inventory, valuation of developed technology, and customer relationships and the fair value of the Company's common stock. 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, including a single-source supplier for a critical component, 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.

During the year ended September 30, 2022, financial results of the Company were not significantly affected by the COVID 19 pandemic, which continues to have global impact. The Company has considered all information available as of the date of issuance of these financial statements and the Company is not aware of any specific events or circumstances that would require an update to its estimates or judgments, or a revision to the carrying value of its assets or liabilities. These estimates may change as new events occur and additional information becomes available. The extent to which the COVID 19 outbreak affects the Company's future financial results and operations will depend on future developments which continue to evolve and are difficult to predict, including new information concerning mutations in the SARS-CoV 2 virus, which may make it more contagious, and current or future domestic and international actions to contain it and treat it.

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 with two financial institutions that management believe are 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 and Europe. The Company 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

There are no major customers who accounted for 10% or more of the Company's revenue for the fiscal year ended September 30, 2022 and September 30, 2021. There were two major customers who accounted for 12% and 10% of the Company's revenue for the fiscal year ended September 30, 2020.

There are no major customers who accounted for 10% or more of the net accounts receivable as of September 30, 2022 and September 30, 2021.

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 consist of investments in money market funds as of September 30, 2022 and 2021.

Restricted cash represents cash held at financial institutions that are pledged as collateral for stand-by letters of credit for lease commitments. The lease related letters of credit will lapse at the end of the respective lease terms through 2044. At September 30, 2022 and 2021, the Company had restricted cash in the amount of $1.6 million and $1.5 million, respectively.

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 as a separate component of stockholders' equity. 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 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.

Fair value of financial instruments

The carrying amounts of the Company’s financial instruments including cash equivalents, short term investments, and accounts receivable approximate fair value due to their relatively short maturities. Based on the borrowing rates currently available to the Company for loans with similar terms, the carrying value of the Company’s long-term debt approximated its fair value (level 2 within the fair value hierarchy).

Inventories

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 less accumulated depreciation and amortization. Depreciation and amortization are computed using the straight-line method over the estimated useful lives of the assets or the lesser of the useful life and the remaining lease term of the respective leasehold improvements assets, if any. Upon retirement or sale, the cost of assets disposed of and the related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is credited or charged to operations in the period recognized. Repairs and maintenance costs are expensed as incurred.

The Company recorded depreciation and amortization expense of $16.5 million, $9.8 million, and $6.7 million for the years ended September 30, 2022, 2021 and 2020, 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

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. Costs include external direct costs of services and applicable personnel costs of employees devoted to specific software application development. Personnel costs consist of salaries, employee benefit costs, bonuses and stock-based compensation expenses. The capitalized amounts are included in property and equipment, net on the consolidated balance sheets.

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 were $5.3 million and $3.0 million as of September 30, 2022 and 2021, respectively. Capitalized costs are amortized from the project completion date, using the straight-line method over an estimated useful life of the assets.

Long-lived assets

The Company reviews property and equipment, right of use assets and intangibles subject to amortization 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 their fair value. There have been no such impairments of long-lived assets during the years ended September 30, 2022, 2021 and 2020.

Intangible assets with finite lives are 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. No impairment charges were recorded during the years ended September 30, 2022, 2021 and 2020.

Leases

On October 1, 2019, the Company adopted Topic 842 using the modified retrospective approach. The adoption had a material effect on the consolidated balance sheets but did not have a material effect on the consolidated statements of operations and comprehensive loss. Prior period amounts were not adjusted and continue to be reported in accordance with the previous accounting under ASC 840, Leases. The Company elected the package of practical expedients permitted under the transition guidance which, among other things, allows carrying forward the historical classification of existing leases as of October 1, 2019.

The Company determines if an arrangement is a lease at inception primarily based on the determination of the party responsible for directing the use of an underlying asset within a contract. Operating lease right-of-use assets represent the Company’s right to use an underlying asset for the lease term and lease liabilities represent the Company’s obligation to make lease payments arising from the lease, net of any tenant improvement allowance. Operating lease right-of-use assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. In determining the present value of committed lease payments, the Company uses its incremental borrowing rate based on the information available at the lease commencement date which includes significant assumptions made including the Company’s estimated credit rating, annual percentage yields from corporate debt financings of companies of similar size and credit rating over a loan term approximating the remaining term of each lease, and government bond yields for terms approximating the remaining term of each lease in countries where the leased assets are located. Certain leases include payments of operating expenses that are dependent on the landlord’s estimate, and these variable payments are therefore excluded from the lease payments used to determine the operating lease right-of-use asset and lease liability. Lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise any such options. Lease expense is recognized on a straight-line basis over the expected lease term.

The Company elected to not apply the recognition requirements of Topic 842 to short-term leases with terms of 12 months or less which do not include an option to purchase the underlying asset that the Company is reasonably certain to exercise. For short-term leases, lease payments are recognized as operating expenses on a straight-line basis over the lease term. The Company elected to account for lease and non-lease components as a single lease component.

Additional information and disclosures required by Topic 842 are contained in Note 7.

Goodwill and indefinite intangible assets

Goodwill is evaluated for impairment annually at the reporting unit level during the fourth quarter of the fiscal year 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 one reporting unit is less than its carrying value. During its goodwill impairment review, the Company assessed qualitative factors to determine whether it is more likely than not that the fair value of its reporting unit is less than its carrying value, including goodwill. The qualitative factors include, but are not limited to, industry and market considerations and the Company’s overall financial performance. The Company performed its annual assessment for goodwill impairment in the fourth quarter of the fiscal year noting no indication of impairment. There were no triggering events indicating potential for impairment through September 30, 2022.

Segment information

The Company is a synthetic biology and genomics company that has developed a disruptive DNA synthesis platform to industrialize the engineering of biology and manufactures synthetic genes, tools for next-generation sequencing preparation, and antibody libraries for drug discovery and development 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

The Company's revenue is generated through the sale of synthetic biology tools, such as synthetic genes, oligo pools, next generation sequencing tools, and DNA and biopharma libraries. The Company recognizes revenue when control of the products is transferred to the customer and at a transaction price that is determined based on the agreed upon rates in the applicable order or master supply agreement applied to the quantity of synthetic DNA that was manufactured and shipped to the customer.

Contracts with customers are 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 Company contracts to date other than antibody discovery services and DNA libraries ("Biopharma") contracts, the customer orders a specified quantity of synthetic DNA sequence; therefore, the delivery of the ordered quantity per the purchase order is accounted for as one performance obligation.

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 shipment of the product to the customer. Accordingly, all of the transaction price, net of any discounts, is allocated to the one performance obligation. The Company's sales are subject to Ex Works (as defined in Incoterms 2010) delivery terms and revenue is recorded at the point in time when products are picked up by the customer's freight forwarder, as the Company has determined that this is the point in time that control transfers to the customer. Therefore, upon shipment of the product, there are no remaining performance obligations. The Company's shipping and handling activities are performed before the customer obtains control of the goods and therefore are considered a fulfillment cost. Shipping and handling fees charged to our customers are recognized as product revenue in the period shipped and the related costs for providing these services are recorded as a cost of revenue. 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 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.

The Company's Biopharma revenue currently primarily consists of research and development agreements with third parties that provide for up-front and milestone-based payments. The Company also enters into research and development agreements that do not include up-front or milestone-based payments and recognizes revenue on these types of agreements based on the timing of development activities. The Company's research and development agreements may include more than one performance obligation. At the inception of the agreement, the Company assesses whether each obligation represents a separate performance obligation or whether such obligations should be combined as a single performance obligation. The transaction price for each agreement is determined based on the amount of consideration the Company expects to be entitled to for satisfying all performance obligations within the agreement. The Company assesses the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. In agreements where the Company satisfies performance obligation(s) over time, the Company recognizes development revenue typically using an input method based on costs incurred relative to the total expected cost which determines the extent of progress toward completion. As part of the accounting for these arrangements, the Company must develop estimates and assumptions that require judgment to determine the transaction price and progress towards completion. The Company reviews its estimate of the transaction price and progress toward completion based on the best information available to recognize the cumulative progress toward completion as of the end of each reporting period and makes revisions to such estimates as necessary. Also, these research and development agreements may include license payments. The Company recognizes revenue from functional license agreements when the license is transferred to the customer and the customer is able to use and benefit from the license. Functional license has significant standalone functionality because it can be used as is for performing a specific task.

The Company had contract assets of $3.4 million and contract liabilities of $3.5 million as of September 30, 2022. The Company had contract assets of $2.0 million and contract liabilities of $1.1 million as of September 30, 2021. For the year ended September 30, 2022, the Company recognized revenue of $1.1 million from the amount that was included in the contract liability balance at the beginning of the year. For September 30, 2021 and 2020, 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. The aggregate amount of the transaction price allocated to the performance obligations that are unsatisfied as of September 30, 2022 was $4.5 million.

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.

The Company states its revenues net of any taxes collected from customers that are required to be remitted to various government agencies. The amount of taxes collected from customers and payable to governmental entities is included on the balance sheet as part of "Accrued expenses and other current liabilities."

Refer to Note 13 for the disaggregation of revenues by geography, by product and by industry.

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, 2022, 2021 and 2020, were $2.4 million, $2.5 million and $1.2 million, respectively.

Government contract payments

The Company has a subcontract with the Georgia Institute of Technology funded by the United States Director of Central Intelligence (IARPA). This subcontract is for the period from September 2019 to February 2023. The Company recognizes payments received from these arrangements when milestones are achieved and records them as a reduction of research and development expenses. The total expected cost for the IARPA development project is $7.2 million with IARPA funding $5.2 million and the Company is responsible for providing a minimum contribution of $2.0 million, which remains outstanding as of September 30, 2022. In fiscal year 2022, 2021, and 2020, the Company received IARPA payments of $0.9 million, $1.1 million, and $2.5 million, respectively.

Stock-based compensation

The Company maintains performance incentive plans under which incentive and nonqualified stock options and restricted stock units are granted primarily to employees and may be granted to members of the board of directors and certain non-employee consultants, and employees may participate in an employee stock purchase plan.

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, restricted stock units and employee stock purchase plan.

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.

For performance-based stock options, expense is recognized over the period from the grant date to the estimated attainment date, which is the derived service period of the award.

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. For purposes of the calculation of diluted net loss per share attributable to common stockholders, unvested shares of common stock issued upon the early exercise of stock options, shares issuable for employee stock purchase plan contributions received, warrants to purchase common stock, unvested restricted common stock, unvested restricted stock units 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, 2022, 2021 and 2020, diluted net loss per common share is the same as the basic net loss per share for those years.

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.

In fiscal 2022, the Company began recognizing an additional component of total Federal tax expense, the tax on Global Intangible Low-Taxed Income (“GILTI”) provision of the Tax Act, which became applicable to the Company in fiscal 2022. The Company elected to account for GILTI as a period cost, and therefore included GILTI expense in the effective tax rate calculation. This provision did not have a material effect on the effective tax rate for the years ended September 30, 2022, 2021 and 2020.

Variable interest entities

The Company consolidates a VIE in which the Company is deemed to be the primary beneficiary. An entity is generally a VIE if it meets any of the following criteria: (i) the entity has insufficient equity to finance its activities without additional subordinated financial support from other parties, (ii) the equity investors cannot make significant decisions about the entity’s operations or (iii) the voting rights of some investors are not proportional to their obligations to absorb the expected losses of the entity or receive the expected returns of the entity and substantially all of the entity’s activities involve or are conducted on behalf of the investor with disproportionately few voting rights. The Company periodically makes judgments in determining whether its investees are VIEs and, for each reporting period, the Company assesses whether it is the primary beneficiary of its VIE. See Note 15 “Investment in variable interest entity.”

Business combinations

The Company accounts for business combinations using the acquisition method.
Under the acquisition method, the purchase price of the acquisition is allocated to the acquired tangible and identifiable intangible assets and assumed liabilities based on their estimated fair values at the time of the acquisition. This allocation involves a number of assumptions, estimates, and judgments that could materially affect the timing or amounts recognized in the Company’s financial statements. As a result, the Company may record adjustments to the fair values of assets acquired and liabilities assumed within the measurement period (up to one year from the acquisition date) with the corresponding offset to goodwill. The most subjective areas of the acquisition accounting method include determining the fair value of the following:

- identifiable intangible assets, including the valuation methodology, estimates of projected revenues, technology obsolescence, and discount rates, as well as the estimated useful life of the intangible assets;
- contingent consideration; and
- goodwill, as measured as the excess of consideration transferred over the acquisition date fair value of the assets acquired, including the amount assigned to identifiable intangible assets, and the liabilities assumed.

The assumptions and estimates are based upon comparable market data and information obtained from the management of the acquired business.

Goodwill is assigned to reporting units that are expected to benefit from the synergies of the business combination as of the acquisition date.

Identifiable intangible assets with finite lives are amortized over their estimated useful lives in a pattern in which the asset is consumed. Acquisition-related costs, including advisory, legal, accounting, valuation, and other similar costs, are expensed in the periods in which those costs are incurred. The results of operations of acquired businesses are included in the Company's consolidated financial statements from the acquisition date.

Recent accounting pronouncements

New accounting guidance adopted

In December 2019, the FASB issued ASU 2019-12, *Simplifying the Accounting for Income Taxes*. The ASU simplifies the accounting for income taxes by eliminating certain exceptions to the guidance in ASC 740, *Income Taxes*, related to the approach for allocating income tax expense or benefit for the year to continuing operations, discontinued operations, other comprehensive income, and other charges or credits recorded directly to shareholders' equity; the methodology for calculating income taxes in an interim period; and the recognition of deferred tax liabilities for outside basis differences. The Company adopted this standard effective October 1, 2021. The adoption of ASU-2019 12 did not have an impact on the Company's consolidated financial statements as of and for the year ended September 30, 2022.

New accounting guidance issued but not yet effective

In June 2016, the FASB issued ASU 2016-13, Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments. The new standard requires entities to use the new "expected credit loss" impairment model for most financial assets measured at amortized cost, including trade and other receivables and held-to-maturity debt securities, and modifies the impairment model for available-for-sale debt securities. The standard is effective for the Company for the fiscal year ending September 30, 2024, including interim periods within that fiscal year. Early application is permitted. Entity should apply the amendments in this update through a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective (that is, modified-retrospective approach). A prospective transition approach is required for debt securities for which an other-than-temporary impairment had been recognized before the effective date. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In November 2021, the FASB issued ASU 2021-10, Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance. The amendments in this update require the following annual disclosures about transactions with a government that are accounted for by applying a grant or contribution accounting model. The amendments in this update are effective for all entities within their scope for financial statements issued for annual periods beginning after December 15, 2021. Early application is permitted. Entity should apply the amendments in this update either (1) prospectively to all transactions within the scope of the amendments that are reflected in financial statements at the date of initial application and new transactions that are entered into after the date of initial application or (2) retrospectively to those transactions. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

3. 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.

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 considering counterparty credit risk in its assessment of fair value.

The following table sets forth the cash and cash equivalents, and short-term investments as of September 30, 2022:

(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Cash and cash equivalents	$ 378,687	$ —	$ —	$ 378,687
Short-term investments:				
Commercial paper	14,997	—	—	14,997
U.S. government treasury bills	112,878	—	(1,594)	111,284
Total	$ 506,562	$ —	$ (1,594)	$ 504,968

The following table sets forth the cash and cash equivalents, and short-term investments as of September 30, 2021:

(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Cash and cash equivalents	$ 465,829	$ —	$ —	$ 465,829
Short-term investments:				
U.S. government treasury bills	12,033	1	—	12,034
Total	$ 477,862	$ 1	$ —	$ 477,863

As of September 30, 2022, 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	$ 316,805	$ —	$ —	$ 316,805
Commercial paper	—	14,997	—	14,997
U.S. government treasury bills	111,284	—	—	111,284
Total financial assets	$ 428,089	$ 14,997	$ —	$ 443,086
Liabilities				
Contingent consideration and indemnity holdback	$ —	$ 9,592	$ 2,100	$ 11,692
Total financial liabilities	$ —	$ 9,592	$ 2,100	$ 11,692

As of September 30, 2021, 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	$ 430,438	$ —	$ —	$ 430,438
U.S. government treasury bills	12,034	—	—	12,034
Total financial assets	$ 442,472	$ —	$ —	$ 442,472
Liabilities				
Contingent consideration and indemnity holdback	$ —	$ 9,856	$ —	$ 9,856
Total financial liabilities	$ —	$ 9,856	$ —	$ 9,856

Contractual maturities of short-term investments, as of September 30, 2022, were less than 12 months. The Company does not intend to sell the money market funds and short term investments and it is not more likely than not that the Company will be required to sell the investments before recovery of their amortized cost basis. The unrealized loss on short-term investments have been in a continuous unrealized loss position for less than 12 months.

As of September 30, 2022, the Company's contingent consideration related to its Abveris acquisition is categorized as Level 3 within the fair value hierarchy. Contingent consideration is classified as a liability and is remeasured to an estimated fair value at each reporting date until the contingency is resolved. Contingent consideration has been recorded at its fair values using unobservable inputs and have included using the Monte Carlo simulation option pricing framework, incorporating contractual terms and assumptions regarding financial forecasts, discount rates, and volatility of forecasted revenue. The key assumptions are forecasted calendar year 2022 revenue and the Company's share price. The development and determination of the unobservable inputs for Level 3 fair value measurements and fair value calculations are the responsibility of the Company’s management with the assistance of a third-party valuation specialist.

The key inputs into the Monte Carlo simulation as of December 1, 2021, the acquisition date and as of September 30, 2022 were as follows:

Contingent consideration	September 30, 2022	December 1, 2021
Stock price	$ 35.24	$ 87.06
Equity volatility	93.7 %	81.3 %
Risk-free interest rate	3.9 %	0.4 %
Revenue volatility	30.2 %	21.9 %

The following table provides a reconciliation of beginning and ending balances of the Level 3 financial liabilities during the year ended September 30, 2022:

(in thousands)	Total
Balance as of September 30, 2021	$ —
Contingent consideration – additions	8,500
Change in fair value	(6,400)
Balance as of September 30, 2022	$ 2,100

4. Balance sheet components

The Company’s accounts receivable, net balance consists of the following:

	September 30,	
(in thousands)	2022	2021
Trade Receivables	$ 35,706	$ 26,549
Other Receivables	4,822	2,337
Allowance for doubtful accounts	(234)	(337)
Accounts Receivable, net	$ 40,294	$ 28,549

Inventories consist of the following:

	September 30,	
(in thousands)	2022	2021
Raw Materials	$ 28,787	$ 18,778
Work-in-process	2,866	4,837
Finished Goods	7,654	8,185
	$ 39,307	$ 31,800

The work-in-process inventory included consigned inventory of $0.1 million and $1.9 million as of September 30, 2022 and 2021 respectively.

Property and Equipment, net consists of the following:

(in thousands)	September 30, 2022	September 30, 2021
Laboratory equipment	$ 62,285	$ 48,439
Furniture, fixtures and other equipment	2,332	2,195
Computer equipment	2,815	2,977
Computer software	1,693	3,899
Leasehold improvements	14,371	5,066
Construction in progress	87,723	16,968
	171,218	79,544
Less: Accumulated depreciation and amortization	(31,777)	(35,422)
	$ 139,441	$ 44,122

Construction in progress mainly represents equipment and leasehold improvements relating to the Wilsonville facility.

Other non-current assets

Other non-current assets consist of the following:

(in thousands)	September 30, 2022	September 30, 2021
Convertible note receivable	$ —	$ 3,021
Other non-current assets	3,385	4,653
	$ 3,385	$ 7,674

During 2021 and as amended in 2022, the Company entered into convertible promissory note agreements with a privately held company (“Borrower”) pursuant to which the Company agreed to loan to the Borrower $3.5 million in a series of loan installments, evidenced by a convertible promissory note having a maturity date of May 1, 2023 (“Convertible Note”). The Convertible Note accrues interest at a rate of 4% per annum. Outstanding principal and any unpaid accrued interest will be converted into preferred shares of the Borrower if before the repayment of the Note, the Borrower has an equity financing round. The convertible note receivable balance at September 30, 2022 is recognized in the prepaid expenses and other current assets on the balance sheet.

Other current liabilities

Other current liabilities consist of the following:

(in thousands)	September 30, 2022	September 30, 2021
Contingent consideration	$ 2,100	$ 5,186
Indemnity holdbacks	9,592	—
Income and sales taxes payable	3,661	2,440
Deferred revenue	3,476	1,088
Other current liabilities	908	909
	$ 19,737	$ 9,623

Other non-current liabilities

The other non-current liabilities consist of the following:

(in thousands)	September 30, 2022	September 30, 2021
Holdback	$ —	$ 4,671
Other non current liabilities	60	397
	$ 60	$ 5,068

5. Goodwill and intangible assets

For the year ended September 30, 2022, goodwill and intangible assets increased from prior year by $63.4 million and $46.5 million, respectively, as a result of a business acquisition. For the year ended September 30, 2021, goodwill and intangible assets increased from the prior year by $21.3 million and $18.4 million, respectively, as a result of a business acquisition. See Note 14, "Business acquisition". Total amortization expense related to intangible assets was $4.9 million, $0.5 million, and $0.2 million for the years ended September 30, 2022, 2021 and 2020, respectively.

The goodwill balance is presented below:

(in thousands)	September 30, 2022	September 30, 2021
Balance at beginning of year	22,434	1,138
Business acquisition – additions (see Note 14)	61,768	21,538
Remeasurement adjustments to the deferred tax assets	1,609	(242)
Balance at end of year	$ 85,811	$ 22,434

The finite-lived intangible assets balances are presented below:

	September 30, 2022			
(in thousands, except for years)	Weighted average Amortization period in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	11	$ 50,020	$ (4,375)	$ 45,645
Customer Relationships	11	15,210	(1,767)	13,443
Tradenames & Trademarks	3	900	(250)	650
Total finite-lived intangible assets		$ 66,130	$ (6,392)	$ 59,738

	September 30, 2021			
(in thousands, except for years)	Weighted average Amortization period in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	16	$ 19,120	$ (1,361)	$ 17,759
Tradenames & Trademarks	2	20	(20)	—
Customer Relationships	1.5	510	(7)	503
Total finite-lived intangible assets		$ 19,650	$ (1,388)	$ 18,262

Future annual amortization expense is as follows (in thousands):

Years ending September 30,		
2023	$	5,255
2024		5,170
2025		4,920
2026		4,870
2027		4,320
Thereafter		35,203
	$	59,738

6. Long-term debt

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 provided a principal amount of $10.0 million, the second advance provided a principal amount of $5.0 million and the third advance provided a principal amount of $5.0 million during their respective draw down periods. The draw down periods for the second and third advances under this agreement have expired as of January 31, 2018 and June 30, 2018, respectively and were not utilized. The Company obtained a term loan under the only the first tranche in a principal amount of $10.0 million, which matured and was paid in full in December 2021.

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. The Fourth Loan contained 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 3.0% 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 a prior loan and a new advance of $2.2 million. The debt provided for interest only payments through December 31, 2018 at which time monthly principal payments became 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 (1.0%) above the prime rate, which interest shall be payable monthly. The Company did not make any borrowings under the revolving loan facility which expired on December 31, 2021.

The Company had no amounts outstanding under the loan facility at September 30, 2022.

7. Commitments and contingencies

The Company may be subject to litigation, claims and disputes in the ordinary course of business. There is an inherent risk in any litigation or dispute and no assurance can be given as to the outcome of any claims.

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. From time to time, the Company has entered into indemnification agreements with its directors and officers that requires 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 law. The Company also has directors' and officers' insurance.

Leases

The Company leases certain of its facilities under non-cancellable operating leases expiring at various dates through 2044. The Company is also responsible for utilities, maintenance, insurance, and property taxes under these leases. Our lease payments consist primarily of fixed rental payments for the right to use the underlying leased assets over the lease terms, as well as payments for common-area-maintenance and administrative services. We often receive customary incentives from our landlords, such as reimbursements for tenant improvements and rent abatement periods, which effectively reduce the total lease payments owed for these leases. Leases are classified as operating or financing at commencement. We do not have any material financing leases.

Certain leases include options to renew or terminate at the Company’s discretion. The lease terms include periods covered by these options if it is reasonably certain the Company will renew or not terminate. The Company’s lease agreements do not contain any material residual value guarantees or restrictive covenants.

Supplemental balance sheet information related to the Company’s operating leases as of September 30, 2022 is as follows:

(in thousands)		**September 30, 2022**
Assets:		
Operating lease right-of-use-assets	$	74,948
Current liabilities:		
Current portion of operating lease liabilities	$	13,642
Noncurrent liabilities:		
Operating lease liabilities, net of current portion	$	81,270

Future minimum lease payments under all non-cancelable operating leases as of September 30, 2022 are as follows:

(in thousands)		**Operating leases**
Years ending September 30 :		
2023	$	14,734
2024		14,153
2025		14,005
2026		12,550
2027		7,205
Thereafter		90,072
Total minimum lease payments	$	152,719
Less: imputed interest		(57,807)
Total operating lease liabilities	$	94,912
Less: current portion		(13,642)
Operating lease liabilities, net of current portion	$	81,270

The statement of cash flows for the year ended September 30, 2022, include changes in right-of-use assets and operating lease liabilities of $13.4 million and $33.5 million, respectively. For the year ended September 30, 2021, changes in right-of-use assets and operating lease liabilities were $27.9 million and $30.1 million, respectively.

Operating lease expense was $15.6 million and $9.5 million for the years ended September 30, 2022 and 2021 respectively. Cash payments for amounts included in the measurement of operating lease liabilities for the year ended September 30, 2022 were $13.0 million. During the year end September 30, 2022 the Company received $17.6 million of lease incentive payments, which is an allowance for improvements made by the Company to the Wilsonville facility. As of September 30, 2022, the weighted-average remaining lease term was 15.98 years and the weighted-average incremental borrowing rate was 6.39%.

On July 28, 2021, the Company entered into a 7-year operating lease for approximately 21,000 square-feet of office space located in South San Francisco, California, to further expand the Company operations. Upon execution of the lease agreement, the Company provided the landlord an approximately $0.2 million security deposit. The Company will pay an initial annual base rent of approximately $1.7 million, which is subject to scheduled 3% annual increases, plus certain operating expenses. The Company has the right to sublease the facility, subject to landlord consent. The lease commenced on October 1, 2022. As of lease commencement, the total future minimum lease payments under the agreement are $13.1 million.

On August 6, 2021, Abveris, which was subsequently acquired by the Company, entered into a 10-year, 5-month operating lease for approximately 22,000 square-feet of office space located in Quincy, Massachusetts, to further expand operations. The Company has two options to extend the term for five years. The Company does not have reasonable certainty that these options will be exercised. Upon execution of the lease agreement, an approximate $0.6 million irrevocable letter of credit was provided as a security deposit. The Company will pay an initial annual base rent of approximately $1.2 million, which is subject to scheduled 2% annual increases, plus certain operating expenses. The Company has the right to sublease the facility, subject to landlord consent. The lease commenced on March 3, 2022. As of lease commencement date, the total future minimum lease payments under the agreement were $13.2 million.

Other than the above leases, during 2022, the Company entered into immaterial operating lease agreements with total minimum lease payments under these agreements of less than $2.0 million and with lease terms ranging from 2.0 to 4.0 years.

8. Related party transactions

During the years ended September 30, 2022, 2021 and 2020, the Company purchased raw materials from related party in the amount of $8.0 million, $5.0 million and $3.4 million, respectively. During the year ended September 30, 2022, the Company had revenues from related party in the amount of $3.5 million. The revenues from related party were immaterial for the years ending September 30, 2021 and 2020. Payable balances and receivable balances with the related party were immaterial as of September 30, 2022, 2021 and 2020. During the year ended September 30, 2022, the Company entered into a service agreement with a related party for the total consideration of $0.1 million.

9. Income taxes

The Company recorded an income tax benefit of $10.4 million and $1.9 million for the years ended September 30, 2022 and 2021, respectively. The Company recorded provisions for income taxes of $0.4 million for the year ended September 30, 2020.

The domestic and foreign components of pre-tax loss for the years ended September 30, 2022, 2021, and 2020 are as follows:

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
US	(231,659)	(149,533)	(138,016)
Foreign	3,385	(4,495)	(1,533)
Total	(228,274)	(154,028)	(139,549)

The components of the provision for income taxes for the years ended September 30, 2022, 2021, and 2020 are as follows:

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
Current			
Federal	—	—	—
State	(1)	(29)	0
Foreign	767	108	382
Total current	766	79	382
Deferred			
Federal	(9,765)	(2,268)	—
State	(1,412)	259	—
Foreign	—	—	—
Total deferred	(11,177)	(2,009)	—
Total (benefit)/provision	(10,411)	(1,930)	382

The following is a reconciliation of the statutory federal income tax rate to the Company’s effective tax rate for the years ended September 30, 2022, 2021, and 2020:

	Year ended September 30,		
	2022	2021	2020
Tax expense computed at the federal statutory rate	21 %	21 %	21 %
Change in valuation allowance	(13)%	(33)%	(25)%
Research and development credit benefit	4 %	3 %	1 %
Business combination	(4)%	(2)%	—
Stock-based compensation	(1)%	12 %	3 %
Change in fair value of contingent consideration and holdbacks	(1)%	— %	— %
Gain on deconsolidation of variable interest entity	(1)%	— %	— %
Total income tax expense	5 %	1 %	— %

The significant components of the Company’s deferred tax assets and liabilities are as follows for the years ended September 30, 2022, and 2021:

	September 30,	
(in thousands)	2022	2021
Net operating loss carryforwards	$ 191,337	$ 163,782
Research and development credit carryforwards	35,109	20,163
Operating lease liability	23,118	14,890
Stock-based compensation	13,138	6,737
Other	11,541	4,894
Gross deferred tax assets	274,243	210,466
Less: Valuation allowance	(240,660)	(190,428)
Net deferred tax assets	33,583	20,038
Fixed assets	(1,169)	(785)
Operating lease right-of-use asset	(17,986)	(14,893)
Intangible assets	(14,428)	(4,360)
Gross deferred tax liabilities	(33,583)	(20,038)
Total net deferred tax asset	$ —	$ —

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, 2022 and 2021. The valuation allowance was $240.7 million and $190.4 million as of September 30, 2022 and 2021, respectively. The change in the valuation allowance was mainly due to an increase in the net operating loss and research and development credits during the fiscal year 2022.

The Company intends to continue maintaining a full valuation allowance on the Company’s deferred tax assets until there is sufficient evidence to support the reversal of all or some portion of the allowance. The release of all, or a portion, of the valuation allowance would result in the recognition of certain deferred tax assets and a decrease to income tax expense for the period the release is recorded.

As of September 30, 2022, the Company had net operating loss carryforwards of approximately $777.2 million and $452.2 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 fiscal year 2024.

The Company also had federal and state research and development credit carryforwards of approximately $29.9 million and $20.8 million, respectively, at September 30, 2022. The federal credits will expire starting in 2033 if not utilized. The California research 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 and foreign jurisdictions.

The aggregate changes in the balance of gross unrecognized tax benefits are as follows:

(in thousands)		**Federal and state**
Balance as of September 30, 2019	$	3,291
Increases related to tax positions taken during 2020		1,409
Balance as of September 30, 2020	$	4,700
Increases related to tax positions taken during 2021		2,737
Balance as of September 30, 2021	$	7,437
Increases related to tax positions taken during 2022		5,082
Increases related to tax positions taken in the prior year	$	864
Balance as of September 30, 2022	$	13,383

The Company does not expect a material change in unrecognized tax benefits in the next twelve months. As of September 30, 2022 and 2021, approximately $0.1 million and $0.1 million of unrecognized tax benefit would, if recognized, impact the Company’s effective income tax rate, respectively.

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, 2022 and 2021.

The Company’s files federal and state income tax returns with varying statutes of limitations. All tax years remain open to examination due to the carryover of net operating losses or tax credits. The Company currently has no federal or state tax examinations in progress.

On August 16, 2022, the Inflation Reduction Act of 2022 (the "IRA") was signed into law, with tax provisions primarily focused on implementing a 15% minimum tax on global adjusted financial statement income and a 1% excise tax on share repurchases. In general, the provisions of the IRA will become effective beginning in 2023, with certain exceptions. The Company currently does not expect the IRA to have a material impact on its consolidated financial statements. Management will continue to evaluate the potential impact of the IRA on the Company's financial statements.

10. Common stock

As of September 30, 2022, the Company had reserved sufficient shares of common stock with a par value of $0.00001 per share for issuance upon exercise of outstanding stock options. 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.

In February 2022, the Company completed an underwritten public offering of 5,227,272 shares of its common stock at a price to the public of $55.00 per share, including the full exercise of underwriters’ option to purchase an additional 681,818 shares of common stock. The Company received total net proceeds from the offering of $269.8 million, net of underwriting discounts and commissions and offering expenses.

11. Stock-based compensation expense

2018 Equity Incentive Plan

On September 26, 2018, the board of directors adopted the 2018 Equity Incentive Plan (the 2018 Plan) as a successor to the 2013 Stock Plan (the 2013 Plan). The maximum aggregate number of shares that may be issued under the 2018 Plan is 6,856,405 of the Company’s common stock. 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 became effective, by a number equal to the least of 999,900, 4% of the shares of common stock outstanding at that time, or such number of shares determined by the Company’s board of directors. The common shares issuable under the 2018 Plan are registered pursuant to a registration statement on Form S-8 on November 1, 2018. As of September 30, 2022, a total of 1,142,937 shares of the Company's common stock have been reserved for issuance under the 2018 Plan.

Any shares subject to outstanding awards under the 2013 Plan that are canceled or repurchased subsequent to the 2018 Plan's effective date are returned to the pool of shares reserved for issuance under the 2018 Plan. Awards granted under the 2018 Plan may be non-statutory stock options, stock appreciation rights, restricted stock, restricted stock units, performance shares, and performance units.

Restricted Stock Units

Restricted stock consists of restricted stock unit awards (RSUs) which have been granted to employees and non-employee directors. The value of an RSU award is based on the Company's stock price on the date of grant. Employee grants generally vest over four years and non-employee director grants generally vest over one year. Forfeitures of RSUs are recognized as they occur. The shares underlying the RSU awards are not issued until the RSUs vest. Upon vesting, each RSU converts into one share of the Company's common stock.

Activity with respect to the Company's restricted stock units during the year ended September 30, 2022 is as follows:

(In thousands, except per share data)	Shares	Weighted average grant date fair value per share
Nonvested shares at October 1, 2021	697	$ 73.27
Granted	1,430	$ 67.30
Vested/Issued	(377)	72.00
Forfeited	(184)	77.23
Nonvested shares at September 30, 2022	1,566	$ 67.66

As of September 30, 2022, there was $92.2 million of total unrecognized compensation cost related to these issuances that is expected to be recognized over a weighted average period of 2.7 years. The total grant date fair value of RSUs awarded during the year ended September 30, 2022 was $96.2 million. The weighted average grant date fair value for RSUs and performance stock units was $113.06 for the year ended September 30, 2021. The weighted average grant date fair value for RSUs was $38.66 for the year ended September 30, 2020.

Performance Stock Units

Performance stock unit awards ("PSUs") granted to certain employees will vest upon achievement of operational milestones related to the Wilsonville facility, and to Company executives will vest upon achievement of revenue and gross profit metrics as determined by the board, and to certain non-employee consultants will vest upon achievement of operational milestones. Stock compensation expense for PSUs is recorded over the vesting period based on the grant date fair value of the awards and probability of the achievement of specified performance targets. The grant date fair value is equal to the closing share price of the Company's common stock on the date of grant. For employees, PSUs generally vest over a one to three-year service period following the grant date, provided that the recipient is a Company employee at the time of vesting and the performance targets applicable to each award are achieved. For non-employees, PSUs generally vest over a one to three-year service period following the grant date, provided that the performance targets applicable to each award are achieved. The percentage of PSUs that vest will depend on the achievement of specified performance targets at the end of the performance period and can range from 0% to 150% of the number of units granted. Forfeitures of PSUs are recognized as they occur.

Activity under the PSUs during the year ended September 30, 2022 is summarized below:

(In thousands, except per share data)	Shares	Weighted average grant date fair value per share
Nonvested shares at October 1, 2021	10	$ 128.49
Granted	621	$ 78.81
Vested/Issued	(14)	34.35
Forfeited	(88)	85.40
Nonvested shares at September 30, 2022	529	$ 79.60

As of September 30, 2022, the unrecognized compensation costs related to these awards was $21.6 million. The Company expects to recognize those costs over a weighted average period of 1.5 years. The total grant date fair value of PSUs awarded during the year ended September 30, 2022 was $49.0 million.

Options

Options are generally granted to employees and were previously granted to non-employee directors. Stock options entitle the holder to purchase, at the end of the vesting term, a specified number of shares of Company common stock at an exercise price per share equal to the closing market price of the common stock on the date of grant. Stock options have a contractual life from the date of the grant and a vesting schedule as established by the board of directors. The maximum term of stock options granted under the 2018 Plan is 10 years and the awards generally vest over a four-year period. Forfeitures of options are recognized as they occur. The fair value of each services based stock option grant is estimated on the date of grant using the Black-Scholes option-pricing model. The Company historically had been a private company and lacked company-specific historical and implied volatility information for its stock. Therefore, it estimated its expected stock price volatility based on the historical volatility of publicly traded peer companies through the period ended September 30, 2022 and utilized the “simplified” method for awards that qualify as “plain-vanilla” options. As determined under the simplified method, the expected term of stock options granted is calculated based on contractual and vesting terms of the option award, the risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award, the expected dividend yield is zero based on the fact that the Company has never paid cash dividends on common stock and does not expect to pay any cash dividends in the foreseeable future.

Options activity during the year ended September 30, 2022 is summarized below:

(In thousands, except per share data)	Shares	Weighted average exercise price per share	Weighted average remaining contractual term (years)	Aggregate intrinsic value
Outstanding at October 1, 2021	2,875	$ 22.83	7.11	$ 242,291
Granted	223	$ 24.03	9.21	$ —
Forfeited	(161)	35.79	—	—
Exercised	(484)	12.42	—	$ 31,918
Outstanding at September 30, 2022	2,453	$ 24.67	6.33	$ 33,447
Nonvested at September 30, 2022	581	$ 32.61	7.20	5,435
Exercisable	1,872	$ 22.20	6.05	$ 28,012

As of September 30, 2022, the unrecognized compensation costs related to these awards was $12.2 million. The Company expects to recognize those costs over a weighted average period of 1.1 years. The total grant date fair value of stock options awarded during the year ended September 30, 2022 was $15.8 million. The Company recognized a tax benefit of $44.2 million in year ended September 30, 2022. The weighted average grant date fair value of options and performance stock options was $42.80 and $20.76 granted during the years ended September 30, 2021 and 2020, respectively.

The fair value of options granted during the year ended September 30, 2022, were calculated using the weighted average assumptions set forth below:

	Year ended September 30, 2022
Expected term (years)	6.0
Expected volatility	70.7 %
Risk-free interest rate	1.4 %
Dividend yield	—%

The fair value of options and performance stock options granted during the years ended September 30, 2021 and 2020, respectively, were calculated using the weighted average assumptions set forth below:

	Year ended September 30,	
	2021	2020
Expected term (years)	6.1	6.2
Expected volatility	64.4 %	62.1 %
Risk-free interest rate	1.0 %	1.3 %
Dividend yield	—%	—%

Performance Stock Options

On September 1, 2020, the board of directors approved the implementation of a revised annual equity award program for executive officers, senior level employees and consultants to be granted as performance-based stock options ("PSOs") under the 2018 Plan. The number of PSOs ultimately earned under the awards to executive officers and senior level employees is calculated based on the achievement of a certain total revenue threshold during the fiscal year ending September 30, 2022. The percentage of performance stock options that vest will depend on the board of directors' determination of total revenue at the end of the performance period and can range from 0% to 150% of the number of options granted. The number of PSOs ultimately earned under the awards to a consultant is calculated based on the achievement of certain operational milestones. The maximum term of performance stock options granted under the 2018 Plan is 10 years for both employees and non-employees. The awards generally vest over a two-year period for executive officers and senior level employees. Awards to non-employees generally vest over a five-year period.

The provisions of the PSO are considered a performance condition, and the effects of that performance condition are not reflected in the grant date fair value of the awards. The Company used the Black-Scholes method to calculate the fair value at the grant date without regard to the vesting condition and will recognize compensation cost for the options that are expected to vest. Forfeitures of PSOs are recognized as they occur. The Company reassesses the probability of the performance condition at each reporting period and adjusts the compensation cost based on the probability assessment. As of September 30, 2022, the Company determined that 293,730 shares are expected to vest based on the probability of the performance condition that will be achieved under this equity award program.

Activity under the PSOs during the year ended September 30, 2022 is summarized below:

(In thousands, except per share data)	Shares	Weighted average exercise price per share	Weighted average remaining contractual term (years)	Aggregate intrinsic value
Outstanding and nonvested at October 1, 2021	256	$ 70.62	8.94	$ 9,331
Granted	75	$ 31.29	9.57	—
Forfeited	(19)	67.85	—	—
Vested	(19)	31.29	—	—
Nonvested at September 30, 2022	293	$ 63.27	8.25	$ 222
Exercisable	19	31.29	9.57	74
Outstanding at September 30, 2022	312	$ 61.35	8.33	$ 296

As of September 30, 2022, the unrecognized compensation costs related to these awards was $0.9 million. The Company expects to recognize those costs over a weighted average period of 1.9 years. The total grant date fair value of performance stock options awarded during the year ended September 30, 2022 was $1.5 million. The weighted average grant date fair value was $45.18 and $43.06 for the years ended September 30, 2021 and 2020, respectively.

The fair values of PSOs granted during the year ended September 30, 2022 respectively, were calculated using the weighted average assumptions set forth below:

	Year ended September 30,
	2022
Expected term (years)	5.9
Expected volatility	70.9%
Risk-free interest rate	2.8%
Dividend yield	—%

Stock-based compensation

Total stock-based compensation expense recognized were as follows:

	Year ended September 30,		
(in thousands)	2022	2021	2020
Cost of revenues	$ 4,587	$ 2,678	$ 1,290
Research and development	19,541	10,166	3,346
Selling, general and administrative	54,905	24,154	12,460
Total stock-based compensation	$ 79,033	$ 36,998	$ 17,096

An immaterial amount of stock-based compensation was capitalized to inventories attributable to employees who support the manufacturing of the Company's products for the year ended September 30, 2022. The balance sheet as of September 30, 2022 includes $0.7 million of stock-based compensation primarily related to implementation of the Company’s lab production software system and order management system, which was capitalized in property and equipment.

The total amount of share-based liabilities settled was $4.6 million for the year ended September 30, 2022. The settlement of the liabilities related entirely to the issuance of contingent consideration associated with the iGenomX acquisition to non-employees only.

2018 Employee Stock Purchase Plan

On September 26, 2018, the board of directors adopted the 2018 Employee Stock Purchase Plan (the 2018 ESPP). A total of 275,225 shares of the Company’s common stock have been reserved for issuance under the 2018 ESPP. The number of shares reserved for issuance under the 2018 ESPP will be increased automatically on the first day of each fiscal year, following the fiscal year in which the 2018 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 the Company’s board of directors. The number of shares reserved for issuance as at September 30, 2022 is as follows:

(In thousands)	Shares available
Outstanding at September 30, 2021	355
Additional shares authorized	249
Shares issued during the period	(97)
Outstanding at September 30, 2022	507

Subject to any plan limitations, the 2018 ESPP allows eligible service providers (through qualified and non-qualified offerings) to contribute, normally through payroll deductions, up to 15% of their earnings for the purchase of the Company’s common stock at a discounted price per share. The offering periods are beginning in February and August of each year, except the initial offering period which commenced with the initial public offering in October 2018 and ended on August 20, 2019. The common shares issuable under the 2018 ESPP were registered pursuant to a registration statement on Form S-8 on November 26, 2018.

Unless otherwise determined by the board of directors, the Company’s common stock will be purchased for the accounts of employees participating in the 2018 ESPP at a price per share that is the lesser of 85% of the fair market value of the Company’s common stock on the first trading day of the offering period, which for the initial offering period is the price at which shares of the Company’s common stock were first sold to the public, or 85% of the fair market value of the

Company's common stock on the last trading day of the offering period. During the years ended September 30, 2022 and 2021, activity under the 2018 ESPP was immaterial.

401(k) Savings Plan

During 2018, the Company adopted a 401(k) savings plan for the benefit of its employees. In January 2022, the Company modified its plan to include an employer matching contribution. The Company is required to make matching contributions to the 401(k) plan equal to 50% of the first 6% of wages deferred by each participating employee. The Company incurred expenses for employer matching contributions of $2.0 million for the year ended September 30, 2022.

Abveris Acquisition

As discussed further in Note 14 "Business acquisition", on December 1, 2021, the Company completed the acquisition of AbX Biologics, Inc. and granted certain equity awards to new employees. These equity awards included up to 231,876 restricted shares of the Company's common stock which are issuable based on achievement of the 2022 calendar revenue target, which had an aggregate grant date fair value of $20.1 million. In addition, all employees must remain employed through the payout date, and certain employees have an additional vesting period of up to two years from the acquisition date. The vesting upon achievement of the 2022 calendar revenue target is considered a performance condition, and the effects of that performance condition are not reflected in the grant date fair value of the awards. The Company used the stock price as of December 1, 2021 for the fair value of restricted shares.

As of September 30, 2022, the Company determined that 177,390 shares are expected to vest based on the probability of the performance condition that will be achieved under this equity award program. The Company reassesses the probability of the performance condition at each reporting period and adjusts the compensation cost based on the probability assessment. The Company recorded approximately $9.9 million in stock-based compensation expense for the year ended September 30, 2022 related to these awards. The grant date fair value was determined to be $87.06 per share for restricted shares. As of September 30, 2022, the unrecognized compensation costs related to these awards were $5.6 million. The Company expects to recognize those costs over a weighted average period of 0.6 years.

12. Net loss per share attributable to common stockholders

The following table sets forth the computation of the Company's basic and diluted net loss per share attributable to common stockholders:

	Year ended September 30,		
(in thousands, except per share data)	**2022**	**2021**	**2020**
Numerator:			
Net loss attributable to common stockholders	$ (217,863)	$ (152,098)	$ (139,931)
Denominator:			
Weighted-average shares used in computing net loss per share, basic and diluted	53,885	48,251	39,190
Net loss per share attributable to common stockholders, basic and diluted	$ (4.04)	$ (3.15)	$ (3.57)

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:

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
Shares subject to options to purchase common stock	2,765	3,131	3,948
Unvested restricted stock units and performance stock units	2,095	707	569
Unvested shares of common stock issued upon early exercise of stock options	—	3	17
Shares subject to employee stock purchase plan	97	27	33
Shares subject to warrants to purchase common stock	—	—	26
Total	4,957	3,868	4,593

13. Geographic, product and industry information

The table below sets forth revenues by geographic region, based on ship-to destinations. Americas consists of the United States of America, Canada, Mexico and South America; EMEA consists of Europe, the Middle East, and Africa; and APAC consists of Japan, China, South Korea, India, Singapore, Malaysia and Australia.

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
Americas	$ 122,473	$ 77,909	$ 59,164
EMEA	62,078	44,124	25,821
APAC	19,014	10,300	5,115
Total	$ 203,565	$ 132,333	$ 90,100

The table below sets forth revenues by products.

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
Synthetic genes	$ 61,509	$ 38,964	$ 35,192
Oligo pools	12,424	8,039	4,545
DNA libraries	6,149	5,678	3,965
Antibody discovery	24,171	6,985	2,383
NGS tools	99,312	72,667	44,015
Total	$ 203,565	$ 132,333	$ 90,100

The table below sets forth revenues by industry.

	Year ended September 30,		
(in thousands)	**2022**	**2021**	**2020**
Industrial chemicals/materials	$ 57,940	$ 34,475	$ 29,054
Academic research	37,097	25,299	19,642
Healthcare	106,363	71,241	40,036
Food/agriculture	2,165	1,318	1,368
Total revenues	$ 203,565	$ 132,333	$ 90,100

Long-lived assets located in the United States were $136.3 million and $40.6 million as of September 30, 2022 and 2021, respectively. Long-lived assets located outside of the United States were $3.1 million and $3.5 million as of September 30, 2022 and 2021, respectively.

14. Business acquisition

AbX Biologics, Inc. (“Abveris”)

On December 1, 2021, the Company acquired all of the outstanding stock of AbX Biologics, Inc. (“Abveris”), a privately-held company providing in vivo antibody discovery services. Abveris offers animal-based antibody discovery and screening services for its customers using the Berkeley Lights Beacon Platform and its proprietary DiversimAb and DivergimAb mouse models, which the Company can humanize using its antibody optimization solution.

The acquisition date fair value of the consideration transferred for Abveris was $102.6 million, consisting of cash totaling $9.5 million, 759,601 shares of the Company’s common stock valued at $66.1 million based on the Company’s closing stock price on December 1, 2021, employee stock awards issued to certain Abveris employees valued at $6.4 million, contingent consideration of $8.5 million, holdbacks of $12.8 million, and a net working capital adjustment of $0.7 million.

The contingent consideration is subject to the attainment of the calendar year 2022 revenue target. The contingent consideration becomes payable after December 31, 2022 and will be settled in a combination of cash and up to 334,939 shares of the Company’s common stock. The acquisition date fair value of the contingent consideration was based on forecasted revenue of Abveris relative to the 2022 revenue target as well as the Company’s stock price as of December 1, 2021.

The Company maintains an indemnity and adjustment holdback for the purposes of providing security against any adjustment to the amounts at closing. The indemnity holdback period extends for 18 months from the anniversary of the closing date. The indemnity holdback will be settled by transferring up to 128,351 shares of the Company’s stock, 15,304 options of the Company’s common stock and an immaterial amount of cash. The fair value of the indemnity holdback was $12.5 million as of the acquisition date. The adjustment holdback will be settled by transferring up to 3,416 shares of the Company’s stock, 408 options of the Company’s common stock and an immaterial amount of cash. The holdback adjustment liability was $0.3 million as of the acquisition date.

As at acquisition date, post-combination compensation expense excluded from the purchase price includes employee stock awards issued to certain Abveris employees valued at $41.0 million. This includes awards valued at $17.7 million which vest over a two year service period following the acquisition date and awards valued at $3.2 million with no future vesting requirements, which were deemed accelerated by the Company at the acquisition date and expensed within the three months ended December 31, 2021. Finally, post-combination expense includes awards valued at approximately $20.1 million which vest based on achievement of the calendar year 2022 revenue target and continuing employment through the payout date, and for certain employees, additional continuing employment through the two year anniversary of the acquisition date. As at September 30, 2022, the fair value of post-combination awards which vest based on performance was $15.4 million.

This acquisition was accounted for using the acquisition method of accounting in accordance with the business combination guidance in ASC 805. Under the acquisition accounting method, the total estimated purchase price was allocated to the identifiable assets acquired and liabilities assumed based on their fair values. The excess of the purchase price over the net of the acquisition date amounts of the identifiable assets acquired and liabilities assumed has been recorded as goodwill. Management’s estimate of the fair values of the acquired intangible assets at December 1, 2021 is preliminary and subject to change and is based on established and accepted valuation techniques performed with the assistance of third-party valuation specialists. Additional information, which existed as of the acquisition date but is yet unknown to the Company may become known to the Company during the remainder of the measurement period, which will not exceed twelve months from the acquisition date. Changes to amounts will be recorded as adjustments to the provisional amounts recognized as of the acquisition date and may result in a corresponding adjustment to goodwill in the period in which new information becomes available. The goodwill that arose from the acquisition consists of synergies expected from integrating Abveris into the Company’s operations and customer base. The goodwill recognized is not expected to be deductible for income tax purposes.

The following table summarizes the preliminary fair value amounts of the assets acquired and liabilities assumed as of the acquisition date, as well as the purchase consideration:

(in thousands)	December 1, 2021
Assets acquired	
Cash and cash equivalents	$ 1,306
Accounts receivable	2,309
Other current assets and prepaid expenses	1,654
Property, plant and equipment	1,078
Other non-current assets	2,970
Intangible assets	46,500
Liabilities assumed	
Current liabilities	3,549
Non-current liabilities	846
Deferred tax liability	10,545
Fair value of assets acquired and liabilities assumed	$ 40,877
Goodwill	61,768
Total purchase price	$ 102,645
Consideration transferred	
Cash	$ 9,467
Company common stock	72,514
Contingent consideration	8,500
Holdback liabilities	12,838
Net working capital adjustment	(674)
Fair value of purchase consideration	$ 102,645

The following table summarizes the preliminary estimate of the intangible assets as of the acquisition date:

(in thousands except for years)	Estimated Weighted Average Useful Lives in Years	Estimated Fair Value
Developed technology	14	$ 30,900
Customer relationships	10	14,700
Trade name	3	900
Estimated fair value of acquired intangible assets		$ 46,500

The Company estimated the fair value of the developed technology intangible asset and a portion of the customer relationships intangible assets using an excess earnings model. An additional portion of the customer relationships intangible assets was valued using the with and without method. The Company estimated the fair value of the trade name intangible asset using a relief from royalty approach. These fair value measurements were based on significant inputs not observable in the market and thus represent a Level 3 measurement. Key assumptions include the level and timing of expected future revenue, conditions and demands specific to each intangible asset over its remaining useful life, and discount rates the Company believes to be consistent with the inherent risks associated with each type of asset, which was approximately 9.6%. The fair value of these intangible assets is primarily affected by the projected revenues, gross margins, operating expenses, the technology obsolescence curve, and the anticipated timing of the projected income associated with each intangible asset coupled with the discount rates used to derive their estimated present values. The Company believes the level and timing of expected future cash flows appropriately reflects market participant assumptions.

Revenue from Abveris included in the Company’s consolidated statements of operations since the acquisition date through September 30, 2022 is $12.3 million. Net loss included in the Company’s consolidated statements of operations from Abveris since the acquisition date through September 30, 2022 is $6.6 million. The Company incurred transaction costs related to the acquisition of $1.5 million, which were recorded as an selling, general and administrative expense on the consolidated statements of operations and comprehensive loss for the year ended September 30, 2022.

The following table provides a reconciliation of contingent consideration and holdbacks balances from acquisition date to September 30, 2022:

(in thousands)	Contingent consideration	Holdbacks	Total
Balance at December 1, 2021 – acquisition date	$ 8,500	$ 12,164	$ 20,664
Change in fair value during the period	(6,400)	(7,071)	(13,471)
Balance at September 30, 2022	$ 2,100	$ 5,093	$ 7,193

The estimated fair value of the contingent consideration liability decreased as a result of the change in the Company's stock price from December 1, 2021 and a change in the probability of the attainment of the calendar year 2022 revenue target as calculated using the Monte Carlo simulation model. The estimated fair value of the holdback liability decreased as a result of the change in the Company's stock price as of September 30, 2022. For the year ended September 30, 2022, the Company recognized a gain of $13.5 million relating to the change in fair value of acquisition consideration in its consolidated statement of operations.

The post-combination effect from net deferred tax liability assumed from the Abveris acquisition also caused a release of the Company's deferred income tax valuation allowance. On the acquisition date, the release resulted in an income tax benefit of $10.5 million.

The following unaudited pro forma financial information presents the combined results of operations for the Company and Abveris as if the Abveris acquisition had occurred on October 1, 2020. The pro forma information contains the actual operating results of the Company, adjusted to include the pro forma impact of the Abveris acquisition, which is primarily additional expense as a result of the amortization of identifiable intangible assets. The unaudited pro forma financial information is prepared for comparative purposes only and does not purport to be indicative of the actual operating results that would have been recorded had the Abveris acquisition actually taken place on October 1, 2020 and should not be taken as indicative of future consolidated operating results. Additionally, the unaudited pro forma financial results do not include any anticipated synergies or other expected benefits from the Abveris acquisition.

	Year ended September 30,	
(in thousands)	2022	2021
Revenues	206,011	143,632
Net loss attributable to common stockholders	(216,796)	(146,515)

iGenomX International Genomics Corporation (iGenomX)

On June 14, 2021, the Company acquired all of the outstanding stock of iGenomX International Genomics Corporation (iGenomX). iGenomX offers multiplex library preparation tools for next-generation sequencing (NGS) workflows. The Company's acquisition is expected to enhance its capabilities to support multiplex sequencing preparations across multiple markets and to accelerate the Company's conversion of customers from static microarray platforms to genotyping by sequencing workflows.

The acquisition date fair value of the consideration transferred for iGenomX was approximately $27.3 million, consisting of a combination of cash totaling $0.5 million and 237,409 of the Company's common stock valued at $26.8 million based on the Company's closing stock price on June 14, 2021 and contingent consideration of up to 48,478 shares valued at $5.5 million based on the Company's closing stock price on June 14, 2021 and indemnity holdback of up to 43,662 shares valued at $4.9 million based on the Company's closing stock price on June 14, 2021. The contingent consideration was settled in shares of the Company's common stock upon completion of the transition milestones. The Company maintains an indemnity holdback for the purposes of providing security against any adjustment to the amounts at closing. The indemnity holdback period extends for 18 months from the anniversary of the closing date.

This acquisition has been accounted for using the acquisition method of accounting in accordance with the business combination guidance in FASB ASC 805. Under the acquisition accounting method, the total estimated purchase price was allocated to the tangible and intangible assets acquired and liabilities assumed based on their relative fair values. The excess of the purchase price over the net tangible and intangible assets acquired and liabilities assumed has been recorded as goodwill. The goodwill that arose from the acquisition consists of synergies expected from integrating iGenomX into the Company's operations and customer base. The goodwill recognized is not expected to be deductible for income tax purposes. The goodwill acquired from the iGenomX transaction was assigned to the Company's only reportable and operating segment business activity, which is manufacturing of synthetic DNA using its semiconductor-based silicon platform.

The estimated fair value of the consideration as of the acquisition date was approximately $37.7 million.

The following table summarizes the preliminary fair value amounts of the assets acquired and liabilities assumed as of the acquisition date, as well as the purchase consideration:

(in thousands)	June 14, 2021
Assets acquired	
Cash and cash equivalents	$ 7
Accounts receivable	37
Inventories	14
Intangible assets	18,410
Goodwill	21,538
Liabilities assumed	
Accounts payable	57
Accrued expenses	44
Deferred tax liability	2,252
Fair value of assets acquired and liabilities assumed	$ 37,653
Consideration transferred	
Cash	$ 490
Company common stock	26,772
Contingent consideration	5,467
Indemnity holdback	4,924
Fair value of purchase consideration	$ 37,653

The following table summarizes the preliminary estimate of the intangible assets as of the acquisition date:

(in thousands, except for years)	Estimated Weighted Average Useful Lives in Years	Estimated Fair Value
Developed technology	17	$ 17,900
Customer relationships	1.5	510
Estimated fair value of acquired intangible assets		$ 18,410

The Company estimated the fair value of the developed technology intangible asset using a discounted cash flow model. Significant judgment was exercised in determining the fair value of the developed technology intangible assets acquired, which included estimates and assumptions related to the projected revenues (specifically volume of sales), discount rate, and technology obsolescence curve. The Company estimated the fair value of the customer relationships intangible asset using a cost approach. These fair value measurements were based on significant inputs not observable in the market and thus represent a Level 3 measurement. Key assumptions include the level and timing of expected future cash flows, conditions and demands specific to each intangible asset over its remaining useful life, and discount rates, the Company believes to be consistent with the inherent risks associated with each type of asset, which was approximately 8.5%. The fair value of these intangible assets is primarily affected by the projected revenues, gross margins, operating expenses, the technology obsolescence curve, and the anticipated timing of the projected income associated with each intangible asset coupled with the discount rates used to derive their estimated present values. The Company believes the level and timing of expected future cash flows appropriately reflects market participant assumptions.

The Company has included the financial results of iGenomX in its consolidated financial statements from the date of acquisition, which were not material. The Company incurred transaction costs related to the acquisition of $0.8 million, which were recognized as an expense on the consolidated statements of operations and comprehensive loss for the year ended September 30, 2021.

The estimated fair value of the contingent consideration and indemnity holdback decreased from $10.4 million as of June 14, 2021 to $4.5 million as of September 30, 2022. For the year ended September 30, 2022, the Company recognized a gain of $0.8 million as change in fair value of acquisition consideration in its consolidated statement of operations due to the change in fair value of such liabilities, as a result of the change in the Company's stock price.

The post-combination effect from net deferred tax liability assumed from the iGenomX acquisition also caused a release of the Company's income tax valuation allowance. The release resulted in an income tax benefit of $2.0 million for the year ended September 30, 2021.

Issuance of contingent consideration for iGenomX acquisition

In December 2021, the Company determined that the transition milestones specified in the iGenomX acquisition agreement were completed, and the Company became obligated to issue 59,190 shares of its common stock to satisfy the contingent consideration. The shares of common stock, valued at $4.6 million, were subsequently issued by the Company during January 2022 along with an immaterial cash payment for fractional shares.

15. Investment in variable interest entity

On November 1, 2021, the Company contributed certain assets and licensed certain intellectual property rights to the then newly formed Revelar Biotherapeutics, Inc. ("Revelar"), an independently operated, new biotechnology company, to develop and commercialize an antibody, discovered and optimized by Twist Biopharma, a division of the Company. The Company granted a license to Revelar for the exclusive development of an antibody lead along with a series of back up compounds for the potential treatment of SARS-CoV-2. While the licensed antibody neutralized all known variants of concern through Omicron, it does not neutralize the BA.4 and BA.5 variants. The Company committed to invest up to $10.0 million in seed funding based on Revelar's progress in the development of the lead antibody and the potential licensing of additional antibody therapeutics, of which the Company made an initial investment of $5.0 million in a simple agreement for future equity ("SAFE"), and two additional investments of $2.5 million each, as described below. In exchange for the assignment of certain contractual rights and the license to the antibody, and its back-up compounds, the Company received stock of Revelar amounting to an ownership percentage as of the date of these financial statements of 49.80%, excluding shares and options reserved for future stock awards and further excluding shares that Revelar would have issued to the Company upon conversion of its SAFEs.

On February 3, 2022, the Company purchased an additional SAFE issued by Revelar for $2.5 million pursuant to the Asset License and Contract Assignment Agreement between the parties. In exchange for the SAFE, the Company obtained the right to receive shares of Revelar issued in a future preferred stock financing.

On April 6, 2022, the Company purchased an additional SAFE issued by Revelar for $2.5 million pursuant to the Asset License and Contract Assignment Agreement between the parties. In exchange for the SAFE, the Company obtained the right to receive shares of Revelar issued in a future preferred stock financing.

The Company determined that Revelar was a VIE as the entity lacks sufficient equity to finance its activities without additional support. Additionally, the Company determined that it has (a) the power to direct the activities that significantly impact Revelar's economic performance and (b) the obligation to absorb losses of, and the right to receive benefits from, Revelar that are potentially significant to Revelar. As a result, the Company was deemed to be the primary beneficiary of Revelar and is required to consolidate Revelar in accordance with ASC 810; however, the Company deconsolidated Revelar as described below.

Revelar incurred a net loss of approximately $14.6 million for the year ended September 30, 2022, and the decrease in net assets was fully absorbed by the Company.

The license agreement with Revelar which provided the Company with power to direct Revelar's activities that most significantly affected Revelar's economic performance and caused the Company to have the obligation to absorb or right to receive the majority of Revelar's losses or benefits, was terminated by all parties on September 30, 2022. As a result, the Company assessed its status as the primary beneficiary of Revelar and determined it was no longer the primary beneficiary of the VIE. The Company deconsolidated Revelar as of September 30, 2022. The deconsolidation resulted in a gain of $4.6 million, recorded in “gain on deconsolidation of subsidiary” in the consolidated statements of comprehensive loss in the year ended September 30, 2022 and the Company deconsolidated Revelar's net liabilities of $4.6 million.

* * * * *

PART IV

Item 15. *Exhibits, financial statement schedules*

Documents filed as part of this report are as follows:

(a) Consolidated Financial Statements

Our Consolidated Financial Statements are included in the “Index to Consolidated Financial Statements” under Part II, Item 8 and filed as part of this Amendment No. 1 to the Annual Report on Form 10-K.

(b) Consolidated Financial Statement Schedules

All financial statement schedules are omitted because the information called for is not required or is shown either in the consolidated financial statements or in the notes thereto.

(c) Exhibits

Set forth below is a list of exhibits that are being filed or incorporated by reference into this Amendment No. 1 to the Annual Report on Form 10-K:

Exhibit Number	Description	Filed / Furnished / Incorporated by Reference from Form	Incorporated by Reference from Exhibit Number	Date Filed
3.1	Amended and Restated Certificate of Incorporation	8-K	3.1	11/7/2018
3.2	Amended and Restated Bylaws	8-K	3.1	11/18/2022
4.1	Form of common stock certificate	S-1/A	4.1	10/17/2018
4.3	Warrant to Purchase Stock by and between Twist Bioscience Corporation and Silicon Valley Bank, dated March 28. 2016.	S-1	4.7	10/3/2018
4.4	Description of Common Stock	10-K	4.5	11/20/2020
+10.1	2013 Stock Plan and forms of agreement thereunder	S-1	10.1	10/3/2018
+10.2	2018 Equity Incentive Plan and forms of agreement thereunder	S-1/A	10.2	10/17/2018
+10.3	2018 Employee Stock Purchase Plan	S-1/A	10.3	10/17/2018
+10.4	Executive Incentive Bonus Plan	S-1	10.4	10/3/2018
+10.5	Form of Indemnification Agreement between Twist Bioscience Corporation and each of its Officers and Directors	S-1/A	10.8	10/17/2018
10.6	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	S-1	10.9	10/3/2018

Exhibit Number	Description	Filed / Furnished / Incorporated by Reference from Form	Incorporated by Reference from Exhibit Number	Date Filed
10.7	Lease Agreement by and between Twist Bioscience Corporation and ARE-San Francisco No. 32. LLC dated March 21, 2018	S-1	10.11	10/3/2018
10.7.1	First Amendment to Lease by and between Twist Bioscience Corporation and ARE-San Francisco No. 32, LLC, dated March 21, 2019	10-Q	10.2	5/1/2019
10.8*	Lease Agreement by and between Twist Bioscience Corporation and PWII Owner, LLC, dated December 18, 2020	8-K	10.1	12/22/2020
10.8.1*	First Amendment to Lease between Twist Bioscience Corporation and PWII Owner, LLC, dated April 13, 2021	8-K	10.1	4/16/2021
10.9†	End User Supply Agreement by and between Twist Bioscience Corporation and FUJIFILM Dimatix, Inc., dated November 5, 2015	S-1	10.14	10/3/2018
16.1	Letter from PricewaterhouseCoopers LLP addressed to the Securities Exchange Commission, dated March 9, 2022	8-K	16.1	3/9/2022
21.1	List of subsidiaries of the Registrant	10-K	21.1	11/28/2022
23.3	Consent of Ernst & Young, Independent Registered Public Accounting Firm	Filed herewith		
23.4	Consent of PricewaterhouseCoopers, Independent Registered Public Accounting Firm	Filed herewith		
31.3	Certification pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, Rule 13(a)-14(a)/15d-14(a), by President and Chief Executive Officer.	Filed herewith		
31.4	Certification pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, Rule 13(a)-14(a)/15d-14(a), by Chief Financial Officer.	Filed herewith		
32.3	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by President and Chief Executive Officer.	Furnished herewith		
32.4	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by Chief Financial Officer.	Furnished herewith		

Exhibit Number	Description	Filed / Furnished / Incorporated by Reference from Form	Incorporated by Reference from Exhibit Number	Date Filed
101.INS	XBRL Instance Document	Filed herewith		
101.SCH	XBRL Taxonomy Extension Schema Document	Filed herewith		
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	Filed herewith		
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	Filed herewith		
101.LAB	XBRL Taxonomy Extension Label Linkbase Document	Filed herewith		
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	Filed herewith		
104	Cover Page Interactive Data File (formatted in Inline XBRL and contained in Exhibit 101)			

+ Indicates a management contract or compensatory plan.

* Registrant has omitted schedules and exhibits pursuant to Item 601(a)(5) of Regulation S-K. The Registrant agrees to furnish supplementally a copy of the omitted schedules and exhibits to the SEC upon request.

† Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment that was separately filed with the SEC.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

June 5, 2023	Twist Bioscience Corporation	
	By:	/s/ James M. Thorburn
		James M. Thorburn
		Chief Financial Officer (Authorized officer)

Exhibit 23.3

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements:

1. Registration Statements on Form S-3 (Nos. 333-238906 and 333-234538) of Twist Bioscience Corporation,
2. Registration Statement on Form S-8 (333-228123) relating to the 2018 Equity Incentive Plan and 2013 Stock Plan of Twist Bioscience Corporation,
3. Registration Statement on Form S-8 (333-228547) relating to the 2018 Employee Stock Purchase Plan of Twist Bioscience Corporation, and
4. Registration Statements on Form S-8 (Nos. 333-236373, 333-258639 and 333-268573) relating to the 2018 Equity Incentive Plan and 2018 Employee Stock Purchase Plan of Twist Bioscience Corporation;

of our reports dated November 28, 2022, with respect to the consolidated financial statements of Twist Bioscience Corporation included in this Form 10-K/A.

/s/ Ernst & Young LLP

San Mateo, California
June 5, 2023

Exhibit 23.4

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-234538 and No. 333-238906) and Form S-8 (No. 333-228123, No. 333-228547, No. 333-236373, No. 333-258639 and No. 333-268573) of Twist Bioscience Corporation of our report dated November 22, 2021 relating to the financial statements, which appears in this Form 10-K/A.

/s/ PricewaterhouseCoopers LLP
San Jose, California
June 5, 2023

Exhibit 31.3

CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO
RULES 13A-14(A) AND 15D-14(A) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Emily M. Leproust, certify that:

1. I have reviewed this Amendment No. 1 to the Annual Report on Form 10-K/A of Twist Bioscience Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize, and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: June 5, 2023

By: /s/ Emily M. Leproust
Emily M. Leproust
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.4

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO
RULES 13A-14(A) AND 15D-14(A) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, James M. Thorburn, certify that:

1. I have reviewed this Amendment No. 1 to the Annual Report on Form 10-K/A of Twist Bioscience Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize, and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: June 5, 2023

By: /s/ James M. Thorburn
James M. Thorburn
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.3

CERTIFICATION OF
CHIEF EXECUTIVE OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Emily M. Leproust, certify pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that the Amendment No. 1 to the Annual Report on Form 10-K/A of Twist Bioscience Corporation for the fiscal year ended September 30, 2022, fully complies with the requirements of Section 13(a) or 15(d) of the Exchange Act and that the information contained in such Amendment No. 1 to the Annual Report on Form 10-K/A fairly presents, in all material respects, the financial condition and result of operations of Twist Bioscience Corporation.

Date: June 5, 2023	By:	/s/ Emily M. Leproust
		Emily M. Leproust
		Chief Executive Officer
		(Principal Executive Officer)

Exhibit 32.4

CERTIFICATION OF
CHIEF FINANCIAL OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, James M. Thorburn, certify pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the “Exchange Act”) and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that the Amendment No. 1 to the Annual Report on Form 10-K/A of Twist Bioscience Corporation for the fiscal year ended September 30, 2022, fully complies with the requirements of Section 13(a) or 15(d) of the Exchange Act and that the information contained in such Amendment No. 1 to the Annual Report on Form 10-K/A fairly presents, in all material respects, the financial condition and result of operations of Twist Bioscience Corporation.

Date: June 5, 2023	By:	/s/ James M. Thorburn
		James M. Thorburn
		Chief Financial Officer
		(Principal Financial Officer)