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

Form 10-Q

(Mark One)

x QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended March 31, 2022

Or

o **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 001-34899

Pacific Biosciences of California, Inc.
(Exact name of registrant as specified in its charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**16-1590339** **(I.R.S. Employer Identification No.)**
1305 O'Brien Drive **Menlo Park, CA** **(Address of principal executive offices)**	**94025** **(Zip Code)**

(650) 521-8000
(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, par value $0.001 per share	PACB	The NASDAQ Stock Market LLC

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 T No o

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 T No o

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.

Large accelerated filer	T	Accelerated filer	o
Non-accelerated filer	o	Smaller reporting company	o
Emerging growth company	o		

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. o

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes o No T

Number of shares outstanding of the issuer's common stock as of April 30, 2022: 224,383,347.

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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Condensed Consolidated Balance Sheets
(Unaudited)

(in thousands, except per share amounts)	March 31, 2022	December 31, 2021
Assets		
Current assets		
Cash and cash equivalents	$ 428,574	$ 460,725
Investments	534,201	583,675
Accounts receivable, net	27,852	24,241
Inventory, net	29,625	24,599
Prepaid expenses and other current assets	8,436	7,394
Short-term restricted cash	500	500
Total current assets	1,029,188	1,101,134
Property and equipment, net	35,510	32,504
Operating lease right-of-use assets, net	44,921	46,617
Long-term restricted cash	4,982	4,592
Intangible assets, net	410,751	410,979
Goodwill	409,974	409,974
Other long-term assets	1,340	1,170
Total assets	$ 1,936,666	$ 2,006,970
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 17,607	$ 11,002
Accrued expenses	19,489	36,261
Deferred revenue, current	12,729	10,977
Operating lease liabilities, current	8,056	7,710
Other liabilities, current	3,129	5,759
Total current liabilities	61,010	71,709
Deferred revenue, non-current	25,246	25,049
Contingent consideration liability, non-current	168,654	169,717
Operating lease liabilities, non-current	47,740	49,970
Convertible senior notes, net, non-current	896,220	896,067
Other liabilities, non-current	3,218	3,471
Total liabilities	1,202,088	1,215,983
Commitments and contingencies		
Stockholders' equity		
Preferred stock, $0.001 par value:		
Authorized 50,000 shares; No shares issued or outstanding	—	—
Common stock, $0.001 par value:		
Authorized 1,000,000 shares; issued and outstanding 224,329 and 220,978 shares at March 31, 2022 and December 31, 2021, respectively	224	221
Additional paid-in capital	2,038,030	2,009,945
Accumulated other comprehensive loss	(4,085)	(1,087)
Accumulated deficit	(1,299,591)	(1,218,092)
Total stockholders' equity	734,578	790,987
Total liabilities and stockholders' equity	$ 1,936,666	$ 2,006,970

See accompanying notes to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Condensed Consolidated Statements of Operations and Comprehensive Loss
(Unaudited)

(in thousands, except per share amounts)	Three Months Ended March 31, 2022	2021
Revenue:		
Product revenue	$ 28,244	$ 25,303
Service and other revenue	4,929	3,694
Total revenue	33,173	28,997
Cost of revenue:		
Cost of product revenue	14,820	12,697
Cost of service and other revenue	4,015	3,323
Amortization of intangible assets	183	—
Total cost of revenue	19,018	16,020
Gross profit	14,155	12,977
Operating expense:		
Research and development	52,937	20,548
Sales, general and administrative	39,804	26,139
Change in fair value of contingent consideration	(1,063)	—
Total operating expense	91,678	46,687
Operating loss	(77,523)	(33,710)
Loss from Continuation Advances from Illumina	—	(52,000)
Interest expense	(3,697)	(1,789)
Other (expense) income, net	(279)	64
Net loss	(81,499)	(87,435)
Other comprehensive loss:		
Unrealized loss on investments	(2,998)	(11)
Comprehensive loss	$ (84,497)	$ (87,446)
Net loss per share:		
Basic	$ (0.37)	$ (0.45)
Diluted	$ (0.37)	$ (0.45)
Weighted average shares outstanding used in calculating net loss per share:		
Basic	222,289	194,790
Diluted	222,289	194,790

See accompanying notes to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Condensed Consolidated Statements of Stockholders' Equity

(Unaudited)

(in thousands)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive (Loss) Income	Accumulated Deficit	Total Stockholders' Equity
For the three months ended March 31, 2022						
Balance at December 31, 2021	220,978	$ 221	$ 2,009,945	$ (1,087)	$ (1,218,092)	$ 790,987
Net loss	—	—	—	—	(81,499)	(81,499)
Other comprehensive income	—	—	—	(2,998)	—	(2,998)
Issuance of common stock in conjunction with equity plans	3,351	3	5,589	—	—	5,592
Stock-based compensation expense	—	—	22,496	—	—	22,496
Balance at March 31, 2022	224,329	$ 224	$ 2,038,030	$ (4,085)	$ (1,299,591)	$ 734,578
For the three months ended March 31, 2021						
Balance at December 31, 2020	192,294	$ 192	$ 1,372,083	$ 85	$ (1,036,869)	$ 335,491
Net loss	—	—	—	—	(87,435)	(87,435)
Other comprehensive loss	—	—	—	(11)	—	(11)
Issuance of common stock in conjunction with equity plans	6,046	6	22,337	—	—	22,343
Stock-based compensation expense	—	—	10,165	—	—	10,165
Balance at March 31, 2021	198,340	$ 198	$ 1,404,585	$ 74	$ (1,124,304)	$ 280,553

See accompanying notes to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Condensed Consolidated Statements of Cash Flows

(Unaudited)

(in thousands)	Three Months Ended March 31, 2022	2021
Cash flows from operating activities		
Net loss	$ (81,499)	$ (87,435)
Adjustments to reconcile net loss to net cash used in operating activities		
Loss from Continuation Advances	—	52,000
Depreciation	2,268	1,606
Amortization of intangible assets	228	—
Amortization of right-of-use assets	1,696	790
Amortization of debt discount and financing costs	159	74
Stock-based compensation	22,703	10,165
Amortization from investment premium	758	565
Change in the estimated fair value of contingent consideration	(1,063)	—
Loss on disposition of equipment	100	—
Changes in assets and liabilities		
Accounts receivable	(3,611)	3,931
Inventory	(6,275)	(2,556)
Prepaid expenses and other assets	(1,185)	(675)
Accounts payable	6,373	153
Accrued expenses	(17,234)	(2,680)
Deferred revenue	1,949	5,004
Operating lease liabilities	(1,884)	(1,066)
Other liabilities	(2,512)	(2,980)
Net cash used in operating activities	(79,029)	(23,104)
Cash flows from investing activities		
Purchase of property and equipment	(3,638)	(401)
Purchase of investments	(76,369)	(64,426)
Sales of investments	—	4,597
Maturities of investments	122,060	68,400
Net cash provided by investing activities	42,053	8,170
Cash flows from financing activities		
Continuation Advances	—	(52,000)
Proceeds from issuance of Convertible Senior Notes, net of issuance costs	—	895,624
Proceeds from issuance of common stock from equity plans	5,592	22,343
Notes payable principal payoff	(377)	—
Other	—	(246)
Net cash provided by financing activities	5,215	865,721
Net increase in cash and cash equivalents and restricted cash	(31,761)	850,787
Cash and cash equivalents and restricted cash at beginning of period	465,817	85,947
Cash and cash equivalents and restricted cash at end of period	$ 434,056	$ 936,734
Cash and cash equivalents at end of period	428,574	932,398
Restricted cash at end of period	5,482	4,336
Cash and cash equivalents and restricted cash at end of period	$ 434,056	$ 936,734

See accompanying notes to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Notes to Condensed Consolidated Financial Statements
(Unaudited)

NOTE 1. ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

We are a life science technology company that designs, develops, and manufactures advanced sequencing solutions to help scientists and clinical researchers resolve genetically complex problems. Our products and technology under development stem from two highly differentiated core technologies focused on accuracy, quality and completeness which include our existing HiFi long read sequencing technology and our emerging short read Sequencing by Binding (SBB®) technology. Our products address solutions across a broad set of applications including human germline sequencing, plant and animal sciences, infectious disease and microbiology, oncology, and other emerging applications. Our focus is on providing our customers with advanced sequencing technologies with higher throughput and improved workflows that we believe will enable dramatic advancements in routine healthcare. Our customers include academic and governmental research institutions, commercial testing and service laboratories, genome centers, public health labs, hospitals and clinical research institutes, contract research organizations (CROs), pharmaceutical companies and agricultural companies.

References in this report to "PacBio," "we," "us," the "Company," and "our" refer to Pacific Biosciences of California, Inc. and its consolidated subsidiaries.

Basis of Presentation and Consolidation

Our unaudited condensed consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States, or U.S. GAAP, as set forth in the Financial Accounting Standards Board, or FASB, Accounting Standards Codification, or ASC. The unaudited condensed consolidated financial statements include the accounts of Pacific Biosciences and our wholly owned subsidiaries. Certain information and footnote disclosures typically included in our audited financial statements have been condensed or omitted. The accompanying unaudited condensed consolidated financial statements have been prepared on a consistent basis with the December 31, 2021 audited consolidated financial statements and include all adjustments, consisting of only normal recurring adjustments, necessary to fairly state our financial position, results of operations, comprehensive income (loss), and cash flows for the period, but are not necessarily indicative of the results to be expected for the entire year or any future periods. All intercompany transactions and balances have been eliminated.

The financial statements should be read in conjunction with the audited consolidated financial statements and notes included in our Annual Report on Form 10-K for the year ended December 31, 2021.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires us to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes to the financial statements. On an ongoing basis, we evaluate our significant estimates including, but not limited to, the valuation of inventory, the determination of stand-alone selling prices for revenue recognition, the fair value of contingent consideration, the valuation of acquired intangible assets, the fair value of certain equity awards, the useful lives assigned to long-lived assets, the computation of provisions for income taxes, the borrowing rate used in calculating the operating lease right-of-use assets and operating lease liabilities, the probability associated with variable payments under partnership development agreements, and the valuations related to our convertible senior notes. While the extent of the potential impact of the ongoing COVID-19 pandemic on our business is highly uncertain, we considered information available related to assumptions and estimates used to determine the results reported and asset valuations as of March 31, 2022. Actual results could differ materially from these estimates.

Cash, Cash Equivalents, and Investments

We consider all highly liquid investments purchased with an original maturity of 90 days or less to be cash equivalents.

We classify our investments in debt securities as available-for sale and report the investments at fair value in current assets. We evaluate our available-for-sale investments in unrealized loss positions and assess whether the unrealized loss is credit-related. Unrealized gains and losses that are not credit-related are recognized in accumulated other comprehensive (loss) income in stockholders' equity. Realized gains and losses, expected credit losses, as well as interest income, on available-for-sale securities are also reported in other income, net. The cost used in the determination of gains and losses of securities sold is based on the specific identification method. The cost of marketable securities is adjusted for the amortization of premiums and discounts to expected maturity. Premium and discount amortization is recorded in other income, net.

Our investment portfolio at any point in time contains investments in cash deposits, money market funds, commercial paper, corporate debt securities and US government and agency securities with high credit ratings. We have established guidelines regarding diversification and maturities of investments with the objectives of maintaining safety and liquidity, while maximizing yield.

Concentration and Other Risks

For the three months ended March 31, 2022, two customers accounted for approximately 14% and 11%, respectively, of total revenue during the period. For the three months ended March 31, 2021, one customer accounted for approximately 12% of total revenue during the period. No other customers exceeded 10% during those periods.

As of March 31, 2022, 56% of our accounts receivable were from domestic customers, compared to 53% as of December 31, 2021. As of March 31, 2022, one customer represented 17% of our accounts receivable, while no customer represented 10% or greater of our net accounts receivable as of December 31, 2021.

Recent Accounting Pronouncements

Recently Adopted Accounting Standards

There are no accounting standards updates ("ASUs") that have been recently adopted.

Significant Accounting Policies

There have been no changes to our significant accounting policies as disclosed in the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, however, as a result of certain changes to the standard contractual terms and conditions with customers implemented during the quarter ended March 31, 2022, we concluded a change in the application of our accounting policy, in accordance with ASC 606, was appropriate.

Specifically, we modified the standard contractual terms with customers during the current quarter, to reflect transfer of title and risk of loss and right to invoice upon delivery. We also updated the terms of the warranty provided with the instrument to remove the service component. As a result, the warranty is no longer a separate performance obligation and, accordingly, we accrue for the cost of the assurance warranty when revenue of the instrument is recognized. In addition, because of technical enhancements associated with our more recent instrument releases, including the Sequel IIe systems, installation services are now distinct from the instrument itself. Therefore, instrument revenue is now recognized upon transfer of control of the asset to the customer, which is generally upon delivery for sales made to our non-distributor customers.

NOTE 2. BUSINESS ACQUISITIONS

Omniome, Inc.

On September 20, 2021, we completed our acquisition of Omniome, Inc. ("Omniome"), a San Diego-based company developing a highly differentiated, proprietary short-read DNA sequencing platform capable of delivering high accuracy.

In connection with the acquisition, the contingent consideration of $200 million (composed of $100 million in cash and $100 million in shares of our common stock) is due upon the achievement of a milestone, defined as the first commercial shipment to a customer of a nucleotide sequencing platform, comprising both an instrument and related consumables, that utilizes SBB technology. The number of shares of stock to be issued will be determined using the volume-weighted average of the trading prices of our common stock for the twenty trading days ending with and including the trading day that is two days immediately prior to the achievement of the milestone. Of the $100 million in shares of our common stock to be issued as part of the milestone, $4.1 million was attributable to stock options issued by PacBio in replacement of Omniome's unvested options as part of the transaction.

The contingent consideration is accounted for as a liability at fair value, with changes during each reporting period recognized in our Consolidated Statements of Operations and Comprehensive Loss. The fair value of the contingent consideration liability is calculated, with the assistance from a third-party valuation firm, using a scenario-based method which considers a range of possible outcomes and their assigned probabilities of occurrence. The potential outcomes are discounted to present value at a discount rate equal to the sum of the term-matched risk-free-interest rate plus PacBio's credit spread.

The acquisition was accounted for as a business combination and, accordingly, the total fair value of the consideration transferred was allocated to the tangible and intangible assets acquired and liabilities assumed based on their fair values on the acquisition date. The major classes of assets and liabilities to which we have allocated the total fair value of the consideration transferred were as follows (in thousands):

Cash and cash equivalents	$	15,338
Property and equipment, net		6,123
Operating lease right-of-use assets, net		18,095
In-process research and development ("IPR&D")		400,000
Goodwill		390,665
Other assets		3,203
Deferred income tax liability		(91,814)
Liabilities assumed		(26,821)
Total consideration transferred	$	714,789

We expect to finalize the purchase price allocation within 12 months of the acquisition date. We will recognize adjustments to the preliminary amounts with a corresponding adjustment to goodwill in the reporting period in which the adjustments to the preliminary amounts are determined, which we expect to be primarily due to the review of certain tax attributes.

Circulomics, Inc.

On July 20, 2021, we acquired Circulomics Inc. ("Circulomics"), a Maryland-based biotechnology company focused on delivering highly differentiated sample preparation products that enable genomic workflows.

We paid $29.5 million in cash in exchange for all outstanding shares of common stock of Circulomics. We allocated the consideration transferred to the identifiable assets acquired and liabilities assumed based on their respective fair values at the date of the completion of the acquisition. The major classes of assets and liabilities to which we have allocated the total fair value of the consideration transferred were as follows (in thousands):

Cash and cash equivalents	$	987
Property and equipment, net		214
Intangible assets		11,360
Goodwill		19,309
Other assets		467
Deferred income tax liability		(2,672)
Liabilities assumed		(118)
Total consideration transferred	$	29,547

We expect to finalize the purchase price allocation within 12 months of the acquisition date. We will record adjustments to the fair value of the assets acquired, liabilities assumed and goodwill within the twelve-month measurement period, if necessary, which we expect to be primarily due to the review of certain tax attributes.

NOTE 3. INVITAE COLLABORATION

On January 12, 2021 we entered into a multi-year Development and Commercialization Agreement (the "Development Agreement") with Invitae Corporation ("Invitae"). Pursuant to the Development Agreement, Invitae is providing certain funding to us to develop products relating to production-scale high-throughput sequencing ("Program Products"). If Program Products become commercially available, Invitae may purchase the Program Products. We are currently renegotiating the terms of the Development Agreement. As of March 31, 2022 and December 31, 2021, we have recognized payments received from Invitae of $23.5 million in deferred revenue, non-current, on the Consolidated Balance Sheet.

NOTE 4. TERMINATION OF MERGER WITH ILLUMINA

On November 1, 2018, we entered into an Agreement and Plan of Merger (as amended, the "Illumina Merger Agreement") with Illumina, Inc. ("Illumina") and FC Ops Corp., a wholly owned subsidiary of Illumina ("Illumina Merger Sub"). On January 2, 2020, we, Illumina and Illumina Merger Sub, entered into an agreement to terminate the Merger Agreement (the "Termination Agreement").

Continuation Advances from Illumina

As part of the Termination Agreement, Illumina paid us cash payments ("Continuation Advances") totaling $52.0 million. Up to the full $52.0 million of Continuation Advances paid to us were repayable without interest to Illumina if, within two years of March 31, 2020, we entered into, or consummated a Change of Control Transaction or raised at least $100 million in a single equity or debt financing (that may have multiple closings), with the amount repayable dependent on the amount raised by us.

Resulting from the issuance and sale of $900 million of 1.50% Convertible Senior Notes due February 15, 2028, $52.0 million of Continuation Advances were paid without interest to Illumina in February 2021, and a corresponding non-operating expense was recorded in the Consolidated Statements of Operations and Comprehensive (Loss) Income during the quarter ended March 31, 2021.

NOTE 5. FINANCIAL INSTRUMENTS

Fair Value of Financial Instruments

Fair value is the exchange price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The fair value hierarchy established under GAAP requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The three levels of inputs that may be used to measure fair value are as follows:

Level 1: quoted prices in active markets for identical assets or liabilities;

Level 2: inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices in active markets for similar assets or liabilities, quoted prices for identical or similar assets or liabilities 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; and

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.

We consider an active market as one in which transactions for the asset or liability occurs with sufficient frequency and volume to provide pricing information on an ongoing basis. Conversely, we view an inactive market as one in which there are few transactions for the asset or liability, the prices are not current, or price quotations vary substantially either over time or among market makers. Where appropriate, our non-performance risk, or that of our counterparty, is considered in determining the fair values of liabilities and assets, respectively.

We classify our cash deposits and money market funds within Level 1 of the fair value hierarchy because they are valued using bank balances or quoted market prices. We classify our investments as Level 2 instruments based on market pricing and other observable inputs. We did not classify any of our investments within Level 3 of the fair value hierarchy.

Assets and liabilities measured at fair value are classified in their entirety based on the lowest level input that is significant to the fair value measurement. Our assessment of the significance of a particular input to the entire fair value measurement requires management to make judgments and consider factors specific to the asset or liability.

The carrying amount of our accounts receivable, prepaid expenses, other current assets, accounts payable, accrued expenses and other liabilities, current, approximate fair value due to their short maturities.

Assets and Liabilities Measured at Fair Value on a Recurring Basis

The following table sets forth the fair value of our financial assets and liabilities that were measured on a recurring basis as of March 31, 2022 and December 31, 2021 respectively:

	March 31, 2022				December 31, 2021			
(in thousands)	**Level 1**	**Level 2**	**Level 3**	**Total**	**Level 1**	**Level 2**	**Level 3**	**Total**
Assets								
Cash and cash equivalents:								
Cash and money market funds	$ 227,251	$ —	$ —	$ 227,251	$ 327,315	$ —	$ —	$ 327,315
Commercial paper	—	143,958	—	143,958	—	133,185	—	133,185
U.S. government & agency securities	—	32,377	—	32,377	—	225	—	225
U.S. Treasury securities	—	24,988	—	24,988	—	—	—	—
Total cash and cash equivalents	227,251	201,323	—	428,574	327,315	133,410	—	460,725
Investments:								
Commercial paper	—	141,976	—	141,976	—	187,632	—	187,632
Corporate debt securities	—	5,313	—	5,313	—	8,968	—	8,968
U.S. government & agency securities	—	386,912	—	386,912	—	387,075	—	387,075
Total investments	—	534,201	—	534,201	—	583,675	—	583,675
Short-term restricted cash:								
Cash	500	—	—	500	500	—	—	500
Long-term restricted cash:								
Cash	4,982	—	—	4,982	4,592	—	—	4,592
Total assets measured at fair value	$ 232,733	$ 735,524	$ —	$ 968,257	$ 332,407	$ 717,085	$ —	$ 1,049,492
Liabilities								
Contingent consideration	$ —	$ —	$ 168,654	$ 168,654	$ —	$ —	$ 169,717	$ 169,717
Total liabilities measured at fair value	$ —	$ —	$ 168,654	$ 168,654	$ —	$ —	$ 169,717	$ 169,717

We classify contingent consideration, which was incurred in connection with the acquisition of Omniome, within Level 3 as factors used to develop the estimate of fair value include unobservable inputs that are not supported by market activity and are significant to the fair value.

On a quarterly basis, we estimate the fair value of the contingent consideration liability by discounting the probability-weighted outcomes to present value using an estimate of our borrowing rate and the risk-free rate. The potential outcomes of milestone achievement dates are within the period from December 31, 2022 to June 30, 2025. A decrease in the probability of an earlier scenario within this range would result in a decrease in the fair value of the liability. The discount rates used are the sum of the U.S. risk-free rate and the estimated subordinated credit spread for B- and B credit rating, which range from 5.7% to 6.7%. An increase in the discount rates used can also result in the decrease in the fair value of liability, which was the primary factor in the $1.1 million decrease in liability at March 31, 2022. Changes in our estimated subordinated credit spread can result in changes in the fair value of the contingent consideration liability, where a lower credit spread may result in an increased liability valuation.

Changes in the estimated fair value of the contingent consideration liability for the three months ended March 31, 2022 were as follows:

(in thousands)	**Level 3**
Beginning balance as of December 31, 2021	$ 169,717
Change in estimated fair value	(1,063)
Ending balance as of March 31, 2022	$ 168,654

Changes to the fair value are recorded as the Change in fair value of contingent consideration in the Condensed Consolidated Statement of Operations and Comprehensive Loss.

For the three months ended March 31, 2022, there were no transfers between Level 1, Level 2, or Level 3 assets or liabilities reported at fair value on a recurring basis, and our valuation techniques did not change compared to the prior year.

The following tables summarize our cash, cash equivalents and investments as of March 31, 2022 and December 31, 2021 (in thousands):

	As of March 31, 2022			
(in thousands)	**Amortized Cost**	**Gross unrealized gains**	**Gross unrealized losses**	**Fair Value**
Cash and cash equivalents:				
Cash and money market funds	$ 227,251	$ —	$ —	$ 227,251
Commercial paper	143,964	2	(8)	143,958
U.S. government & agency securities	32,386	—	(9)	32,377
U.S. Treasury securities	24,989	—	(1)	24,988
Total cash and cash equivalents	428,590	2	(18)	428,574
Investments:				
Commercial paper	142,266	1	(291)	141,976
Corporate debt securities	5,322	—	(9)	5,313
U.S. government & agency securities	390,682	7	(3,777)	386,912
Total investments	538,270	8	(4,077)	534,201
Total cash, cash equivalents and investments	$ 966,860	$ 10	$ (4,095)	$ 962,775
Short-term restricted cash:				
Cash	$ 500	$ —	$ —	$ 500
Long-term restricted cash:				
Cash	$ 4,982	$ —	$ —	$ 4,982

	As of December 31, 2021			
(in thousands)	**Amortized Cost**	**Gross unrealized gains**	**Gross unrealized losses**	**Fair Value**
Cash and cash equivalents:				
Cash and money market funds	$ 327,316	$ —	$ —	$ 327,316
Commercial paper	133,190	—	(5)	133,185
U.S. government & agency securities	225	—	—	224
Total cash and cash equivalents	460,731	—	(5)	460,725
Investments:				
Commercial paper	187,705	—	(73)	187,632
Corporate debt securities	8,964	9	(5)	8,968
U.S. government & agency securities	388,088	1	(1,014)	387,075
Total investments	584,757	10	(1,092)	583,675
Total cash, cash equivalents and investments	$ 1,045,488	$ 10	$ (1,097)	$ 1,044,400
Short-term restricted cash:				
Cash	$ 500	$ —	$ —	$ 500
Long-term restricted cash:				
Cash	$ 4,592	$ —	$ —	$ 4,592

The following table summarizes the contractual maturities of our cash equivalents and available-for-sale investments, excluding money market funds, as of March 31, 2022:

(in thousands)	**Fair Value**
Due in one year or less	$ 651,213
Due after one year through five years	84,311
Total investments	$ 735,524

Actual maturities may differ from contractual maturities because issuers may have the right to call or prepay obligations without call or prepayment penalties.

NOTE 6. BALANCE SHEET COMPONENTS

Short-term Restricted Cash

As of March 31, 2022 and December 31, 2021, the short-term restricted cash balance was $0.5 million, which was comprised of security deposits for the credit cards of employees.

Inventory, net

As of March 31, 2022 and December 31, 2021, our inventory, net, consisted of the following components:

(in thousands)	March 31, 2022	December 31, 2021
Purchased materials	$ 11,530	$ 7,993
Work in process	9,202	8,611
Finished goods	8,893	7,995
Inventory	$ 29,625	$ 24,599

Long-term Restricted Cash

For our facility located at 1305 O'Brien Drive, Menlo Park, California (the "O'Brien Lease"), we were required to establish a letter of credit for the benefit of the landlord and to submit $4.5 million as a deposit for the letter of credit in October 2015. Subsequently, pursuant to the terms of the O'Brien Lease, beginning on May 1, 2019, the amount of the letter of credit was reduced by $0.5 million each year thereafter on May 1. As such, $3.0 million was recorded in long-term restricted cash related to the O'Brien Lease in the Condensed Consolidated Balance Sheets as of March 31, 2022 and December 31, 2021, respectively. In connection with the acquisition of Omniome in September 2021, we acquired $1.6 million of long-term restricted cash related to a letter of credit established for a facility lease. At March 31, 2022, we had an additional $0.4 million in long-term restricted cash primarily related to lease deposits.

Intangible Assets and Goodwill

Intangible assets include acquired in-process research and development (IPR&D) of $400 million as a result of the Omniome acquisition in September 2021. The IPR&D will remain on our consolidated balance sheet as an indefinite-lived intangible asset until the completion or abandonment of the associated research and development activities. During the development period following the acquisition, IPR&D will not be amortized, but instead will be tested for impairment annually and more frequently if events or changes in circumstances indicate that it is more likely than not that the asset is impaired. Upon completion of the development, we will begin to amortize the asset over the life of the product, or record an impairment charge if the asset is determined to be impaired.

In addition to IPR&D, we had the following definite-lived intangible assets from business acquisitions (in thousands, except years):

	Estimated Useful Life (in years)	As of March 31, 2022			As of December 31, 2021		
		Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Developed technology	15	$ 11,000	$ (489)	$ 10,511	$ 11,000	$ (306)	$ 10,694
Customer relationships	2	360	(120)	240	360	(75)	285
Total		$ 11,360	$ (609)	$ 10,751	$ 11,360	$ (381)	$ 10,979

The estimated future amortization expense of acquisition-related intangible assets with definite lives is estimated as follows:

	(in thousands)
Remainder of 2022	$ 685
2023	838
2024	733
2025	733
2026	733
2027 and thereafter	7,029
Total	$ 10,751

We review definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets.

Goodwill is reviewed for impairment at least annually during the second quarter, or more frequently if an event occurs indicating the potential for impairment. We had no indicators of impairment related to goodwill during the three months ended March 31, 2022.

Deferred revenue

As of March 31, 2022, we had a total of $38.0 million of deferred revenue, $12.7 million of which was recorded as deferred revenue, current and primarily relates to deferred service contract revenues to be recognized over the next year and the remaining $25.2 million was recorded as deferred revenue, non-current. Of the deferred revenue, non-current balance, $23.5 million relates to payments received under the Invitae collaboration described in *Note 3, Invitae Collaboration* in Part I, Item 1 of this Quarterly Report on Form 10-Q and $1.7 million primarily relates to deferred service contract revenues and is scheduled to be recognized in the next 5 years. Revenue recorded in the three months ended March 31, 2022 includes $4.0 million of previously deferred revenue that was included in deferred

revenue, current as of December 31, 2021. Contract assets as of March 31, 2022 and December 31, 2021 were not material.

As of March 31, 2022, we had a total of $0.6 million of deferred commissions included in prepaid expenses and other current assets which is recognized as sales, general and administrative expense as the related revenue is recognized. Costs to obtain a contract are expensed as incurred if the amortization period would have been a year or less.

Term loans

In connection with the acquisition of Omniome, we acquired $1.3 million in short-term debt and $3.0 million in long-term debt relating to a term loan facility that Omniome obtained in April 2020. Borrowings on the term loan facility were used to fund Omniome's purchases of equipment, which serves as collateral. Each term loan has a term of 43 months and bears a fixed interest rate of approximately 17% annually. The fee for the elective option to prepay all, but not less than all, of the borrowed amounts at any time after the 24th month and before the 43rd month after the commencement date, is 4% of the outstanding loan balance. Payments are made in equal monthly installments including principal and interest. The following table presents the future principal payments on the term loans:

(in thousands)		
Remainder of 2022	$	1,231
2023		1,842
2024		490
Total	$	3,563

NOTE 7. CONVERTIBLE SENIOR NOTES

On February 9, 2021, we entered into an investment agreement (the "Investment Agreement") with SB Northstar LP (the "Purchaser"), a subsidiary of SoftBank Group Corp., relating to the issuance and sale to the Purchaser of $900 million in aggregate principal amount of our 1.50% Convertible Senior Notes (the "Notes"). The Notes were issued on February 16, 2021.

The Notes are governed by an indenture (the "Indenture") between the Company and U.S. Bank National Association, as trustee. The Notes bear interest at a rate of 1.50% per annum. Interest on the Notes is payable semi-annually in arrears on February 15 and August 15 and commenced on August 15, 2021. The Notes will mature on February 15, 2028, subject to earlier conversion, redemption or repurchase.

The Notes are convertible at the option of the holder at any time until the second scheduled trading day prior to the maturity date, including in connection with a redemption by the Company. The Notes are convertible into shares of our common stock based on an initial conversion rate of 22.9885 shares of common stock per $1,000 principal amount of the Notes (which is equal to an initial conversion price of $43.50 per share), in each case subject to customary anti-dilution and other adjustments as a result of certain extraordinary transactions. Upon conversion of the Notes, we may elect to settle such conversion obligation in shares, cash or a combination of shares and cash.

On or after February 20, 2026, the Notes will be redeemable by the Company in the event that the closing sale price of our common stock has been at least 150% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which we provide the redemption notice at a redemption price of 100% of the principal amount of such Notes, plus accrued and unpaid interest up to, but excluding, the redemption date.

With certain exceptions, upon a change of control of the Company or the failure of our common stock to be listed on certain stock exchanges (a "Fundamental Change"), the holders of the Notes may require that we repurchase all or part of the principal amount of the Notes at a purchase price of par plus unpaid interest up to, but excluding, the maturity date.

The Indenture includes customary "events of default," which may result in the acceleration of the maturity of the Notes under the Indenture. The Indenture also includes customary covenants for convertible notes of this type.

To the extent we elect, the sole remedy for an event of default relating to our failure to comply with certain of our reporting obligations shall, for the first 360 calendar days after the occurrence of such an event of default, consist exclusively of the right to receive additional interest on the Notes at a rate equal to (i) 0.25% per annum of the principal amount of the Notes outstanding for each day during the first 180 calendar days of the 360-day period after the occurrence of such an event of default during which such event of default is continuing (or, if earlier, the date on which such event of default is cured or waived) and (ii) 0.50% per annum of the principal amount of the Notes outstanding for each day from, and including, the 181st calendar day to, and including, the 360th calendar day after the occurrence of such an event of default during which such event of default is continuing (or, if earlier, the date on which such event of default is cured or waived as provided for in the Indenture). On the 361st day after such event of default (if the event of default relating to our failure to comply with its obligations is not cured or waived prior to such 361st day), the Notes shall be subject to acceleration as provided for in the Indenture.

The Notes are accounted for in accordance with the authoritative guidance for convertible debt instruments that may be settled in cash upon conversion. Under ASU 2020-06, the guidance requires that debt with an embedded conversion feature is accounted for in its entirety as a liability and no portion of the proceeds from the issuance of the convertible debt instrument is accounted for as attributable to the conversion feature unless the conversion feature is required to be accounted for separately as an embedded derivative or the conversion feature results in a substantial premium. The conversion feature of the Notes is not accounted for as an embedded derivative because it is considered to be indexed to our common stock, and the Notes were not issued at a premium; therefore, the Notes are accounted for in their entirety as a liability. Because we may elect to settle any conversions entirely in shares, and because settlement in shares is the default settlement method, the liability is classified as non-current.

The requirement to repurchase the Notes including unpaid interest to the maturity date in the event of a Fundamental Change is considered a put option for certain periods requiring bifurcation under ASC 815 – *Derivatives and Hedging*. However, given the low probability of a Fundamental Change occurring during the applicable periods, the value of the embedded derivative is immaterial.

The additional interest feature in the event of our failure to comply with certain reporting obligations is also considered an embedded derivative requiring bifurcation under ASC 815. However, due to the nature and terms of the reporting obligations, the value of the embedded derivative is immaterial.

We incurred issuance costs related to the Notes of approximately $4.5 million, which were recorded as debt issuance cost and are presented as a reduction to the Notes on our Consolidated Balance Sheets and are amortized to interest expense using the effective interest method over the term of the Notes, resulting in an effective interest rate of 1.6%.

As of March 31, 2022 and December 31, 2021, the net carrying amount of the liability for the Notes is recorded as convertible senior notes, net, in the Condensed Consolidated Balance Sheets as follows (in thousands):

(in thousands)	**March 31, 2022**	**December 31, 2021**
Principal amount	$ 900,000	$ 900,000
Unamortized debt issuance costs	(3,780)	(3,933)
Net carrying amount	$ 896,220	$ 896,067

For the three months ended March 31, 2022, interest expense for the Notes was as follows (in thousands):

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Contractual interest expense	$ 3,375	$ 1,688
Amortization of debt issuance costs	153	74
Total interest expense	$ 3,528	$ 1,762

As of March 31, 2022, the estimated fair value (Level 2) of the Notes was $654.3 million. The fair value of the Notes is estimated using a pricing model that is primarily affected by the trading price of our common stock and market interest rates.

NOTE 8. COMMITMENTS AND CONTINGENCIES

The Company has entered into various operating lease agreements, primarily relating to our corporate offices. See *Note 8 – Commitments and Contingencies*, subsection titled "Leases", in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2021 for information regarding the Company's maturity of lease liabilities under its lease agreements.

Contingencies

We may become involved in legal proceedings, claims and assessments from time to time in the ordinary course of business. We accrue liabilities for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated.

Legal

U.S. District Court Proceedings

On September 26, 2019, Personal Genomics of Taiwan, Inc. ("PGI") filed a complaint in the U.S. District Court for the District of Delaware against us for patent infringement (C.A. No. 19-cv-1810) (the "PGI District Court matter"). The matter from this complaint is based on PGI's U.S. Patent No. 7,767,441 (the "'441 Patent"). We plan to vigorously defend in this matter. On November 20, 2019, we filed our answer to the complaint, denying infringement and seeking a declaratory judgement of invalidity of the '441 Patent.

On June 22, 2020, we filed a petition requesting institution of an inter-partes review (IPR) to the Patent Trial and Appeals Board (the "Board") at the United States Patent Office requesting the Board to find a set of claims in the '441 Patent invalid. On June 27, 2020, we filed a second petition requesting institution of an IPR requesting the Board to find another set of claims in the '441 Patent invalid. The two petitions (the "PacBio IPR Petitions") requesting IPRs assert that all of the claims relevant to the PGI complaint are invalid. On January 19, 2021, the Board ordered that both PacBio IPR Petitions are instituted on all grounds presented. On January 18, 2022, the Board issued decisions on the two IPRs. In one IPR, all challenged claims were found unpatentable including PGI's core device claims. In the second IPR, the board did not find the disputed claims unpatentable. We are appealing the decision in the second IPR to the U.S. Court of Appeals for the Federal Circuit.

On August 19, 2020, the court ordered a stay of the PGI District Court matter based on a joint stipulation by the parties pending a final written decision on the IPRs. Following the final decision on the IPRs described above, on February 2, 2022, the judge ordered that the PGI District Court matter be reopened. We plan to vigorously defend against the remaining claims.

Proceedings in China

On May 12, 2020, PGI filed a complaint in the Wuhan Intermediate People's Court in China alleging infringement of one or more claims of China patent No. CN101743321B (the "CN321 Patent"), which is related to the '441 Patent. We were served on January 20, 2021 and plan to vigorously defend in this matter. On November 23, 2020 we filed an Invalidation Petition at the China National Intellectual Property Administration (CNIPA) demonstrating the invalidity of the claims in the CN321 Patent on grounds of insufficient disclosure, and the lack of support, essential technical features, clarity, novelty, and inventiveness. A hearing in the invalidation proceeding at the CNIPA was held on April 29, 2021. On September 2, 2021, the CNIPA issued its decision on the Invalidation Petition and determined that all claims (1-61) of the CN321 patent were invalid. We have filed a petition with the Wuhan Intermediate People's court requesting dismissal of the infringement action. On December 1, 2021, PGI filed an appeal with the Beijing IP Court, contesting the CNIPA decision.

Other Proceedings

From time to time, we may also be involved in a variety of other claims, lawsuits, investigations and proceedings relating to securities laws, product liability, patent infringement, contract disputes, employment and other matters that arise in the normal course of our business. In addition, third parties may, from time to time, assert claims against us in the form of letters and other communications.

We record a provision for contingent losses when it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. We currently do not believe that the ultimate outcome of any of the matters described above is probable or reasonably estimable, or that these matters will have a material adverse effect on our business; however, the results of litigation and claims are inherently unpredictable. Regardless of the outcome, litigation can have an adverse impact on us because of litigation and settlement costs, diversion of management resources and other factors.

Indemnification

Pursuant to Delaware law and agreements entered into with each of our directors and officers, we may have obligations, under certain circumstances, to hold harmless and indemnify each of our directors and officers against losses suffered or incurred by the indemnified party in connection with their service to us, and judgements, fines, settlements and expenses related to claims arising against such directors and officers to the fullest extent permitted under Delaware law, our bylaws and our certificate of incorporation. We also enter and have entered into indemnification agreements with our directors and officers that may require us to indemnify them against liabilities that arise by reason of their status or service as directors or officers, except as prohibited by applicable law. In addition, we may have obligations to hold harmless and indemnify third parties involved with our fundraising efforts and their respective affiliates, directors, officers, employees, agents or other representatives against any and all losses, claims, damages and liabilities related to claims arising against such parties pursuant to the terms of agreements entered into between such third parties and us in connection with such fundraising efforts. To the extent that any such indemnification obligations apply to the lawsuits described above, any associated expenses incurred are included within the related accrued litigation expense amounts. No additional liability associated with such indemnification obligations has been recorded as of March 31, 2022 and December 31, 2021.

NOTE 9. STOCKHOLDERS' EQUITY

Equity Plans

The 2020 Equity Incentive Plan (the "2020 Plan"), the 2020 Inducement Equity Incentive Plan (the "Inducement Plan") and the 2021 adopted Omniome Equity Incentive Plan of Pacific Biosciences of California, Inc. (the "Omniome Plan") allow for the issuance of stock options, restricted units and awards and performance-based awards.

On August 4, 2020, stockholders approved the 2020 Plan and reserved 11,000,000 shares of our common stock for issuance pursuant to equity awards granted under the 2020 Plan.

On December 2, 2020, the Board of Directors (the "Board") adopted the Inducement Plan and reserved 2,500,000 shares of our common stock for issuance pursuant to equity awards granted under the Inducement Plan. On April 18, 2021 and November 22, 2021, the Board amended the Inducement Plan to reserve an additional 750,000 and 360,000 shares, respectively.

On September 20, 2021, in connection with the acquisition of Omniome, we adopted the Omniome Equity Incentive Plan of Pacific Biosciences of California, Inc. (the "Omniome Plan"). Under the Omniome Merger Agreement, each unvested option to purchase Omniome common stock, granted under the Omniome Plan held by employees continuing with us, were assumed by PacBio and converted into an option to purchase shares of our common stock. The terms and conditions of the converted options are substantially the same (including vesting and exercisability), except that (A) the assumed options cover shares of PacBio's common stock; (B) the number of shares of our common stock subject to the assumed option is equal to the product of (i) the number of shares of Omniome common stock subject to the corresponding unvested option, multiplied by (ii) the exchange ratio (as defined below), with any resulting fractional share rounded down to the nearest whole share; and (C) the exercise price per share of the assumed options is equal to the quotient of (i) the exercise price per share of the corresponding unvested option to purchase shares of Omniome common stock, divided by (ii) the exchange ratio (as defined below), with any resulting fractional cent rounded up to the nearest whole cent. The exchange ratio was equal to 0.259204639. We reserved 2,494,128 shares of our common stock for issuance pursuant to equity awards under the Omniome Plan.

As of March 31, 2022, we had 1.2 million shares remaining and available for future issuance under the 2020 Plan, Inducement Plan, and the Omniome Plan.

Stock Options

Time-based Stock Options

The following table summarizes stock option activity for time-based awards under all our stock option plans for the three months ended March 31, 2022 (in thousands, except per share amounts):

	Stock Options Outstanding		
	Number of shares	Exercise price	Weighted average exercise price
Outstanding at December 31, 2021	12,159	$ 1.16 – 46.37	$ 11.38
Granted	3,798	10.18 – 16.58	11.76
Exercised	(178)	1.16 – 8.90	3.38
Canceled	(232)	2.47 – 46.37	27.74
Outstanding at March 31, 2022	15,547	$ 1.16 – 46.37	$ 11.32

Performance-based Stock Options

The following table summarizes stock option activity for performance-based awards under all our stock option plans for the three months ended March 31, 2022 (in thousands, except per share amounts):

	Stock Options Outstanding		
	Number of shares	Exercise price	Weighted average exercise price
Outstanding at December 31, 2021	304	$ 4.71 - 4.90	$ 4.71
Granted	—	—	—
Exercised	—	—	—
Canceled	—	—	—
Outstanding at March 31, 2022	304	$ 4.71 - 4.90	$ 4.71

For the three months ended March 31, 2022, we recognized stock-based compensation expense of $7.5 million related to time-based and performance-based options.

Restricted Stock Units ("RSUs")

The following table summarizes the time-based RSU activity for the three months ended March 31, 2022 (in thousands, except per share amounts):

	Number of shares	Weighted average grant date fair value
Outstanding at December 31, 2021	7,392	$ 19.78
Granted	3,650	11.36
Vested	(1,845)	14.69
Forfeited	(322)	22.50
Outstanding at March 31, 2022	8,875	$ 17.28

For the three months ended March 31, 2022, we recognized stock-based compensation expense of $11.9 million related to restricted stock units.

Employee Stock Purchase Plan ("ESPP")

Shares issued under our ESPP were 1,316,923 and 983,180 during the three months ended March 31, 2022 and 2021, respectively. In February 2022, an additional 4.0 million shares were reserved under the ESPP. As of March 31, 2022, 10,493,750 shares of our common stock remain available for issuance under our ESPP.

For the three months ended March 31, 2022, we recognized stock-based compensation expense of $3.3 million related to our ESPP.

Stock-Based Compensation

The following table summarizes stock-based compensation expense (in thousands):

	Three Months Ended March 31,	
	2022	2021
Cost of revenue	$ 1,758	$ 992
Research and development	8,965	3,048
Sales, general and administrative	11,980	6,125
Total stock-based compensation expense	$ 22,703	$ 10,165

Determining Fair Value

We estimate the fair value of stock options granted using the Black-Scholes valuation method and a single option award approach. This fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. The fair market value of RSUs granted is the closing price of our shares on the date of grant and is generally recognized as compensation expense on a straight-line basis over the respective vesting period. For shares purchased under our ESPP, we estimate the grant-date fair value, and the resulting stock-based compensation expense, using the Black-Scholes option-pricing model. We estimate forfeitures of stock options, RSUs and shares purchased under our ESPP which is utilized to determine the compensation expense to be recorded over the requisite service period.

Expected Term - The expected term used in the Black-Scholes valuation method represents the period that the stock options are expected to be outstanding and is determined based on historical experience of similar awards, giving consideration to the contractual terms of the stock options and vesting schedules.

Expected Volatility - The expected volatility used in the Black-Scholes valuation method is derived from the implied volatility related to our share price over the expected term.

Expected Dividend - We have never paid dividends on our shares and, accordingly, the dividend yield percentage is zero for all periods.

Risk-Free Interest Rate - The risk-free interest rate used in the Black-Scholes valuation method is the implied yield currently available on U.S. Treasury constant maturities issued with a term equivalent to the expected terms.

Stock Options

We estimated the fair value of employee stock options using the Black-Scholes option pricing model. The fair value of employee stock options is being amortized on a straight-line basis over the requisite service period of the awards.

When determining the current share prices underlying the stock options for calculating the grant-date fair value, we reference the observable market prices of our stock.

For three months ended March 31, 2022 and 2021, the fair value of employee stock options was estimated using the following weighted average assumptions:

	Three Months Ended March 31,	
	2022	2021
Expected term in years	4.6	4.6
Expected volatility	70%	68%
Risk-free interest rate	1.76%	0.50%
Dividend yield	—	—
Weighted average grant date fair value per share	$ 6.66	$ 20.21

ESPP

We estimate the fair value of shares to be issued under the ESPP using the Black-Scholes option pricing model. For three months ended March 31, 2022 and 2021, the fair value of shares to be issued under the ESPP was estimated using the following assumptions:

	Three Months Ended March 31,	
	2022	2021
Expected term in years	0.5 - 2.0	0.5 - 2.0
Expected volatility	70%	68%
Risk-free interest rate	0.60% - 1.31%	0.07% - 0.13%
Dividend yield	—	—
Weighted average grant date fair value per share	$ 5.42	$ 29.26

NOTE 10. NET LOSS PER SHARE

Basic net loss per share is computed by dividing net loss by the weighted average number of shares of common stock outstanding during the period. Diluted net loss per share is computed using the weighted average number of shares of common stock outstanding and potential shares assuming the dilutive effect of the convertible senior notes, using the if-converted method, and outstanding stock options, restricted stock units and common stock issuable pursuant to our employee stock purchase plan, or ESPP, using the treasury stock method.

The following table presents the calculation of the basic and diluted net loss per share amounts presented in the Condensed Consolidated Statements of Operations and Comprehensive Loss (in thousands, except per share amounts):

	Three Months Ended March 31,	
	2022	2021
Numerator:		
Net loss	$ (81,499)	$ (87,435)
Denominator:		
Basic		
Weighted average shares used in computing basic net loss	222,289	194,790
Basic net loss per share	$ (0.37)	$ (0.45)
Diluted		
Weighted average shares used in computing diluted net loss per share	222,289	194,790
Diluted net loss per share	$ (0.37)	$ (0.45)

The following outstanding shares issuable upon conversion of the convertible senior notes, common stock options, restricted stock units ("RSUs"), with time-based vesting and performance-based vesting and ESPP shares expected to be purchased, were excluded from the computation of diluted net loss per share for the periods presented because including them would have had an anti-dilutive effect. See *Note 9. Stockholders' Equity* in Part I, Item 1 of this Quarterly Report on Form 10-Q for detailed information on RSUs with time-based vesting and RSUs with performance-based vesting.

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Shares issuable upon conversion of convertible senior notes	20,690	20,690
Options to purchase common stock	15,851	12,332
RSUs	8,875	6,527
ESPP shares	2,026	2,336

These potentially dilutive securities have been excluded from the computation of diluted net loss per share as the effect would be to reduce the net loss per share. Therefore, the weighted-average number of shares of common stock outstanding used to calculate both basic and diluted net loss per share is the same.

NOTE 11. REVENUE

A summary of our revenue by geographic location for the three months ended March 31, 2022 and 2021 is as follows (in thousands):

	Three Months Ended March, 31	
(in thousands)	**2022**	**2021**
Americas	$ 19,082	$ 12,157
Europe (including the Middle East and Africa)	5,700	8,325
Asia Pacific	8,391	8,515
Total	$ 33,173	$ 28,997

A summary of our revenue by category for the three months ended March 31, 2022 and 2021 is as follows (in thousands):

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Instrument revenue	$ 15,550	$ 14,939
Consumable revenue	12,694	10,364
Product revenue	28,244	25,303
Service and other revenue	4,929	3,694
Total revenue	$ 33,173	$ 28,997

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

You should read the following discussion and analysis of our financial condition and results of operations together with the unaudited condensed consolidated financial statements and related notes that are included elsewhere in this Quarterly Report on Form 10-Q and the consolidated financial statements and the related notes included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2021 filed with the U.S. Securities and Exchange Commission, or the SEC, on February 28, 2022, or our Annual Report on Form 10-K. This discussion contains forward-looking statements based upon current plans, expectations and beliefs that involve risks and uncertainties including the effect of the ongoing COVID-19 pandemic and our response thereto. The words "anticipates," "believes," "could," "estimates," "expects," "intends," "may," "might," "plans," "potential," "predicts," "projects," "seeks," "should," "target," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including, but not limited to, those discussed in the section entitled "Risk Factors" and elsewhere in this Quarterly Report on Form 10-Q, and you should not place undue reliance on our forward-looking statements. We do not assume any obligation to update any forward-looking statements. In preparing this MD&A, we presume that readers have access to and have read the MD&A in our Annual Report on Form 10-K, pursuant to Instruction 2 to paragraph (b) of Item 303 of Regulation S-K.

Our Management's Discussion and Analysis (MD&A) is organized in the following sections:

- Overview and Outlook
- Results of Operations
- Liquidity and Capital Resources
- Critical Accounting Policies and Estimates
- Recent Accounting Pronouncements
- Off Balance Sheet Arrangements

Overview and Outlook

About PacBio

We are a premier life science technology company that is designing, developing and manufacturing advanced sequencing solutions to help scientists and clinical researchers resolve genetically complex problems.

Our products and technology under development stem from two highly differentiated core technologies focused on accuracy, quality and completeness which include our existing HiFi long read sequencing and our emerging SBB short read sequencing technologies. Our products address solutions across a broad set of research applications including human germline sequencing, plant and animal sciences, infectious disease and microbiology, oncology, and other emerging applications.

Our focus is on providing our customers with advanced sequencing technologies with higher throughput and improved workflows that we believe will enable dramatic advancements in routine healthcare.

Our customers include academic and governmental research institutions, commercial testing and service laboratories, genome centers, public health labs, hospitals and clinical research institutes, contract research organizations (CROs), pharmaceutical companies and agricultural companies.

As of March 31, 2022, our commercial team was comprised of over 188 employees, including 52 quota-carrying representatives, many with advanced degrees in biology and significant experience in the genomics industry.

Strategic Objectives

Our 2022 strategic objectives include:

- Execution - leveraging commercial investment to drive continued HiFi and Sequel II/IIe adoption;
- Progress our product pipeline - continuing the development of our future higher throughput HiFi sequencing platform and differentiated short-read technology; and
- Delight our customers - deepening our customer relationships and expanding customer collaborations across existing and rapidly expanding new applications for our technology.

We will continue to leverage our commercial organization and make significant improvements in efficiency and usability of our Sequel II/IIe to seek to reach a broader customer base. We believe the commercial investments we made in 2021 and expect to continue to make during the remainder of 2022 will further help drive growth in our business. We employed 52 quota-carrying field sales personnel as of March 31, 2022, and we expect to continue to invest in our sales, general and administrative departments to support future growth.

To increase the adoption of HiFi sequencing, we have various development programs in progress to expand our product portfolio as well as increase the throughput and improve the usability of our existing sequencing technologies. We continue to focus on programs to accelerate new platform launches in the near to mid-term as well as increase applications for our technologies. To address the oncology markets with a highly differentiated alternative, we are also progressing our short read platform development with a goal of launching our SBB short read sequencing platform in the first half of 2023. As a result, we expect our research and development expense to increase during 2022 as compared to 2021.

We continue to believe that with the capabilities of our HiFi chemistry and SMRT technology, we can be a market leader in whole-genome clinical sequencing. Leading institutions have adopted our products to study rare and inherited disease. We believe the market opportunity for clinical sequencing is significant and could drive substantial revenue growth for the company. We plan to continue to pursue customer collaborations where the technologies being developed or applications being considered extend beyond whole-genome clinical sequencing. Collaborative arrangements add to the awareness of our products and service offerings and may drive new applications for use of our technology.

Financial Overview

The COVID-19 pandemic and efforts to control its spread have significantly curtailed the movement of people, goods, and services worldwide, including in the regions in which we sell our products and services and conduct our business operations. We have been negatively impacted by the COVID-19 pandemic and expect to continue to be impacted by COVID-19 for the foreseeable future. Due to the uncertain scope and duration of the pandemic, we cannot reasonably estimate the future impact to our operations and financial results.

The spread of COVID-19 has caused us to modify our business practices, including limiting certain of our commercial operations and limiting certain employees from working in the office. Starting in April 2022, we invited employees located near our reopened offices to return to the office. We have and will continue to provide consumables, instruments, and support to scientists at government, academic, and commercial labs that have remained open or as they reopen.

We have experienced and expect to continue to experience an adverse impact to our business as a result of its global economic impact, including any recession that has occurred or may occur in the future. Specifically, difficult macroeconomic conditions, decreases in discretionary capital spending, increased and prolonged unemployment or a decline in consumer confidence as a result of the COVID-19 pandemic could have a continuing adverse effect on the demand for some of our products. Such economic disruption could have a material adverse effect on our business, results of operations and liquidity. The degree of impact of COVID-19 on our business will depend on several

factors, such as the duration and the extent of the pandemic, as well as actions taken by governments, businesses and consumers in response to the pandemic, all of which continue to evolve and remain uncertain at this time.

See the Risk Factors section for further discussion of the possible impact of the COVID-19 pandemic on our business.

Key highlights of the three months ended March 31, 2022 consolidated financial results include the following:

- Revenue increased $4.2 million, or 14%, to $33.2 million for the three months ended March 31, 2022, as compared to $29.0 million for the three months ended March 31, 2021, driven primarily by an increase in instrument and consumable revenue. We expect revenue to grow during the remainder of 2022 compared to 2021. However, our future revenues largely depend on the rate of sales of our sequencing instruments, which are a leading indicator of future sales of consumables. We expect instrument placements to continue to grow as we expand our sales globally through our expanded sales force, through application of technology in new markets and through offering new features and solutions. However, we also expect a potential slower ramp in the sales of consumables due to lower utilization resulting from project delays due to the COVID-19 pandemic and prolonged lockdowns in China.

- Gross profit as a percentage of revenue (gross margin) was 42.7% for the three months ended March 31, 2022, compared to 44.8% for the three months ended March 31, 2021. Despite higher sales volumes, gross margin declined due to a lower average selling price (ASP) of instruments, resulting primarily from an increase in instruments sold as multi-unit orders with volume discounts, leading to lower ASP, and an increase in our average product costs during the quarter. Our gross margin in future periods will depend on several factors, including strategic product pricing; product mix; sales of higher-margin consumables; supply chain constraints increasing costs of raw materials; manufacturing capacity and production volumes impacting the cost of inventory; freight costs; and excess or obsolete inventories.

- Loss from operations increased $43.8 million or 130%, to a loss of $77.5 million for the three months ended March 31, 2022, as compared to a loss of $33.7 million for the three months ended March 31, 2021, driven primarily by an increase of $45.0 million in operating expenses, including a $32.4 million increase in research and development expenses primarily due to the Omniome acquisition and the establishment of an advanced research organization, $13.7 million increase in sales, general and administrative expenses, offset by a $1.1 million change in the fair value of contingent consideration. See *Note 2, Business Acquisitions* in Part I, Item 1 of this Quarterly Report on Form 10-Q for further details.

- Cash, cash equivalents and short-term investments were $962.8 million at March 31, 2022, which represents a 7.8% decrease compared to the balance at December 31, 2021.

Results of Operations

Comparison of the Three Months Ended March 31, 2022 and 2021

	Three Months Ended March 31,			
	2022	2021	$ Change	% Change
	(in thousands, except percentages)			
Revenue:				
Product revenue	$ 28,244	$ 25,303	$ 2,941	12%
Service and other revenue	4,929	3,694	1,235	33%
Total revenue	33,173	28,997	4,176	14%
Cost of revenue:				
Cost of product revenue	14,820	12,697	2,123	17%
Cost of service and other revenue	4,015	3,323	692	21%
Amortization of intangible assets	183	—	183	100%
Total cost of revenue	19,018	16,020	2,998	19%
Gross profit	14,155	12,977	1,178	9%
Operating expense:				
Research and development	52,937	20,548	32,389	158%
Sales, general and administrative	39,804	26,139	13,665	52%
Change in fair value of contingent consideration	(1,063)	—	(1,063)	(100%)
Total operating expense	91,678	46,687	44,991	96%
Operating loss	(77,523)	(33,710)	(43,813)	(130%)
Loss from continuation advances from Illumina	—	(52,000)	52,000	100%
Interest expense	(3,697)	(1,789)	(1,908)	(107%)
Other (expense) income, net	(279)	64	(343)	(536%)
Net loss	$ (81,499)	$ (87,435)	$ 5,936	7%

Revenue

Revenue increased $4.2 million, or 14%, to $33.2 million for the three months ended March 31, 2022, as compared to $29.0 million for the three months ended March 31, 2021, driven primarily by an increase in instrument and consumable revenue.

Instrument revenue increased $0.6 million, or 4%, to $15.6 million for the three months ended March 31, 2022, as compared to $14.9 million for the three months ended March 31, 2021, primarily due to an increase in instruments sold offset by a lower average selling price of instruments attributed to volume-based discounts. At March 31, 2022, our installed base was 424 Sequel II and Sequel IIe systems compared to the 244 systems in the three months ended March 31, 2021. We expect the number of Sequel II/IIe placements to continue to grow during the remainder of 2022, reflecting our increased commercial presence and customer demand.

Consumables revenue increased $2.3 million, or 21%, to $12.7 million for the three months ended March 31, 2022, as compared to $10.4 million for the three months ended March 31, 2021. The increase in consumable sales was primarily attributable to higher Sequel II/IIe consumables sales from growth of the installed base.

Service and other revenue increased $1.2 million, or 33%, to $4.9 million for the three months ended March 31, 2022, as compared to $3.7 million for the three months ended March 31, 2021, primarily due to product services contracts sold on the growing installed base.

Cost of Revenue, Gross Profit and Gross Margin

Cost of product revenue increased by $2.1 million, or 17%, to $14.8 million for the three months ended March 31, 2022, compared to $12.7 million for the three months ended March 31, 2021. The increase in cost of product revenue was primarily due to the increase in instrument sales and higher average product costs.

Cost of service and other revenue increased by $0.7 million, or 21%, to $4.0 million for the three months ended March 31, 2022, compared to $3.3 million for the three months ended March 31, 2021, primarily due to higher service volumes from our growing installed base.

Gross profit increased $1.2 million, or 9%, to $14.2 million for the three months ended March 31, 2022, compared to the three months ended March 31, 2021. Gross margin was 42.7% for the three months ended March 31, 2022, compared to gross margin of 44.8% for the three months ended March 31, 2021. The decrease in gross margin percentage was primarily due to higher sales volumes offset by lower average selling price and increased product costs during the three months ended March 31, 2022, compared to the three months ended March 31, 2021.

The global shortage of semiconductors, which has been reported since early 2021, continues to be a challenge for us in our supply chain and resulted in cost increases that have and may continue to adversely impact margins. During these periods of shortages or delays, the price of components may increase, or the components may not be available at all. Additionally, in response to the rising COVID-19 infections, China has imposed lockdowns in certain parts of the country, which has had, and may continue to have, a negative impact on manufacturing and/or supply chains, as well as customer demand for our products and demand through certain distributors. We may not be able to secure enough components at reasonable prices or of acceptable quality to build new products in a timely manner in the quantities or configurations needed. Accordingly, our revenue and gross margins could suffer until other sources can be developed.

Research and Development Expense

Research and development expense increased by $32.4 million, or 158%, to $52.9 million for the three months ended March 31, 2022, compared to the three months ended March 31, 2021. This change was primarily driven by an increase of $10.4 million in personnel expenses due to an increase in headcount, including the acquired workforce from the Omniome acquisition and an increase of $11.9 million of product development costs and other related costs. Research and development expense included stock-based compensation expense of $9.0 million and $3.0 million during the three months ended March 31, 2022 and 2021, respectively.

We will continue to focus a significant portion of our resources on developing new products and solutions, including improving the efficiency and usability of existing products, developing new solutions, software, workflows and applications leveraging our core technologies. We have collaborated and expect to continue to collaborate with strategic partners to develop sequencing solutions and expand the application of our technology. On January 12, 2021, we entered into a multi-year Development and Commercialization Agreement (the “Development Agreement”) with Invitae Corporation (“Invitae”). We are currently renegotiating the terms of the Development Agreement. While we expect to continue to develop next generation high throughput sequencing platforms and products, we do not anticipate that Invitae will continue to provide funding support for future development under the Development Agreement. We expect to continue discussions with Invitae in connection with the Development Agreement to receive feedback and operational assistance and expertise which we will incorporate in the continued development of our high throughput sequencing platforms and products.

We expect research and development expenses to increase in 2022, when compared to 2021, due to continued product development, a full year of expenses associated with the acquisition of Omniome and our intent to continue to hire additional personnel in research and development.

Sales, General and Administrative Expense

Sales, general and administrative expense increased by $13.7 million, or 52%, to $39.8 million for the three months ended March 31, 2022, compared to the three months ended March 31, 2021. This change was primarily driven by an increase of $5.9 million in stock-based compensation expense and an increase of $2.9 million in salaries and related expense due to increased headcount, which included quota-carrying sales representatives.

Sales, general and administrative expense is planned to increase in 2022, when compared to 2021, as we incur a full year of expenses associated with the acquisition of Omniome and our prior year headcount growth.

Change in Fair Value of Contingent Consideration

Change in fair value of contingent consideration of $1.1 million during the three months ended March 31, 2022, represents the remeasurement impact of the contingent consideration of $200 million (composed of $100 million in cash and $100 million in shares of our common stock) that is due upon the achievement of a milestone, defined as the first commercial shipment to a customer of both an instrument and related consumables, utilizing SBB technology.

Loss from Continuation Advances from Illumina

As part of the Termination Agreement, Illumina paid us Continuation Advances totaling $52.0 million, which was repayable without interest to Illumina if, within two years of March 31, 2020, we entered into, or consummated a Change of Control Transaction or raised at least $100 million in a single equity or debt financing (that may have multiple closings), with the amount repayable dependent on the amount raised by us.

Resulting from the issuance and sale of $900 million of 1.50% Convertible Senior Notes due February 15, 2028, $52.0 million of Continuation Advances were paid without interest to Illumina in February 2021 and recorded as other expense in the three months ended March 31, 2021.

Interest Expense

Interest expense for the three months ended March 31, 2022, was $3.7 million compared to $1.8 million for the three months ended March 31, 2021. The increase was primarily due to the full quarter interest incurred on the $900 million of 1.50% Convertible Senior Notes due February 15, 2028 that we issued on February 16, 2021.

Other (Expense) Income, Net

The increase in Other (expense) income, net was primarily driven by greater foreign exchange loss for the three months ended March 31, 2022.

Liquidity and Capital Resources

Our primary sources of liquidity, other than our holdings of cash, cash equivalents, and investments, has primarily been through the issuance of debt or equity securities, together with cash flow from operating activities. We have historically incurred, and expect to continue to incur, operating losses and generate negative cash flows from operations on an annual basis due to the investments we intend to make as described in Results of Operations above, and as a result, we may require additional capital resources to execute our strategic initiatives to grow our business.

As of March 31, 2022, we had cash, cash equivalents and investments of $962.8 million compared to $1.04 billion as of December 31, 2021. We have historically incurred, and expect to continue to incur, operating losses and generate negative cash flows from operations on an annual basis due to the investments we intend to make as described in "—Results of Operations" above, and as a result, we may require additional capital resources to execute on our strategic initiatives to grow our business. We believe that our existing cash, cash equivalents and investments will be sufficient to fund our projected operating requirements for at least the next 12 months from the date of filing of this Quarterly Report on Form 10-Q for the quarter ended March 31, 2022.

Factors that may affect our capital needs include, but are not limited to, the pace of adoption of our products, which affects the sales of our products and services; our ability to obtain new collaboration and customer arrangements and maintain existing collaborations and arrangements; the progress of our research and development programs; initiation or expansion of research programs and collaborations; the purchase of patent licenses; future acquisitions; manufacturing costs; service costs; the impact of product quality; litigation costs, including the costs involved in preparing, filing, prosecuting, defending and enforcing intellectual property rights; costs of developing new and enhanced products; acquisitions of complementary businesses, technologies or assets; and other factors. There can be no assurance that funds will be available on favorable terms, or at all.

Summary of Cash Flows

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Cash used in operating activities	$ (79,029)	$ (23,104)
Cash provided by investing activities	42,053	8,170
Cash provided by financing activities	5,215	865,721
Net (decrease) increase in cash, cash equivalents and restricted cash	$ (31,761)	$ 850,787

Operating Activities

Our primary uses of cash in operating activities include the development of future products and product enhancements, manufacturing, and support functions related to our sales, general and administrative activities.

We used $79.0 million of cash in operating activities for the three months ended March 31, 2022, compared to cash used in operating activities of $23.1 million for the three months ended March 31, 2021.

Cash used in operating activities for the three months ended March 31, 2022, of $79.0 million was due primarily to a $81.5 million net loss that included non-cash items such as stock-based compensation of $22.7 million, depreciation expense of $2.3 million, amortization of right-of-use assets of $1.7 million, a $1.1 million decrease in liability due to the change in estimated fair value of contingent consideration, and a net cash outflow due to $24.4 million in net changes to operating assets and liabilities. The change in net operating assets and liabilities was primarily attributable to a decrease of $17.2 million in accrued expenses, $6.3 million increase in inventory, $3.6 million increase in accounts receivable, $2.5 million decrease in other liabilities, $1.9 million decrease in operating lease liabilities, $1.2 million increase in prepaid and other assets partially offset by an increase of $6.4 million in accounts payable and $1.9 million increase in deferred revenue.

Cash used in operating activities for the three months ended March 31, 2021, was due primarily to $87.4 million net loss, partially offset by a loss of $52.0 million from Continuation Advances repaid to Illumina that is considered a financing activity and non-cash items such as stock-based compensation of $10.2 million and depreciation of $1.6 million. The change in net operating assets and liabilities was primarily attributable to decreases of $3.0 million in other liabilities and $2.7 million in accrued expenses and an increase of $2.6 million in inventory, partially offset by a decrease of $3.9 million in accounts receivable and an increase of $5.0 million in deferred revenue.

Investing Activities

Our investing activities consist primarily of capital expenditures and investment purchases, sales and maturities. Cash provided by investing activities for the three months ended March 31, 2022, was due primarily to $122.1 million in maturities of investments offset by net purchases of investments of $76.4 million, and partially offset by purchases of property and equipment of $3.6 million.

Cash provided by investing activities for the three months ended March 31, 2021, was due primarily to net sales and maturities of investments of $8.6 million, partially offset by purchases of property and equipment of $0.4 million.

Financing Activities

Cash provided by financing activities was $5.2 million and $865.7 million for the three months ended March 31, 2022 and 2021, respectively.

Cash provided by financing activities during the three months ended March 31, 2022, resulted from proceeds of $5.6 million from the issuance of common stock through our equity compensation plans.

Cash provided by financing activities during the three months ended March 31, 2021, resulted from the net proceeds of $895.6 million from our February 2021 issuance of $900 million of 1.50% Convertible Senior Notes after deducting debt issuance costs and proceeds of $22.3 million from the issuance of common stock through our equity compensation plans, partially offset by $52.0 million of Continuation Advances repaid to Illumina.

Critical Accounting Policies and Estimates

The discussion and analysis of our financial condition and results of operations are based upon our unaudited condensed consolidated financial statements, which have been prepared in accordance with the rules and regulations of the SEC. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses. We evaluate our critical accounting policies and estimates on an ongoing basis. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

There have been no changes to our significant accounting policies as disclosed in the Annual Report on Form 10-K for the year ended December 31, 2021, however, as a result of certain changes to the standard contractual terms and conditions with customers implemented during the quarter ended March 31, 2022, we concluded a change in the application of our accounting policy, in accordance with ASC 606, was appropriate.

Specifically, we modified the standard contractual terms with customers during the current quarter, to reflect transfer of title and risk of loss and right to invoice upon delivery. We also updated the terms of the warranty provided with the instrument to remove the service component. As a result, the warranty is no longer a separate performance obligation and, accordingly, we accrue for the cost of the assurance warranty when revenue of the instrument is recognized. In addition, because of technical enhancements associated with our more recent instrument releases, including the Sequel IIe systems, installation services are now distinct from the instrument itself. Therefore,

instrument revenue is now recognized upon transfer of control of the asset to the customer, which is generally upon delivery for sales made to our non-distributor customers.

Recent Accounting Pronouncements

Please see *Note 1, Organization and Significant Accounting Policies*, subsection titled "Recent Accounting Pronouncements", in Part II, Item 8 of the Annual Report on Form 10-K for information regarding applicable recent accounting pronouncements

Off-Balance Sheet Arrangements

As of March 31, 2022, we did not have any off-balance sheet arrangements.

In the ordinary course of business, we enter into standard indemnification arrangements. Pursuant to these arrangements, we indemnify, hold harmless, and agree to reimburse the indemnified parties for losses suffered or incurred by the indemnified party in connection with any trade secret, copyright, patent or other intellectual property infringement claim by any third party with respect to its technology, or from claims relating to our performance or non-performance under a contract, any defective products supplied by us, or any acts or omissions, or willful misconduct, committed by us or any of our employees, agents or representatives. The term of these indemnification agreements is generally perpetual after the execution of the agreement. The maximum potential amount of future payments we could be required to make under these agreements is not determinable because it involves claims that may be made against us in future periods but have not yet been made. To date, we have not incurred costs to defend lawsuits or settle claims related to these indemnification agreements.

We also enter and have entered into indemnification agreements with our directors and officers that may require us to indemnify them against liabilities that arise by reason of their status or service as directors or officers, except as prohibited by applicable law. In addition, we may have obligations to hold harmless and indemnify third parties involved with our fundraising efforts and their respective affiliates, directors, officers, employees, agents or other representatives against any and all losses, claims, damages and liabilities related to claims arising against such parties pursuant to the terms of agreements entered into between us and such third parties in connection with such fundraising efforts. To the extent that such indemnification obligations apply to the lawsuits described in *Note 8, Commitments and Contingencies* in Part I, Item 1 of this Quarterly Report on Form 10-Q, any associated expenses incurred are included within the related accrued litigation expense amounts. No additional liability associated with such indemnification agreements has been recorded as of March 31, 2022.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Interest Rate and Market Risk

We carry our convertible senior notes at the principal amount, less unamortized debt issuance costs, on our Condensed Consolidated Balance Sheets. Because the notes have a fixed annual interest rate of 1.50%, we do not have any economic interest rate exposure or financial statement risk associated with changes in interest rates. The fair value of the notes, however, may fluctuate when interest rates and the market price of our stock changes. See *Note 7. Convertible Senior Notes* in Part I, Item 1 of this Form 10-Q for additional information.

There have been no other material changes in market risk from the information provided in our Annual Report on Form 10-K for the fiscal year ended December 31, 2021.

Item 4. Controls and Procedures

Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer, our Chief Financial Officer and our Chief Accounting Officer evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act) as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on this evaluation, our chief executive officer and our chief financial officer concluded that our disclosure controls and procedures are designed at a reasonable assurance level and are effective to provide reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to our management, including our chief executive officer and our chief financial officer, as appropriate, to allow timely decisions regarding required disclosure.

In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply its judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Changes in Internal Control Over Financial Reporting

An evaluation was performed under the supervision and with the participation of our management, including our Chief Executive Officer, Chief Financial Officer and Chief Accounting Officer to determine whether any change in our internal control over financial reporting occurred during the fiscal quarter ended March 31, 2022 that materially affected, or is reasonably likely to materially affect, our internal control over financial reporting. There were no material changes in our internal control over financial reporting during the fiscal quarter ended March 31, 2022, that have materially affected, or were reasonably likely to materially affect, our internal control over financial reporting.

Item 1. Legal Proceedings

Please see *Note 8. Commitments and Contingencies* in Part I, Item 1 of this Quarterly Report on Form 10-Q.

Item 1A. Risk Factors

You should consider carefully the risks and uncertainties described below, together with all of the other information in our public filings with the SEC, which could materially affect our business, financial condition, results of operations and prospects. The risks described below are not the only risks facing us. Risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially affect our business, financial condition, results of operations and prospects. In addition, the impact of the ongoing COVID-19 pandemic and any worsening of the economic environment may exacerbate the risks described below, any of which could have a material impact on us. This situation is changing rapidly and additional impacts may arise that we are not aware of currently.

Summary Risk Factors

The following is a summary of the principal risks that could adversely affect our business, operations and financial results. Such risks are discussed more fully below and include, but are not limited to, risks related to:

- The potential adverse impact of health epidemics, including the ongoing COVID-19 pandemic;
- Our ability to successfully market, commercialize, and sell current and future products and related maintenance services;
- Our ability to achieve profitability for our business;
- Our ability to successfully leverage and integrate our acquisitions and future acquisitions;
- Our ability to successfully research, develop and timely manufacture our current and future products;
- Management of new product introductions and transitions, resultant costs, and ability of new products to generate promised performance;
- Recent significant changes to our leadership team and resultant disruptions to our business;
- Retention, recruitment, and training of senior management, key personnel, scientists and engineers;
- Our ability to further penetrate nucleic acid sequencing applications, as well as grow product demand;
- Our reliance on outsourcing to other companies for manufacturing certain components and sub-assemblies, some of which are sole-sourced;
- Our ability to consistently manufacture our instruments and consumables to meet customers' specifications, quantity, cost, or performance requirements;
- The high amount of competition we face in our industry;
- Our ability to attract customers and increase sales of current and future products;
- Reliance on a limited number of customers for a significant portion of our revenues, including academic, research and government institutions;
- The complexity of our products giving rise to defects or errors;
- Our unpredictable and lengthy sales cycle;
- Our business, financial condition and results of operations could be adversely affected by the political and economic tensions between the United States and other countries, including China and Russia;

Securing and maintaining patent or other intellectual property protection for our products and related improvements;

Current and future legal proceedings filed against us claiming intellectual property infringement;

Governmental regulations that burden operations or narrow the market for our products;

Evolving ethical, legal, privacy, social, and regulatory concerns regarding genetic testing;

Volatility of the price of our common stock; and

Our stock price falling as a result of future offerings or sales.

Risks Related to Our Business

Our business may be adversely affected by health epidemics, including the ongoing COVID-19 pandemic.

Our business has been and could be further adversely impacted by the effects of COVID-19 or other epidemics or pandemics. As a result of the ongoing COVID-19 pandemic, our financial results continue to be impacted negatively as our customers in multiple regions around the world suspended or curtailed their normal operations in efforts to curb the spread of COVID-19. While a significant number of our customer sites that shut down due to COVID-19 have re-opened, a significant number of our customers had delayed purchases of capital assets due to the negative impact of the pandemic on their businesses. This dynamic continues to negatively impact the recognition of revenue related to the sale of our Sequel and Sequel II/IIe instruments and the associated consumables and software. The inability to receive or accept shipments of orders for our products on a timely basis, or at all, the delay or possible cancellation of orders for our products or related maintenance and support services, and the reduced utilization of our products has negatively affected and may negatively affect in the future our operations and revenues. We are continuing to monitor this evolving situation.

Our manufacturing partners and suppliers have been and could continue to be disrupted by conditions related to COVID-19 or other epidemics or pandemics, possibly resulting in disruption to the production of our products. If our manufacturing partners or suppliers are unable or fail to fulfill their obligations to us for any reason, we may not be able to manufacture our products and satisfy customer demand or our obligations under sales agreements in a timely manner, and our business could be harmed as a result. There is significant uncertainty relating to the long-term effect of COVID-19 on our business. Infections may resurge or become more widespread and the limitation on our ability to travel and timely sell and distribute our products, as well as any closures or supply disruptions, may be extended for longer periods of time, which could have a negative impact on our business, financial condition and operating results. For example, because our semiconductor manufacturers are located in a region where immunization rates in certain communities may be low, the Omicron variant of COVID-19, as well as any future variants that evolve, could impact workforce availability at those locations and disrupt supply. For example, in response to the rising COVID-19 infections, China has imposed lockdowns in certain parts of the country, which has had, and may continue to have, a negative impact on manufacturing and/or supply chains, as well as customer demand for our products and demand through certain distributors.

The spread of COVID-19 has caused us to modify our business practices, including limiting certain of our commercial operations and limiting certain employees from working in the office. Starting in April 2022, we invited employees located near those reopened offices to return to the office. The reopening of our U.S. offices has created and may continue to create additional risks and operational challenges and may require us to make additional investments in the design, implementation and enforcement of new workplace health and safety protocols. Even if we follow what we believe to be best practices, our efforts to reopen our offices safely may not be successful and could expose our employees, partners and customers to health risks, and us to associated liability. Furthermore, additional and/or extended governmental restrictions, new regulations or other changing conditions could cause us to temporarily close certain office locations again. We have offered, and may plan to continue to offer, a significant percentage of

our employees flexibility in the amount of time they work in an office, which could adversely impact the productivity of certain employees and harm our business, including our future operating results. This may also present risks for our strategy and may present operational, cybersecurity and workplace culture challenges that may adversely affect our business.

Even after the COVID-19 pandemic has subsided, we may continue to experience an adverse impact to our business as a result of its global economic impact, including any recession that has occurred or may occur in the future. Specifically, difficult macroeconomic conditions, such as decreases in discretionary capital expenditure spending, changes to the government funding environment, a reduction in or the lapsing of COVID-19-related governmental stimulus measures, increased and prolonged unemployment or a decline in consumer confidence as a result of the COVID-19 pandemic, as well as limited or significantly reduced points of access of our products, could have a continuing adverse effect on the demand for some of our products and, consequently, related maintenance and support services. The degree of impact of COVID-19 on our business will depend on several factors, such as the duration and the extent of the pandemic, as well as actions taken by governments, businesses and consumers in response to the pandemic, all of which continue to evolve and remain uncertain at this time.

The commercialization and sales of our current or future products may be unsuccessful or less successful than anticipated. While we plan to continue pursuing new products and expand into adjacent markets, we have limited experience in managing and selling multiple products and, as a result, may face challenges selling in new markets and fail to successfully carry out these initiatives, which may adversely impact our business, financial condition or results of operation.

In September 2015, we launched the PacBio Sequel® System, and concurrently began phasing out production of PacBio RS II instruments, and, in April 2019 we announced the commercial launch of the Sequel II System. In October 2020, we launched the Sequel IIe System, which has increased computational capacity, and is designed to enable customers to generate PacBio HiFi reads more efficiently. In April 2021, we released a new HiFi sequencing workflow allowing for more accurate HiFi reads with limited sample quantities. At March 31, 2022, our installed based was 424 Sequel II and Sequel IIe systems compared to the 244 systems as of March 31, 2021, and we expect the number of Sequel II/IIe placements to continue to grow during 2022.

We have made and expect to continue making substantial investments to develop new products and enhance our existing products through our acquisitions and research and development efforts. For example, we are developing a SBB short read sequencing platform. However, due to challenges we may experience in developing and marketing our existing products and launching new products, we may not be able to effectively:

- manage the timeliness of our new product introductions and the rate at which sales of our new products may cannibalize sales of our older products or manage sales and marketing of multiple sequencing platforms;
- drive adoption of our current and future products, including the Sequel II/IIe Systems and products under development related to our emerging SBB technology;
- maintain our competitive position by continuing to attract and retain customers for our products;
- provide appropriate levels of customer training and support for our products;
- implement an effective marketing strategy to promote awareness of our products;
- develop and implement an effective sales and distribution strategy for our current and future products;
- develop, manufacture and commercialize new products or achieve an acceptable return on our manufacturing or research and development efforts and expenses;
- comply with regulatory requirements applicable to our products;
- anticipate and adapt to changes in our market;
- accommodate customer expectations and demands with respect to our products, increase product adoption by our existing customers or develop new customer relationships;

deliver our future products in a timely manner to our customers;

grow our share by marketing and selling our products for new and additional applications;

manage the significant burdens that expanding our existing or future products into current and new markets may impose on marketing, compliance, and other administrative and managerial resources;

maintain and develop strategic relationships with vendors, manufacturers and other industry partners to acquire necessary materials for the production of, and to develop, manufacture and commercialize, our existing or future products;

adapt or scale our manufacturing activities to meet performance specifications and potential demand at a reasonable cost;

avoid infringement and misappropriation of third-party intellectual property;

obtain and maintain any necessary licenses to third-party intellectual property on commercially reasonable terms;

obtain valid and enforceable patents that give us a competitive advantage or enforce existing patents;

protect our proprietary technology; and

attract, retain and motivate qualified personnel.

The risks noted above, especially with respect to the marketing, sales, and commercialization of our products, may be heightened by the impact of the COVID-19 pandemic. In addition, a high percentage of our expenses is and will continue to be fixed. Accordingly, if we do not generate revenue as and when anticipated, we could suffer a material adverse effect on our business, financial conditions, results of operations and prospects.

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

Except for the quarters ended September 30, 2015 (as a result of a one-time gain on lease amendments), March 31, 2020 (as a result of the recognition of a gain relating to the Continuation Advances), December 31, 2020 (as a result of recognition of gain relating to the Reverse Termination Fee), September 30, 2021 (as a result of the recognition of a one-time income tax benefit from business acquisitions), and the year ended December 31, 2020 (as a result of recognition of gain relating to the Reverse Termination Fee and gain relating to the Continuation Advances), we have incurred net losses since inception and we cannot be certain if or when we will produce sufficient revenue from our operations to support our costs. Even if profitability is achieved in the future, we may not be able to sustain profitability on a consistent basis. We expect to continue to incur substantial losses and negative cash flow from operations for the foreseeable future.

Our net losses since inception and our expectation of incurring substantial losses and negative cash flow for the foreseeable future could:

make it more difficult for us to satisfy our obligations;

increase our vulnerability to general adverse economic and industry conditions;

limit our ability to fund future working capital, capital expenditures, research and development and other business opportunities;

increase the volatility of the price of our common stock;

limit our flexibility to react to changes in our business and the industry in which we operate;

place us at a disadvantage to other companies that offer nucleic acid sequencing equipment or consumables; and

limit our ability to borrow additional funds.

In addition, inflationary pressure, including as a result of supply shortages, could adversely impact our financial results, and our operating costs may increase. We may not fully offset these cost increases by raising prices for our products and services, which could result in downward pressure on our margins. Further, our customers may choose to reduce their business with us if we increase our pricing.

Any or all of the foregoing may have a material adverse effect on our business, operations, financial condition, and prospects.

We are not cash flow positive and may not have sufficient cash to make required payments under the terms of our debt or fund our long term planned operations.

Our operations have consumed substantial amounts of cash since inception, and we expect to continue to incur substantial losses and negative cash flow from operations for the foreseeable future. Additional funds may not be available on terms acceptable to us or at all. We have incurred and may further incur additional debt, including the debt incurred through issuance of $900.0 million in aggregate principal amount of 1.50% Convertible Senior Notes due 2028. We may not have sufficient cash to make required payments under the terms of this debt, and, should this occur, debt holders have rights senior to common stockholders to make claims on our assets. We may not be able to issue equity securities due to unacceptable terms and conditions to us in the capital markets. To the extent that we intend to raise additional funds through the sale of our common stock, downward fluctuations in our stock price could adversely affect such fundraising efforts. Furthermore, equity financings normally involve shares sold at a discount to the current market price and fundraising through sales of additional shares of common stock or other equity securities will have a dilutive effect on our existing investors. The shares may also be sold at a time when the market price for our common stock is low because we are in need of the funds, which will further dilute existing holders more than if the market price for our common stock was higher.

We believe that our growth will depend, in part, on our ability to fund our commercialization efforts and our efforts to develop new products, including any improvements to the SMRT Cell 8M and Sequel II/IIe Systems and our planned development of a SBB short read sequencing platform. To the extent our existing resources are not sufficient, it may require us to delay, or even not allow us to conduct any or all of these activities that we believe would be beneficial for our future growth. We may need to raise additional funds through public or private debt or equity financing or alternative financing arrangements, which may include collaborations or licensing arrangements. If we are unable to raise funds on favorable terms, or at all, we may have to reduce our cash burn rate and may not be able to support our commercialization efforts and launching of new products, operations or to increase or maintain the level of our research and development activities.

If we are unable to generate sufficient cash flows or to raise adequate funds to finance our forecasted expenditures, we may have to make significant changes to our operations, including delaying or reducing the scope of, or eliminating some or all of, our development programs. We also may have to reduce sales, marketing, engineering, customer support or other resources devoted to our existing or new products, or we may need to cease operations. Any of these actions could materially impede our ability to achieve our business objectives and could materially harm our operating results. If our cash, cash equivalents and investments are insufficient to fund our projected operating requirements and we are unable to raise capital, it could have a material adverse effect on our business, financial condition and results of operations and prospects.

We have made acquisitions and, in the future, may continue to acquire businesses, technologies or assets, form joint ventures or make other strategic investments with companies that could harm our operating results, dilute our stockholders' ownership, or cause us to incur debt or significant expense.

As part of our business strategy, we have acquired and expect to continue to pursue acquisitions of complementary businesses, technologies or assets. We may also pursue technology license arrangements, strategic alliances or investments that complement our business. For example, we entered into a multi-year Development and Commercialization Agreement with Invitae, whereby Invitae was providing us with funding to develop certain products relating to production-scale high-throughput sequencing. In July 2021, we acquired Circulomics and in September 2021, we acquired Omniome.

Acquisitions and strategic transactions involve numerous risks, any of which could harm our business and negatively affect our financial condition and results of operations, including:

- intense competition for suitable acquisition targets, which could increase prices and adversely affect our ability to consummate deals on favorable or acceptable terms;
- failure or material delay in closing a transaction;
- transaction-related lawsuits or claims;
- difficulties in integrating the technologies, operations, existing contracts, and personnel of an acquired company;
- difficulties in retaining key employees or business partners of an acquired company;
- difficulties in retaining suppliers, partners or customers of an acquired company;
- challenges with integrating the brand identity of an acquired company with our own;
- diversion of financial and management resources from existing operations or alternative acquisition opportunities;
- failure to realize the anticipated benefits or synergies of a transaction;
- difficulties in developing technology post-acquisition;
- failure to identify the problems, liabilities, or other shortcomings or challenges of an acquired company or technology, including issues related to intellectual property, regulatory compliance practices, litigation, revenue recognition or other accounting practices, or employee or user issues;
- risks that regulatory bodies may enact new laws or promulgate new regulations that are adverse to an acquired company or business;
- risks that regulatory bodies do not approve our acquisitions or business combinations or delay such approvals;
- theft of our trade secrets or confidential information that we share with potential acquisition candidates;
- risk that an acquired company or investment in new services cannibalizes a portion of our existing business; and
- adverse market reaction to an acquisition.

To finance any acquisitions or other strategic investments, we may raise additional funds, which could adversely affect our existing stockholders and our business. If the price of our common stock is low or volatile, we may not be able to acquire other companies for stock. In addition, our stockholders may experience substantial dilution as a result of additional securities we may issue for acquisitions. Open market sales of substantial amounts of our common stock issued to stockholders of companies we acquire could also depress our stock price. Additional funds may not be available on terms that are favorable to us, or at all.

If we fail to address the foregoing risks or other problems encountered in connection with past or future acquisitions of businesses, new technologies, services, and other assets and strategic investments, or if we fail to successfully integrate such acquisitions or investments, our business, financial condition, and results of operations could be adversely affected.

If we are unable to successfully develop and timely manufacture our current and future products, including with respect to SMRT Cell Sequel II/IIe Systems, the SBB products under development, and related products, our business may be adversely affected.

In light of the highly complex technologies involved in our products, there can be no assurance that we will be able to manufacture and commercialize our current and future products on a timely basis or continue providing adequate support for our existing products. The commercial success of our products, including the Sequel and Sequel II/IIe

Systems, depends on a number of factors, including performance and reliability of the system, our anticipating and effectively addressing customer preferences and demands, the success of our sales and marketing efforts, effective forecasting and management of product demand, purchase commitments and inventory levels, effective management of manufacturing and supply costs, and the quality of our products, including consumables such as SMRT Cells and reagents. Should we face delays in or discover unexpected defects during the further development or manufacturing process of instruments or consumables related to our products, including with respect to SMRT Cells, reagents, Sequel II/IIe Systems, SBB products under development, and including any delays or defects in software development or product functionality, the timing and success of the continued rollout and scaling of our products may be significantly impacted, which may materially and negatively impact our revenue and gross margin. The ability of our customers to successfully utilize our products will also depend on our ability to deliver high quality SMRT Cells and reagents, including with respect to the SMRT Cell 8M. We have designed SMRT Cells and other consumables specifically for the Sequel and Sequel II/IIe Systems, and may need to develop in the future, other customized SMRT Cells and consumables for our future products. Our production of the SMRT Cells for the Sequel and Sequel II/IIe Systems has been and may in the future be below desired levels and yields, and we have experienced and may experience in the future manufacturing delays, product or quality defects, SMRT Cell variability, and other issues. For example, the COVID–19 pandemic outbreak has impacted and could result in more pronounced impacts to our manufacturing and our ability to supply products. The performance of our consumables is critical to our customers' successful utilization of our products, and any defects or performance issues with our consumables would adversely affect our business. All of the foregoing could materially negatively impact our ability to sell our products or result in other material adverse effects on our business, operations, financial condition, operations and prospects.

The development of our products is complex and costly. Problems in the design or quality of our products may have a material and adverse effect on our brand, business, financial condition, and operating results, and could result in us losing our certifications from the International Organization for Standardization ("ISO"). If we were to lose ISO certification, then our customers might choose not to purchase products from us and this could adversely impact our ability to develop products approved for clinical uses. Unanticipated problems with our products could divert substantial resources, which may impair our ability to support our new and existing products, and could substantially increase our costs. If we encounter development challenges or discover errors in our products late in our development cycle, we may be forced to delay product shipments or the scaling of manufacturing or supply. In particular, if the continued rollout of our current and future products, including with respect to the SMRT Cell 8M and Sequel II/IIe Systems, is delayed or is not successful or less successful than anticipated, then we may not be able to achieve an acceptable return, if any, on our substantial research and development efforts, and our business may be materially and adversely affected. The expenses or losses associated with delayed or unsuccessful product development or lack of market acceptance of our existing and new products, including the SMRT Cell 8M and Sequel II/IIe Systems, could materially and adversely affect our business, operations, financial condition, and prospects.

Our research and development efforts may not result in the benefits that we anticipate, and our failure to successfully market, sell, and commercialize our current and future products could have a material adverse effect on our business, financial condition and results of operations.

We have dedicated significant resources to developing our current products, including sequencing systems and consumables based on our proprietary SMRT sequencing technology and our Sequel and Sequel II/IIe Systems. We are also engaged in substantial and complex research and development efforts, which, if successful, may result in the introduction of new products in the future, including in connection with the SMRT Cell 8M and the Sequel II/IIe Systems, in addition to SBB products currently under development. Our research and development efforts are complex and require us to incur substantial expenses. We may not be able to develop, manufacture and commercialize new products, obtain regulatory approval if necessary, or achieve an acceptable return, if any, on our research and development efforts and expenses or joint research and development efforts with partners. Our joint research and development efforts with partners require significant management attention and operational resources. If we are unable to successfully manage such joint research and development efforts, our future results may be adversely impacted. In January 2021, we entered into the Development Agreement, a multi-year collaboration with Invitae to begin development of a production-scale high-throughput sequencing platform; in certain termination

circumstances of this collaboration, we may be obligated to refund all or a portion of the development funds advanced by Invitae and/or we may owe Invitae a share of the revenue generated from the sale of the program products. While we expect to continue to develop next generation high throughput sequencing platforms and products, we are currently renegotiating the terms of the Development Agreement, and we do not anticipate that Invitae will continue to provide funding support for future development under the Development Agreement. We expect to continue discussions with Invitae in connection with the Development Agreement to receive feedback and operational assistance and expertise which we will incorporate in the continued development of our high throughput sequencing platforms and products. Furthermore, we need to continue to expand our internal capabilities or seek new partnerships or collaborations, or both, in order to successfully develop, market, sell and commercialize our products for and in the markets we seek to reach. If we are unable to do so or are delayed, then this could materially and adversely affect our business, operations, financial condition and prospects.

We must successfully manage new product introductions and transitions, including with respect to the SMRT Cell 8M and Sequel II/IIe Systems, and the development of our proposed SBB short read sequencing platform, and we may incur significant costs during these transitions and development, and these efforts may not result in the benefits we anticipate.

If our products and services fail to deliver the performance, scalability or results expected by our current and future customers, or are not delivered on a timely basis, our reputation and credibility may suffer, our current and future sales and revenue may be materially harmed and our business may not succeed. For instance, if we are not able to realize the benefits we anticipate from the development and commercialization of the SMRT Cell 8M and Sequel II/IIe Systems, our proposed SBB short read sequencing platform, and any future products that may be developed for medical and clinical uses, it could have a material adverse effect on our business, financial condition and results of operations. In addition, the introduction of future products, including with respect to future long-read and short-read products, and related consumables, has and may in the future lead to our limiting or ceasing development of further enhancements to our existing products as we focus our resources on new products, and has resulted and could in the future result in reduced marketplace acceptance and loss of sales of our existing products, materially adversely affecting our revenue and operating results. The introduction of new products has had and may in the future also have a negative impact on our revenue in the near-term as our current and future customers have delayed or cancelled and may in the future delay or cancel orders of existing products in anticipation of new products and we may also be pressured to decrease prices for our existing products. Further, we have experienced, and may in the future experience, difficulty in managing or forecasting customer reactions, purchasing decisions or transition requirements with respect to newly launched products. We have incurred and may continue to incur significant costs in completing these transitions, including costs of write-downs of our products, as current or future customers transition to new products. If we do not successfully manage these product transitions, including with respect to the SMRT Cell 8M and Sequel II/IIe System, our business, operations, financial condition, and prospects may be materially and adversely affected.

Significant changes to our leadership team and the resulting management transitions might harm our future operating results.

We have experienced significant changes to our leadership team. Our President and Chief Executive Officer Christian O. Henry was appointed effective September 14, 2020, succeeding Dr. Michael Hunkapiller who retired on December 31, 2020. Our Chief Financial Officer Susan G. Kim was appointed effective September 28, 2020, succeeding Susan K. Barnes who retired on August 7, 2020. Our Chief Operating Officer, Mark Van Oene, and our Chief Commercial Officer, Peter Fromen, were each appointed effective January 8, 2021. Also, our Vice President and Chief Accounting Officer Michele Farmer was appointed effective May 17, 2021, and our Chair of the Board Dr. John F. Milligan was appointed effective September 14, 2020.

Although we believe these leadership transitions are in the best interest of our stakeholders, these transitions may result in the loss of personnel with deep institutional or technical knowledge. Further, the transition could potentially disrupt our operations and relationships with employees, suppliers, partners and customers due to added costs, operational inefficiencies, decreased employee morale and productivity and increased turnover. We must successfully recruit and integrate our new leadership team members within our organization to achieve our operating

objectives; as such, the leadership transition may temporarily affect our business performance and results of operations while the new members of our leadership team become familiar with our business. In addition, our competitors may seek to use this transition and the related potential disruptions to gain a competitive advantage over us. Furthermore, these changes increase our dependency on the other members of our leadership team that remain with us, who are not contractually obligated to remain employed with us and may leave at any time. Any such departure could be particularly disruptive given that we are already experiencing leadership transitions and, to the extent we experience additional management turnover, competition for top management is high such that it may take some time to find a candidate that meets our requirements. Our future operating results depend substantially upon the continued service of our key personnel and in significant part upon our ability to attract and retain qualified management personnel. If we are unable to mitigate these or other similar risks, our business, results of operations and financial condition may be materially and adversely affected.

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

Our success depends upon the continuing services of members of our senior management team and scientific and engineering personnel. In particular, our scientists and engineers are critical to our technological and product innovations and we will need to hire additional qualified personnel. Our industry, particularly in the San Francisco Bay Area, is characterized by high demand and intense competition for talent, and the turnover rate can be high. We compete for qualified management and scientific personnel with other life science companies, academic institutions and research institutions, particularly those focusing on genomics. This competition has become exacerbated by the increase in employee resignations currently taking place throughout the United States in connection with the COVID-19 pandemic. The loss of qualified employees, or an inability to attract, retain, and motivate employees, could prevent us from pursuing collaborations and materially and adversely affect our support of existing products, product development and launches, business growth prospects, results of operations and financial condition. In addition, we will need to continue to recruit, hire and retain sales personnel to support the commercialization of our products. Our employees could leave our company with little or no prior notice and would be free to work for a competitor. In addition, changes to U.S. immigration policies, particularly to H-1B and other visa programs, could restrain the flow of technical and professional talent into the U.S. and may inhibit our ability to hire qualified personnel. If one or more of our senior executives or other key personnel were unable or unwilling to continue in their present positions, we may not be able to replace them easily or at all, and other senior management may be required to divert attention from other aspects of the business. In addition, we do not have “key person” life insurance policies covering any member of our management team or other key personnel. Further, our vaccination and return to office protocols related to COVID-19 may also impact the recruitment and retention of key employees. The loss of any of these individuals or any inability to attract or retain qualified personnel, including scientists, engineers, sales personnel and others, could prevent us from pursuing collaborations and materially and adversely affect our support of existing products, product development and introductions, business growth prospects, results of operations and financial condition.

Our success is highly dependent on our ability to further penetrate nucleic acid sequencing applications as well as on the growth and expansion of the demand for our products. If our products fail to achieve and sustain sufficient market acceptance, we will not generate expected revenue and our business may not succeed.

Although nucleic acid sequencing technology is well-established, our SMRT Sequencing technology is relatively new and evolving. We cannot be sure that our current or future products will gain acceptance in the marketplace at levels sufficient to support our costs. Our success depends, in part, on our ability to expand overall demand for nucleic acid sequencing to include new applications that are not practicable with other current technologies and to introduce new products that capture a larger share of growing overall demand for sequencing. To accomplish this, we must successfully commercialize, and continue development of, our proprietary SMRT Sequencing technology for use in a variety of life science and other research applications, including uses by academic, government and clinical laboratories, as well as pharmaceutical, diagnostic, biotechnology and agriculture companies, among others.

However, we may be unsuccessful in these efforts and the sale and commercialization of the SMRT Cell 8M and Sequel II/IIe Systems, and related products may not grow sufficiently to cover our costs.

There can be no assurance that we will be successful in adding new products or securing additional customers for our current and future products, including with respect to the SMRT Cell 8M and Sequel II/IIe Systems and products related to our recent Circulomics and Omniome acquisitions. If we are unable to develop SBB technology and sell acquired technology product, we may fail to achieve our strategic commercial initiatives in connection with the planned release of new products and anticipated entry into new markets. Our ability to further penetrate existing applications and any new applications depends on a number of factors, including the cost, performance and perceived value associated with our products, as well as customers' willingness to adopt a different approach to nucleic acid sequencing. Potential customers may have already made significant investments in other sequencing technologies and may be unwilling to invest in new technologies. We are experiencing pricing pressures caused by industry competition and increased demand for lower-priced instruments and lower operational costs. We have limited experience commercializing and selling products outside of the academic and research settings, and we cannot guarantee success in acquiring additional customers. Furthermore, we cannot guarantee that our products will be satisfactory to potential customers or that our products will perform in accordance with customer expectations.

Nucleic acid sequencing applications are new and dynamic, and there can be no assurance that they will develop as quickly as we anticipate, that they will reach their full potential or that our products will be appropriate competitive for these applications. As a result, we may be required to refocus our marketing efforts, and we may have to make changes to the specifications of our products to enhance our ability to enter particular applications more quickly. We may also need to delay full-scale commercial deployment of new products as we develop them in order to perform quality control and early access user testing. Even if we are able to implement our technology successfully, we and/or our sales and distribution partners may fail to achieve or sustain market acceptance of our current or future products across the full range of our intended life science and other applications. We need to continue to expand and update our internal capabilities or to collaborate with other partners, or both, in order to successfully expand sales of our products in the applications that we seek to reach, which we may be unable to do at the scale required to support our business.

If the demand for our products grows more slowly than anticipated, if we are unable to successfully scale or otherwise ensure sufficient manufacturing capacity for new products to meet demand, if we are not able to successfully market and sell our products, if competitors develop better or more cost-effective products, if our product launches and commercialization are not successful, or if we are unable to further grow our customer base or do not realize the growth with existing customers that we are expecting, our current and future sales and revenue may be materially and adversely harmed, or we may recognize an impairment loss, and our business may not succeed.

We rely on other companies for the manufacture of certain components and sub-assemblies and intend to outsource additional sub-assemblies in the future, some of which are sole sources. We may not be able to successfully scale the manufacturing process necessary to build and test multiple products on a full commercial basis, which could materially harm our business.

Our products are complex and involve a large number of unique components, many of which require precise manufacturing. The nature of our products requires customized components that are currently available only from a limited number of sources, and in some cases, single sources. We have chosen to source certain critical components from a single source, including suppliers for our SMRT Cells, reagents and instruments. We cannot assure you that product supplies will not be limited or interrupted, especially with respect to our sole source third-party manufacturing and supply collaborators, or that product supplies will be of satisfactory quality or continue to be available at acceptable prices. In particular, any replacement of our manufacturers could require significant effort and expertise because there may be a limited number of qualified replacements. We may be unable to negotiate binding agreements with our current and future sole source third-party manufacturing and supply collaborators or, in the event that such collaborators' services become interrupted for any reason, find replacement manufacturers to

support our development and commercial activities at commercially reasonable terms. We do not always have arrangements in place for a redundant or second-source supply for our sole source vendors in the event they cease to provide their products or services to us or fail to provide sufficient quantities in a timely manner. If we are required to purchase these components from alternative sources, it could take several months or longer to qualify the alternative sources. If we are unable to secure a sufficient supply of these product components on a timely basis, or if these components do not meet our expectations or specifications for quality and functionality, our operations and manufacturing would be materially and adversely affected, we could be unable to meet customer demand and our business and results of operations may be materially and adversely affected.

The operations of our third-party manufacturing partners and suppliers have been and could continue to be disrupted by conditions unrelated to our business or operations or that are beyond our control, including but not limited to international trade restrictions, inflation, supply chain disruptions, and conditions related to COVID-19 or other epidemics. If our manufacturing partners or suppliers are unable or fail to fulfill their obligations to us for any reason, we may not be able to manufacture our products and satisfy customer demand or our obligations under sales agreements in a timely manner, and our business could be harmed as a result. For example, the global shortage of semiconductors, which has been reported since early 2021, has caused challenges for us in our supply chain and resulted in some cost increases that have and may continue to adversely impact margins. During these periods of shortages or delays, the price of components may increase, or the components may not be available at all. We may not be able to secure enough components at reasonable prices or of acceptable quality to build new products in a timely manner in the quantities or configurations needed. For example, in response to the rising COVID-19 infections, China has imposed lockdowns in certain parts of the country, which has had, and may continue to have, a negative impact on manufacturing and/or supply chains, in addition to customer demand for our products and demand through certain distributors. Accordingly, our revenue and gross margins could suffer until lockdowns from COVID-19 infections are reduced and/or other sources can be developed.

In addition, because our semiconductor suppliers are in regions that may have communities with low vaccination rates, the Omicron variant of COVID-19, or any variants that evolve in the future, could lead to increased infections among workers that could further disrupt the supply chain. Our current manufacturing process is characterized by long lead times between the placement of orders for and delivery of our products. If we do not accurately anticipate our needs or if we receive insufficient components to manufacture our products on a timely basis to meet customer demand, our sales and our gross margin may be adversely affected and our business could be materially harmed. If we are unable to reduce our manufacturing costs and establish and maintain reliable, high-volume manufacturing suppliers as we scale our operations, our business, operations, financial condition, and prospects could be materially and adversely harmed.

We may be unable to consistently manufacture our instruments and consumables, including SMRT Cells and reagents, to the necessary specifications or in quantities necessary to meet demand at an acceptable cost or at an acceptable performance level.

In order to successfully generate revenue from our products, we need to supply our customers with products that meet their expectations for quality and functionality in accordance with established specifications. Our customers have experienced variability in the performance of our products. We have experienced and may continue to experience delays, quality issues or other difficulties leading to customer dissatisfaction with our products. Our production of SMRT Cells and reagents involves a long and complex manufacturing process, and has been and may in the future be below desired yields and resulting output levels. We have experienced and may experience in the future manufacturing delays, product defects, variability in the performance of SMRT Cells and other products, inadequate reserves for inventory, or other issues.

There is no assurance that we will be able to manufacture our products so that they consistently achieve the product specifications and quality that our customers expect, including any products developed for clinical uses. Problems in the design or quality of our products, including low manufacturing yields of SMRT Cells, or sub-performing reagent lots may have a material adverse effect on our brand, business, financial condition, and operating results, and could result in us losing our ISO certifications. If we were to lose our ISO certifications, then our customers might choose

not to purchase products from us. There is also no assurance that we will be able to increase manufacturing yields and decrease costs, or that we will be successful in forecasting customer demand or manufacturing and supply costs, or that product supplies, including reagents or integrated chips, will not be limited or interrupted, or will be of satisfactory quality or continue to be available at acceptable prices. Furthermore, while we are undertaking efforts to increase our manufacturing scale and capability, we may not be able to increase manufacturing to meet anticipated demand or may experience downtime in our manufacturing facilities, including, for example, if we experience increased cases of COVID-19 among our employees, or if our suppliers are unable to meet our increased demand at a time when the supply chain is under duress due to potential dislocations and disruptions in product and employee availability due to COVID-19. An inability to manufacture products and components that consistently meet specifications, in necessary quantities and at commercially acceptable costs, will have a negative impact, and may have a material adverse effect on our business, product development timelines, financial condition and results of operations.

Rapidly changing technology in life sciences and research diagnostics could make our products obsolete unless we continue to develop, manufacture and commercialize new and improved products and pursue new opportunities.

Our industry is characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry standards. Our future success depends on our ability to continually improve our products, to develop and introduce new products that address the evolving needs of our customers on a timely and cost-effective basis and to pursue new opportunities. These new opportunities may be outside the scope of our proven expertise or in areas where demand is unproven, and new products and services developed by us may not gain market acceptance or may not adequately perform in order to capture market share. Our inability to develop and introduce new products and to gain market acceptance of our existing and new products could harm our future operating results. Unanticipated difficulties or delays in replacing existing products with new products or in commercializing our existing or new products in sufficient quantities and of acceptable quality to meet customer demand, including with respect to the SMRT Cell 8M and Sequel II/IIe Systems, could diminish future demand for our products and may materially and adversely harm our future operating results.

Increased market adoption of our products by customers may depend on the availability of sample preparation and informatics tools, some of which may be developed by third parties.

Our commercial success may depend in part upon the development of sample preparation and software and informatics tools by third parties for use with our products. We cannot guarantee that product supplies, including reagents, will not be limited or interrupted, or will be of satisfactory quality or continue to be available at acceptable prices, or that third parties will develop tools that our current and future customers will find useful with our products, or that customers will adopt such third-party tools on a timely basis or at all. A lack of complementary sample preparation and informatics tools, or delayed updates of such tools, may impede the adoption of our products and may materially and adversely impact our business.

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

There are a significant number of companies offering nucleic acid sequencing products and/or services, including Illumina, BGI Genomics, Thermo, Oxford Nanopore Technologies Ltd. (“ONT Ltd.”), Roche, and Qiagen. Many of these companies currently have greater name recognition, more substantial intellectual property portfolios, longer operating histories, significantly greater financial, technical, research and/or other resources, more experience in new product development, larger and more established manufacturing capabilities and marketing, sales and support functions, and/or more established distribution channels to deliver products to customers than we do. These companies may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or customer requirements.

There are also several companies that are in the process of developing or have already developed and commercialized new, competing or potentially competing technologies, products and/or services, including ONT Ltd.

and its subsidiaries, against whom we have filed complaints for patent infringement in the U.S. District Court for the District of Delaware and, previously, with the U.S. International Trade Commission, in the High Court of England and Wales and in the District Court of Mannheim, Germany. ONT Ltd. previously filed claims against us in the High Court of England and Wales and the District Court of Mannheim, Germany, also for patent infringement, and its subsidiary, Oxford Nanopore Technologies, Inc. ("ONT Inc."), filed counterclaims against us in the U.S. District Court for the District of Delaware seeking declaratory judgements of non-infringement, invalidity and unenforceability of the asserted patents, as well as antitrust, false advertising and unfair competition counterclaims that were subsequently dismissed by that court. Roche is developing potentially competing sequencing products. Increased competition may result in pricing pressures, which could harm our sales, profitability or market share. Our failure to further enhance our existing products and to introduce new products to compete effectively could materially and adversely affect our business, operations, financial condition and prospects.

We may be unable to successfully increase sales of our current products or market and sell our future products.

Our ability to achieve profitability depends on our ability to attract customers for our current and future products, and we may be unable to effectively market or sell our products, or find appropriate partners to do so. To perform sales, marketing, distribution and customer support functions successfully, we face a number of risks, including:

- our ability to attract, retain and manage qualified sales, marketing and service personnel necessary to expand market acceptance for our technologies;
- the performance and commercial availability expectations of our existing and potential customers with respect to new and existing products;
- availability of potential sales and distribution partners to sell our technologies, and our ability to attract and retain such sales and distribution partners;
- the time and cost of maintaining and growing a specialized sales, marketing and service force for a particular application, which may be difficult to justify in light of the revenue generated; and
- our sales, marketing and service force may be unable to execute successful commercial activities.

We have enlisted and may continue to enlist third parties to assist with sales, distribution and customer support. There is no guarantee that we will be successful in attracting desirable sales and distribution partners, that we will be able to enter into arrangements with such partners on terms favorable to us or that we will be able to retain such partners on a going-forward basis. If our sales and marketing efforts, or those of any of our third-party sales and distribution partners, are not successful, or our products do not perform in accordance with customer expectations, our technologies and products may not gain market acceptance, which could materially and adversely impact our business, operations, financial condition and prospects.

Large purchases by a limited number of customers represent a significant portion of our revenue, and any loss or delay of expected purchases has resulted, and in the future could result, in material quarter-to-quarter fluctuations of our revenue or otherwise adversely affect our results of operations.

We receive a significant portion of our revenue from a limited number of customers. For example, for the fiscal years ended December 31, 2021, 2020 and 2019, one of our customers, who is our primary distributor in China, accounted for approximately 13%, 14% and 17% of our total revenue, respectively. Many of these customers make large purchases on a purchase-order basis rather than pursuant to long-term contracts. As a consequence of the concentrated nature of our customer base and their purchasing behavior, our quarterly revenue and results of operations have fluctuated, and may fluctuate in the future, from quarter to quarter and are difficult to forecast. For example, the cancellation of orders or acceleration or delay in anticipated product purchases or the acceptance of shipped products by our larger customers has materially affected, and in the future could materially affect, our revenue and results of operations in any quarterly period. We have been, and may be in the future be, unable to sustain or increase our revenue from our larger customers, or offset any discontinuation or decrease of purchases by our larger customers with purchases by new or other existing customers. To the extent one or more of our larger customers experience significant financial difficulty, bankruptcy or insolvency, this could have a material adverse

effect on our sales and our ability to collect on receivables, which could materially and adversely harm our financial condition and results of operations.

In addition, many of our customers, including some of our larger customers, have negotiated, or may in the future negotiate, volume-based discounts or other more favorable terms from us or our sales and distribution partners, which can and have had a negative effect on our gross margins or revenue.

We expect that such concentrated purchases will continue to contribute materially to our revenue for the foreseeable future and that our results of operations may fluctuate materially as a result of such larger customers' buying patterns. In addition, we may see consolidation of our customer base. The loss of one of our larger customers, a significant delay or reduction in its purchases, or any volume-based discount or other more favorable terms that we or our sales and distribution partner(s) may agree to provide, in light of the aggregated purchase volume or buying power resulting from such consolidation, has harmed, and in the future could harm, our business, financial condition, results of operations and prospects.

Our products are highly complex, have recurring support requirements and could have unknown defects or errors, which may give rise to claims against us or divert application of our resources from other purposes.

Products using our SMRT sequencing technology are highly complex and may develop or contain undetected defects or errors. Our customers have experienced and may continue to experience reliability issues with our existing and future products, including the Sequel System and the Sequel II/IIe Systems. Despite testing, defects or errors may arise in our products, which could result in a failure to obtain, maintain or increase market acceptance of our products, diversion of development resources, injury to our reputation and increased warranty, service and maintenance costs. New products, including the SMRT Cell 8M and Sequel II/IIe Systems, or enhancements to our existing products in particular may contain undetected errors or performance problems that are discovered only after delivery to customers. If our products have reliability or other quality issues or require unexpected levels of support in the future, the market acceptance and utilization of our products may not grow to levels sufficient to support our costs and our reputation and business could be harmed. Low utilization rates of our products could cause our revenue and gross margins to be adversely affected. We provide a warranty for our sequencing instruments and consumables, which is generally limited to replacing, repairing, or at our option, giving credit for any sequencing instrument or consumable with defects in material or workmanship. Service contracts for our sequencing instruments may be separately purchased. Defects or errors in our products may also discourage customers from purchasing our products. The costs incurred in correcting any defects or errors may be substantial and could materially and adversely affect our operating margins. If our service and support costs increase, our business and operations may be materially and adversely affected.

In addition, such defects or errors could lead to the filing of product liability claims against us or against third parties who we may have an obligation to indemnify against such claims, which could be costly and time-consuming to defend and result in substantial damages. Although we have product liability insurance, any product liability insurance that we have or procure in the future may not protect our business from the financial impact of a product liability claim. Moreover, we may not be able to obtain adequate insurance coverage on acceptable terms. Any insurance that we have or obtain will be subject to deductibles and coverage limits. A product liability claim could have a material adverse effect on our business, financial condition and results of operations.

A significant portion of our sales depends on customers' spending budgets that may be subject to significant and unexpected variation which could have a negative effect on the demand for our products.

Our instruments represent significant capital expenditures for our customers in research applications. Current and potential customers for our current or future products include academic and government institutions, genome centers, medical research institutions, clinical laboratories, pharmaceutical, agricultural, biotechnology, diagnostic and chemical companies. Their spending budgets can have a significant effect on the demand for our products. Spending budgets are based on a wide variety of factors, including the allocation of available resources to make purchases, funding from government sources which is highly uncertain and subject to change, the spending priorities

among various types of research equipment, policies regarding capital expenditures during economically uncertain periods and the impact of COVID-19. Any decrease in capital spending or change in spending priorities of our current and potential customers could significantly reduce the demand for our products. Any delay or reduction in purchases by current or potential customers or our inability to forecast fluctuations in demand could materially and adversely harm our future operating results.

We may not be able to convert our orders in backlog into revenue.

Our backlog represents product orders from our customers that we have confirmed but have not been able to fulfill, and, accordingly, for which we have not yet recognized revenue. We may not receive revenue from these orders, and any order backlog we report may not be indicative of our future revenue.

Many events can cause an order to be delayed or not completed at all, some of which may be out of our control, including the potential impacts from COVID-19 and our suppliers, especially our sole source suppliers, not being able to provide us with products or components. If we delay fulfilling customer orders or if customers reconsider their orders, those customers may seek to cancel or modify their orders with us. Customers may otherwise seek to cancel or delay their orders even if we are prepared to fulfill them. If our orders in backlog do not result in sales, our operating results may suffer.

Our sales cycle is unpredictable and lengthy, which makes it difficult to forecast revenue and may increase the magnitude of quarterly or annual fluctuations in our operating results.

The sales cycle for our sequencing instruments is lengthy because they represent a major capital expenditure and generally require the approval of our customers' senior management. This may contribute to substantial fluctuations in our quarterly or annual operating results, particularly during the periods in which our sales volume is low. Factors that may cause fluctuations in our quarterly or operating results include, without limitation, market acceptance for our products; our ability to attract new customers; publications of studies by us, competitors or third parties; the timing and success of new product introductions by us or our competitors or other changes in the competitive dynamics of our industry, such as consolidation; the amount and timing of our costs and expenses; changes in our pricing policies or those of our competitors; general economic, industry and market conditions; the effects of seasonality; the regulatory environment; expenses associated with warranty costs or unforeseen product quality issues; the hiring, training and retention of key employees, including our ability to grow our sales organization; litigation or other claims against us for intellectual property infringement or otherwise; our ability to obtain additional financing as necessary; changes or trends in new technologies and industry standards; and the impact of COVID-19. Because of these fluctuations, it is likely that in some future quarters our operating results will fall below the expectations of securities analysts or investors. If that happens, the market price of our stock would likely decrease. Past fluctuations in our quarterly and annual operating results have resulted in decreases in our stock price. Such fluctuations also mean that investors may not be able to rely on our operating results in any particular period as an indication of future performance. Sales to existing customers and the establishment of a business relationship with other potential customers is a lengthy process, generally taking several months and sometimes longer. Following the establishment of the relationship, the negotiation of purchase terms can be time-consuming, and a potential customer may require an extended evaluation and testing period. In anticipation of product orders, we may incur substantial costs before the sales cycle is complete and before we receive any customer payments. As a result, in the event that a sale is not completed or is canceled or delayed, we may have incurred substantial expenses, making it more difficult for us to become profitable or otherwise negatively impacting our financial results. Furthermore, because of our lengthy sales cycle, the realization of revenue from our selling efforts may be substantially delayed, our ability to forecast our future revenue may be more limited and our revenue may fluctuate significantly from quarter to quarter.

Because some of our customers and suppliers are based in China, our business, financial condition and results of operations could be adversely affected by the political and economic tensions between the United States and China.

We are subject to risks associated with political conflicts between the U.S. and China. A significant portion of our revenue is generated from China. For example, for the fiscal years ended December 31, 2021, 2020 and 2019, one customer, who is our primary distributor in China, accounted for approximately 13%, 14% and 17% of our total revenue, respectively. In addition, certain components, some of which are critical components, of our products are manufactured in China. These components are either sourced directly from companies in China or indirectly from third parties that source from companies in China.

The imposition of tariffs or other trade barriers between the U.S. and China, including the tariffs previously implemented and additional tariffs that have been proposed by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods, the scope and duration of which, if implemented, remain uncertain. Beginning in September 2018, the U.S. Trade Representative (the "USTR") enacted various tariffs of 7.5%, 10%, 15% and 25% on the import of Chinese products, including non-U.S. components and materials that may be used in our products. These tariffs could raise our costs. Additionally, in November 2018, the U.S. Commerce Department's Bureau of Industry and Security ("BIS") released an advance notice of proposed rulemaking to control the export of emerging technologies. This notice included "[b]iotechnology, including nanobiology; synthetic biology; genomic and genetic engineering; or neurotech" as possible areas of increased export controls. Therefore, it is possible that our ability to export our products to China may be restricted in the future. China also has imposed tariffs on imports into China from the United States. Given the relatively fluid regulatory environment in China and the United States and uncertainty how the U.S. or foreign governments will act with respect to tariffs, international trade agreements and policies, there could be additional tax or other regulatory changes in the future. Any such changes could directly and adversely impact our financial results and results of operations.

Other risks could include:

- interruptions to operations in China as a result of the COVID-19 pandemic or other disease outbreaks and natural catastrophic events, which have in the past and can result in the future in business closures, transportation restrictions, import and export complications and cause shortages in the supply of raw materials or disruptions in manufacturing;
- product supply disruptions and increased costs as a result of heightened exposure to changes in the policies of the Chinese government, political unrest or unstable economic conditions in China; and
- the nationalization or other expropriation of private enterprises or intellectual property by the Chinese government.

Difficulties in this relationship may require us to take actions adverse to our business to comply with governmental restrictions on business and trade with China.

In addition, our consumable chips are partly manufactured by a company based in Taiwan. Accordingly, there is a risk that current political tensions between China and Taiwan may lead to circumstances that negatively affect the availability of such consumable chips to us, which could lead to an increase in our supply costs if we cannot find a similar cost alternative supplier, resulting in an adverse impact to our financial results and results of operations.

Seasonality may cause fluctuations in our revenue and results of operations.

We operate on a December 31st year-end and believe that there are significant seasonal factors which may cause sales of our products, and particularly our sequencing instruments, to vary on a quarterly or yearly basis, contribute to the lengthy sales cycle for our sequencing instruments, and increase the magnitude of quarterly or annual fluctuations in our operating results. We believe that this seasonality results from a number of factors, including the procurement and budgeting cycles of many of our customers, especially government-funded customers, which often coincide with government fiscal year ends. For example, the U.S. government's fiscal year-end occurs in our third quarter and may result in increased sales of our products during this quarter if government-funded customers have

unused funds that may be forfeited, or future budgets that may be reduced if funds remain unspent at fiscal year-end. Furthermore, Lunar New Year celebrations, which occur during our first quarter, and may last for a week or longer, resulting in closure of many of our customers' offices in China and across the Asia-Pacific region have caused, and may in the future cause, decreased sales of our consumables during our first quarter. These factors have contributed, and may contribute in the future, to substantial fluctuations in our quarterly operating results. Because of these fluctuations, it is possible that in some quarters our operating results will fall below the expectations of securities analysts or investors. If that happens, the market price of our stock would likely decrease. These fluctuations, among other factors, also mean that our operating results in any particular period may not be relied upon as an indication of future performance. Seasonal or cyclical variations in our sales have in the past, and may in the future, become more or less pronounced over time, and have in the past materially affected, and may in the future materially affect, our business, financial condition, results of operations and prospects.

Our ability to use net operating losses to offset future taxable income may be subject to substantial limitations, and changes to U.S. tax laws may cause us to make adjustments to our financial statements.

Under Section 382 of the Internal Revenue Code, a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change net operating losses ("NOLs") to offset future taxable income. We believe that we have had one or more ownership changes, as a result of which our existing NOLs are currently subject to limitation. Future changes in our stock ownership could result in additional ownership changes under Section 382. We may not be able to utilize a material portion of our NOLs even if we attain profitability. Furthermore, the changes to deductions, credits and expense recognition resulting from the Tax Cuts and Jobs Act of 2018 enacted on December 22, 2017, have materially impacted the value of our deferred tax assets and liabilities, and could adversely affect our future taxable income and effective tax rate.

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

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

Risks Related to Our Intellectual Property

Failure to secure patent or other intellectual property protection for our products and improvements to our products may reduce our ability to maintain any technological or competitive advantage over our current and potential competitors.

Our ability to protect and enforce our intellectual property rights is uncertain and depends on complex legal and factual questions. Our ability to establish or maintain a technological or competitive advantage over our competitors may be diminished because of these uncertainties. For example:

- we or our licensors might not have been the first to make the inventions covered by each of our pending patent applications or issued patents;
- we or our licensors might not have been the first to file patent applications for these inventions;
- it is possible that neither our pending patent applications nor the pending patent applications of our licensors will result in issued patents;
- the scope of the patent protection we or our licensors obtain may not be sufficiently broad to prevent others from practicing our technologies, developing competing products, designing around our patented technologies or independently developing similar or alternative technologies;

- our and our licensors' patent applications or patents have been, are and may in the future be, subject to interference, opposition or similar administrative proceedings, which could result in those patent applications failing to issue as patents, those patents being held invalid or the scope of those patents being substantially reduced;
- our enforcement of patents and proprietary rights in other countries may be problematic or unpredictable;
- we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions;
- we or our partners may not adequately protect our trade secrets;
- we may not develop additional proprietary technologies that are patentable; or
- the patents of others may limit our freedom to operate and prevent us from commercializing our technology in accordance with our plans.

The occurrence of any of these events could impair our ability to operate without infringing upon the proprietary rights of others or prevent us from establishing or maintaining a competitive advantage over our competitors.

Variability in intellectual property laws may adversely affect our intellectual property position.

Intellectual property laws, and patent laws and regulations in particular, have been subject to significant variability either through administrative or legislative changes to such laws or regulations or changes or differences in judicial interpretation, and it is expected that such variability will continue to occur. Additionally, intellectual property laws and regulations differ by country. Variations in the patent laws and regulations or in interpretations of patent laws and regulations in the United States and other countries may diminish the value of our intellectual property and may change the impact of third-party intellectual property on us. Accordingly, we cannot predict the scope of the patents that may be granted to us with certainty, the extent to which we will be able to enforce our patents against third parties or the extent to which third parties may be able to enforce their patents against us.

Some of the intellectual property that is important to our business is owned by other companies or institutions and licensed to us, and changes to the rights we have licensed may adversely impact our business.

We license from third parties some of the intellectual property that is important to our business. If the third parties who license intellectual property to us fail to maintain the intellectual property that we have licensed, or lose rights to that intellectual property, the rights we have licensed may be reduced or eliminated, which would eliminate barriers against our competition. Termination of these licenses or reduction or elimination of our licensed rights may result in our having to negotiate new or reinstated licenses with less favorable terms, or could subject us to claims of intellectual property infringement or contract breach in litigation or other administrative proceedings that could result in damage awards against us and injunctions that could prohibit us from selling our products. In addition, some of our licenses from third parties limit the field in which we can use the licensed technology. Therefore, in order for us to use such licensed technology in potential future applications that are outside the licensed field of use, we may be required to negotiate new licenses with our licensors or expand our rights under our existing licenses. We cannot be certain that we will be able to obtain such licenses or expanded rights on reasonable terms or at all. In the event a dispute with our licensors were to occur, our licensors may seek to renegotiate the terms of our licenses, increase the royalty rates that we pay to obtain and maintain those licenses, limit the field or scope of the licenses, or terminate the license agreements. In addition, we have limited rights to participate in the prosecution and enforcement of the patents and patent applications that we have licensed. If we fail to meet our obligations under these licenses, or if we have a dispute regarding the terms of the licenses, these third parties could terminate the licenses, which could subject us to claims of intellectual property infringement. As a result, we cannot be certain that these patents and applications will be prosecuted and enforced in a manner consistent with the best interests of our business. Further, because of the rapid pace of technological change in our industry, we may need to rely on key technologies developed

or licensed by third parties, and we may not be able to obtain licenses and technologies from these third parties at all or on reasonable terms. The occurrence of these events may have a material adverse effect on our business, financial condition or results of operations.

The measures that we use to protect the security of and enforce our intellectual property and other proprietary rights may not be adequate, which could result in the loss of legal protection for, and thereby diminish the value of, such intellectual property and other rights.

In addition to patents, we also rely upon trademarks, trade secrets, copyrights and unfair competition laws, as well as license agreements and other contractual provisions, to protect our intellectual property and other proprietary rights. Despite these measures, any of our intellectual property rights could be challenged, invalidated, circumvented or misappropriated. In addition, we attempt to protect our intellectual property and proprietary information by requiring our employees and consultants to enter into confidentiality and assignment of inventions agreements, and by entering into confidentiality agreements with our third-party development, manufacturing, sales and distribution partners, who may also acquire, develop and/or commercialize alternative or competing products or provide services to our competitors. For example, Roche had certain access to our trade secrets and other proprietary information pursuant to our agreement with them, subject to the confidentiality provisions thereof (certain of which provisions survive the termination of the agreement); however, Roche is developing potentially competing sequencing products. There can be no assurance that our measures have provided or will provide adequate protection for our intellectual property and proprietary information. These agreements may be breached, and we may not have adequate remedies for any such breach. In addition, our trade secrets and other proprietary information may be disclosed to others, or others may gain access to or disclose our trade secrets and other proprietary information. Enforcing a claim that a third party illegally obtained and is using our trade secrets is expensive and time consuming, and the outcome is unpredictable. Additionally, others may independently develop proprietary information and techniques that are substantially equivalent to ours. The occurrence of these events may have a material adverse effect on our business, financial condition or results of operations.

Our intellectual property may be subject to challenges in the United States or foreign jurisdictions that could adversely affect our intellectual property position.

Our pending, issued and granted U.S. and foreign patents and patent applications have been, are and may in the future be, subject to challenges by ONT Ltd., ONT Inc. and Metrichor, Ltd. ("Metrichor" and, together with ONT Ltd. and ONT Inc., "ONT") in addition to other parties asserting prior invention by others or invalidity on various grounds, through proceedings, such as interferences, reexaminations or opposition proceedings. Addressing these challenges to our intellectual property has been, and any future challenges can be, costly and distract management's attention and resources. For example, we previously incurred significant legal expenses to litigate and settle a complaint seeking review of a patent interference decision of the U.S. Patent and Trademark Office. Additionally, ONT previously requested that the U.S. Patent and Trademark Office institute *inter partes* reviews of certain patents that we have asserted against ONT Inc. and ONT Ltd. in litigation proceedings for patent infringement. While none of the *inter partes* reviews requested by ONT were instituted by the U.S. Patent and Trademark Office, challenges of this nature in the future could result in determinations that our patents or pending patent applications are unpatentable to us, or are invalidated or unenforceable in whole or in part and could require us to expend significant time, funds, and other resources in litigating such challenges. Accordingly, adverse rulings in such proceedings could negatively impact the scope of our intellectual property protection for our products and technology, and could materially and adversely affect our business.

Some of our technology is subject to "march-in" rights by the U.S. government.

Some of our patented technology was developed with U.S. federal government funding. When new technologies are developed with U.S. government funding, the government obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention for non-commercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise "march-in" rights to use or allow third parties to use our patented technology. The government can exercise its march-in rights if it

determines that such action is necessary to (i) achieve practical application of the U.S. government-funded technology, (ii) alleviate health or safety needs, (iii) meet requirements of federal regulations, or (iv) give preference to U.S. industry. In addition, U.S. government-funded inventions must be reported to the government and such government funding must be disclosed in any resulting patent applications. Furthermore, our rights in such inventions are subject to government license rights and foreign manufacturing restrictions. The U.S. government has generally denied requests to exercise its march-in rights, even to provide access to potentially life-saving medications; however, if the U.S. government were to exercise its march-in rights to our patent technologies funded by the U.S. government, particularly for the benefit of one of more of our competitors, that may have a material adverse effect on our business.

We are involved in legal proceedings to enforce our intellectual property rights.

Our intellectual property rights involve complex factual, scientific and legal questions. We operate in an industry characterized by significant intellectual property litigation. Even though we may believe that we have a valid patent on a particular technology, other companies have from time to time taken, and may in the future take, actions that we believe violate our patent rights. For example, we are involved in legal proceedings for patent infringement and related matters in the United States with PGI, and we were previously involved in other legal proceedings with ONT and Harvard University in several United States and European jurisdictions. We have in the past received adverse rulings against us with respect to our complaint with the United States International Trade Commission for one of these proceedings. Legal actions to enforce our patent rights have been, and will continue to be, expensive, and may divert significant management time and resources. Adverse parties from previous legal actions have brought, and they and others may in the future bring, claims against us and/or our intellectual property. Litigation is a significant ongoing expense, recognized in sales, general and administrative expense, with an uncertain outcome, and has been, and may in the future be, a material expense for us. Our enforcement actions may not be successful, have given rise to legal claims against us and could result in some of our intellectual property rights being determined to be invalid or not enforceable. Furthermore, an adverse determination or judgement could lead to an award of damages against us, or the issuance of an injunction against us or our products that could prevent us from selling any products found to be infringing the intellectual property rights of another party.

We have been, are currently, and could in the future be, subject to legal proceedings with third parties who may claim that our products infringe or misappropriate their intellectual property rights.

Our products are based on complex, rapidly developing technologies. We may not be aware of issued or previously filed patent applications that belong to third parties that mature into issued patents that cover some aspect of our products or their use. In addition, because patent litigation is complex and the outcome inherently uncertain, our belief that our products do not infringe third-party patents of which we are aware or that such third-party patents are invalid and unenforceable may be determined to be incorrect. As a result, third parties have claimed, and may in the future claim, that we infringe their patent rights and have filed, and may in the future file lawsuits or engage in other proceedings against us to enforce their patent rights. For example, ONT Ltd. and Harvard University have, in the past, filed claims against us in the High Court of England and Wales and the District Court of Mannheim, Germany for patent infringement, and Personal Genomics of Taiwan, Inc. ("PGI") has filed claims against us in the U.S. District Court for the District of Delaware and in the Wuhan People's Court in China. We are aware of other issued patents and patent applications owned by third parties that could be construed to read on our products, and related maintenance and support services. Although we do not believe that our products or services infringe any valid issued patents, the third-party owners of these patents and applications may in the future claim that we infringe their patent rights and file lawsuits against us. In addition, as we enter new markets, our competitors and other third parties may claim that our products infringe their intellectual property rights as part of a business strategy to impede our successful entry into those markets. Furthermore, parties making claims against us may be able to obtain injunctive or other relief, which effectively could block our ability to further develop or commercialize products or services, and could result in the award of substantial damages against us. Patent litigation between competitors in our industry is common. Additionally, we have certain obligations to many of our customers and suppliers to indemnify and defend them against claims by third parties that our products or their use infringe any intellectual property of these third parties. In defending ourselves against any of these claims, we have in the past incurred, and could in the future incur, to defend ourselves or our customers, substantial costs, and the attention of our management and technical personnel could be diverted. For example, we previously incurred significant legal expenses to litigate and settle a complaint alleging patent infringement. Even if we have an agreement that indemnifies us against such costs, the indemnifying party may be unable to uphold its contractual obligations. To avoid or settle legal claims, it may be necessary or desirable in the future to obtain licenses relating to one or more products or relating to current or future technologies, which could negatively affect our gross margins. We may not be able to obtain these licenses on commercially reasonable terms, or at all. We may be unable to modify our products so that they do not infringe the intellectual property rights of third parties. In some situations, the results of litigation or settlement of claims may require us to cease allegedly infringing activities which could prevent us from selling some or all of our products. The occurrence of these events may have a material adverse effect on our business, financial condition or results of operations.

In addition, in the course of our business, we may from time to time have access or be alleged to have access to confidential or proprietary information of others, which, though not patented, may be protected as trade secrets. Others could bring claims against us asserting that we improperly used their confidential or proprietary information, or that we misappropriated their technologies and incorporated those technologies into our products. A determination that we illegally used the confidential or proprietary information or misappropriated technologies of others in our products could result in us paying substantial damage awards or being prevented from further developing or selling some or all of our products, which could materially and adversely affect our business.

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

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

Our use of "open source" software could adversely affect our ability to sell our products and subject us to possible litigation.

A portion of the products or technologies developed and/or distributed by us incorporate "open source" software, and we may incorporate open source software into other products or technologies in the future. Some open source software licenses require that we disclose the source code for any modifications to such open source software that we make and distribute to one or more third parties, and that we license the source code for such modifications to third parties, including our competitors, at no cost. We monitor the use of open source software in our products to avoid uses in a manner that would require us to disclose or grant licenses under our source code that we wish to maintain as proprietary; however, there can be no assurance that such efforts have been or will be successful. In some circumstances, distribution of our software that includes or is linked with open source software could require that we disclose and license some or all of our proprietary source code in that software, which could include permitting the use of such software and source code at no cost to the user. Open source license terms are often ambiguous and there is little legal precedent governing the interpretation of these licenses. Successful claims made by the licensors of open source software that we have violated the terms of these licenses could result in unanticipated obligations, including being subject to significant damages, being enjoined from distributing products that incorporate open source software and being required to make available our proprietary source code pursuant to an open source license, which could substantially help our competitors develop products that are similar to or better than ours or otherwise materially and adversely affect our business.

Risks Related to Regulation

We are, and may become, subject to governmental regulations that may impose burdens on our operations, and the markets for our products may be narrowed.

We are subject, both directly and indirectly, to the adverse impact of government regulation of our operations and markets. For example, export of our instruments may be subject to strict regulatory control in a number of jurisdictions. We have expanded and are continuing to expand the international jurisdictions into which we supply products, which increase the risks surrounding governmental regulations relating to our business. The failure to satisfy export control criteria or to obtain necessary clearances could delay or prevent shipment of products, which could materially and adversely affect our revenue and profitability. Moreover, the life sciences industry, which is expected to continue to be one of the primary markets for our technology, has historically been heavily regulated. There are, for example, laws in several jurisdictions restricting research in genetic engineering, which may narrow our markets. Given the evolving nature of this industry, legislative bodies or regulatory authorities may adopt additional regulations that may adversely affect our market opportunities. Additionally, if ethical and other concerns surrounding the use of genetic information, diagnostics or therapies become widespread, there may be less demand for our products.

Our business is also directly affected by a wide variety of government regulations applicable to business enterprises generally and to companies operating in the life science industry in particular. Failure to comply with government regulations or obtain or maintain necessary permits and licenses could result in a variety of fines or other censures or an interruption in our business operations which may have a negative impact on our ability to generate revenue and the cost of operating our business. In addition, changes to laws and government regulations could cause a material adverse effect on our business as we will need to adapt our business to comply with such changes. For example, a governmental prohibition on the use of human *in vitro* diagnostics or other regulations that negatively impact the research and development activities of our customers would adversely impact our commercialization of products on which we have expended significant research and development resources, which would in turn have a material adverse impact on our business and prospects.

Our products could become subject to government regulation as medical devices by the U.S. Food and Drug Administration or other domestic and international regulatory agencies even if we do not elect to seek regulatory clearance or approval to market our products for diagnostic purposes, which could increase our costs and impede or delay our commercialization efforts, thereby materially and adversely affecting our business and results of operations.

Our products are currently labeled and promoted as research use only ("RUO") products, and are not currently designed, or intended to be used, for clinical diagnostic tests or as medical devices. However, in the future, certain of our products or related applications, such as those that may be developed for clinical uses, could be subject to regulation by the U.S. Food and Drug Administration ("FDA"), or the FDA's regulatory jurisdiction could be expanded to include our products. Also, even if our products are labeled, promoted, and intended as RUO, the FDA or comparable agencies of other countries could disagree with our conclusion that our products are intended for research use only or deem our sales, marketing and promotional efforts as being inconsistent with the FDA's guidance on RUO products. For example, our customers may independently elect to use our RUO labeled products in their own laboratory developed tests ("LDTs") for clinical diagnostic use, which could subject our products to government regulation, and the regulatory clearance or approval and maintenance process for such products may be uncertain, expensive, and time-consuming. Regulatory requirements related to marketing, selling, and distribution of RUO products could change or be uncertain, even if clinical uses of our RUO products by our customers were done without our consent. If the FDA or other regulatory authorities assert that any of our RUO products are subject to regulatory clearance or approval, our business, financial condition, or results of operations could be adversely affected. In the event that we fail to obtain and maintain necessary regulatory clearances or approvals for products that we develop for clinical uses, or if clearances or approvals for future products and indications are delayed or not issued, our commercial operations may be materially harmed. Furthermore, even if we are granted regulatory clearances or approvals, they may include significant limitations on the indicated uses for the product, which may limit the market for the product. We do not have experience in obtaining FDA approvals and no assurance can be

given that we will be able to obtain or to maintain such approvals. Furthermore, any approvals that we may obtain can be revoked if safety or efficacy problems develop.

The FDA has historically exercised enforcement discretion in not enforcing the medical device regulations against laboratories developing and offering LDTs. However, on October 3, 2014, the FDA issued two draft guidance documents that set forth the FDA's proposed risk-based framework for regulating LDTs, which are designed, manufactured, and used within a single laboratory. The draft guidance documents provide the anticipated details through which the FDA would propose to establish an LDT oversight framework, including premarket review for higher-risk LDTs, such as those that have the same intended use as FDA-approved or cleared companion diagnostic tests currently on the market. In January 2017, the FDA announced that it would not issue final guidance on the oversight of LDTs and manufacturers of products used for LDTs, but would seek further public discussion on an appropriate oversight approach, and give Congress an opportunity to develop a legislative solution. More recently, the FDA has issued warning letters to certain genomics labs for illegally marketing genetic tests that claim to predict patients' responses to specific medications, noting that the FDA has not created a legal "carve-out" for LDTs and retains discretion to take action when appropriate, such as when certain genomic tests raise significant public health concerns.

As manufacturers develop more complex diagnostic tests and diagnostic software, the FDA may increase its regulation of LDTs. Any future legislative or administrative rule making or oversight of LDTs, if and when finalized, may impact the sales of our products and how customers use our products, and may require us to change our business model in order to maintain compliance with these laws. We cannot predict how these various efforts will be resolved, how Congress or the FDA will regulate LDTs in the future, or how that regulatory system will impact our business. Changes to the current regulatory framework, including the imposition of additional or new regulations, including regulation of our products, could arise at any time during the development or marketing of our products, which may negatively affect our ability to obtain or maintain FDA or comparable regulatory approval of our products, if required. Further, sales of devices for diagnostic purposes may subject us to additional healthcare regulation and enforcement by the applicable government agencies. Such laws include, without limitation, state and federal anti-kickback or anti-referral laws, healthcare fraud and abuse laws, false claims laws, privacy and security laws, Physician Payments Sunshine Act and related transparency and manufacturer reporting laws, and other laws and regulations applicable to medical device manufacturers.

Additionally, on November 25, 2013, the FDA issued Final Guidance "Distribution of In Vitro Diagnostic Products Labeled for Research Use Only." The guidance emphasizes that the FDA will review the totality of the circumstances when it comes to evaluating whether equipment and testing components are properly labeled as RUO. The final guidance states that merely including a labeling statement that the product is for research purposes only will not necessarily render the device exempt from the FDA's clearance, approval, and other regulatory requirements if the circumstances surrounding the distribution, marketing and promotional practices indicate that the manufacturer knows its products are, or intends for its products to be, used for clinical diagnostic purposes. These circumstances may include written or verbal sales and marketing claims or links to articles regarding a product's performance in clinical applications and a manufacturer's provision of technical support for clinical applications.

As part of the Trump Administration's efforts to combat COVID-19 and consistent with Executive Orders 13771 and 13924, the Department of Health and Human Services ("HHS") announced rescission of guidance and other informal issuances of the FDA regarding premarket review of LDT absent notice-and-comment rulemaking, stating that, absent notice-and-comment rulemaking, those seeking approval or clearance of, or an emergency use authorization ("EUA"), for an LDT may nonetheless voluntarily submit a premarket approval application ("PMA"), premarket notification or an Emergency Use Authorization request, respectively, but are not required to do so. However, laboratories opting to use LDTs without FDA premarket review or authorization would not be eligible for liability protection under the Public Readiness and Emergency Preparedness Act. In November 2021, HHS under the Biden Administration issued a statement that withdrew the 2020 policy announcement issued under the Trump Administration, stating that HHS does not have a policy on LDTs that is separate from FDA's longstanding approach. The FDA also issued a revised version of its COVID-19 test policy that states the FDA expects newly offered COVID-19 tests, including LDTs, to have an EUA, or traditional marketing authorization such as a granted De Novo or cleared 510(k), prior to clinical use.

Further, in June 2021, Congress introduced an updated legislation called the Verifying Accurate, Leading-edge IVCT Development Act (VALID Act), which, if enacted, will establish a new risk-based regulatory framework for in vitro clinical tests (IVCTs), which include IVDs, LDTs, collection devices, and instruments used with such tests, and a technology certification program, among other proposals. The adoption of new restrictions on IVDs, LDTs, or RUOs, whether by the FDA or Congress, could adversely affect our ability to commercialize our products and the demand for our specialized reagents and instruments. Further, we could be required to obtain premarket clearance or approval from the FDA before we can sell our products to certain customers.

If the FDA determines our products or related applications should be subject to additional regulation as in vitro diagnostic devices based upon customers' use of our products for clinical diagnostic or therapeutic decision-making purposes, our ability to market and sell our products could be impeded and our business, prospects, results of operations and financial condition may be adversely affected. In addition, the FDA could consider our products to be misbranded or adulterated under the Federal Food, Drug, and Cosmetic Act and subject to recall and/or other enforcement action.

To the extent we elect to label and promote any of our products as medical devices, we would be required to obtain prior approval or clearance by the FDA or comparable foreign regulatory authority, which could take significant time and expense and could fail to result in a marketing authorization for the intended uses we believe are commercially attractive. Obtaining marketing authorization in one jurisdiction does not mean that we will be successful in obtaining marketing authorization in other jurisdictions where we conduct business.

If we elect to label and market our products for use as, or in the performance of, clinical diagnostics in the United States, thereby subjecting them to FDA regulation as medical devices, we would be required to obtain premarket 510(k) clearance or premarket approval from the FDA, unless an exception applies. It is possible, in the event we elect to submit 510(k) applications for certain of our products, that the FDA would take the position that a more burdensome premarket application, such as a PMA or a *de novo* application is required for some of our products. If such applications were required, greater time and investment would be required to obtain FDA approval. Even if the FDA agreed that a 510(k) was appropriate, FDA clearance can be expensive and time consuming. It generally takes a significant amount of time to prepare a 510(k), including conducting appropriate testing on our products, and several months to years for the FDA to review a submission. Notwithstanding the effort and expense, FDA clearance or approval could be denied for some or all of our products for which we choose to market as a medical device or a clinical diagnostic device. Even if we were to seek and obtain regulatory approval or clearance, it may not be for the intended uses we request or that we believe are important or commercially attractive. There can be no assurance that future products for which we may seek premarket clearance or approval will be approved or cleared by FDA or a comparable foreign regulatory authority on a timely basis, if at all, nor can there be assurance that labeling claims will be consistent with our anticipated claims or adequate to support continued adoption of such products. Compliance with FDA or comparable foreign regulatory authority regulations will require substantial costs, and subject us to heightened scrutiny by regulators and substantial penalties for failure to comply with such requirements or the inability to market our products. The lengthy and unpredictable premarket clearance or approval process, as well as the unpredictability of the results of any required clinical studies, may result in our failing to obtain regulatory clearance or approval to market such products, which would significantly harm our business, results of operations, reputation, and prospects.

If we sought and received regulatory clearance or approval for certain of our products, we would be subject to ongoing FDA obligations and continued regulatory oversight and review, including the general controls listed above and the FDA's QSRs for our development and manufacturing operations. In addition, we would be required to obtain a new 510(k) clearance before we could introduce subsequent material modifications or improvements to such products. We could also be subject to additional FDA post-marketing obligations for such products, any or all of which would increase our costs and divert resources away from other projects. If we sought and received regulatory clearance or approval and are not able to maintain regulatory compliance with applicable laws, we could be prohibited from marketing our products for use as, or in the performance of, clinical diagnostics and/or could be subject to enforcement actions, including warning letters and adverse publicity, fines, injunctions, and civil penalties; recall or seizure of products; operating restrictions; and criminal prosecution.

Further, if we decide to seek regulatory clearance or approval for certain of our products in countries outside of the United States or if a foreign regulatory authority determines that our products are regulated as medical devices, we would be subject to extensive medical device laws and regulations outside of the United States. Sales of such products outside the United States will likely be subject to foreign regulatory requirements, which can vary greatly from country to country. As a result, the time required to obtain clearances or approvals outside the United States may differ from that required to obtain FDA clearance or approval and we may not be able to obtain foreign regulatory approvals on a timely basis or at all. In Europe, we would need to comply with the new Medical Device Regulation 2017/745 and In Vitro Diagnostic Regulation 2017/746, which became effective May 26, 2017, with application dates of May 26, 2021 (postponed from 2020) and May 26, 2022, respectively. This will increase the difficulty of regulatory approvals in Europe in the future. In addition, the FDA regulates exports of medical devices. The number and scope of these requirements are increasing. Unlike many of the other companies offering nucleic acid sequencing equipment or consumables, this is an area where we do not have expertise. We, or our other third-party sales and distribution partners, may not be able to obtain regulatory approvals in such countries or may incur significant costs in obtaining or maintaining our foreign regulatory approvals. In addition, the export by us of certain of our products, which have not yet been cleared for domestic commercial distribution, may be subject to FDA or other export restrictions. Failure to comply with these regulatory requirements or obtain and maintain required approvals, clearances and certifications could impair our ability to commercialize our products for diagnostic use outside of the United States. Any action brought against us for violations of these laws or regulations, even if successfully defended, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business.

Enhanced trade tariffs, import restrictions, export restrictions, Chinese regulations or other trade barriers may materially harm our business.

We are continuing to expand our international operations as part of our growth strategy and have experienced an increasing concentration of sales in certain regions outside the United States, especially the Asia-Pacific region. There is currently significant uncertainty about the future relationship between the United States and various other countries, most significantly China, with respect to trade policies, treaties, government regulations and tariffs. Starting in September 2018, the U.S. Trade Representative (the "USTR") enacted various tariffs of 7.5%, 10%, 15% and 25% on the import of Chinese products, including non-U.S. components and materials that may be used in our products. Additionally, China also has imposed tariffs on imports into China from the United States. These tariffs could raise our costs. Furthermore, tariffs, trade restrictions, or trade barriers that have been, and may in the future be, placed on products such as ours by foreign governments, especially China, have raised, and could further raise, amounts paid for some or all of our products, which may result in the loss of customers and our business, and our financial condition and results of operations may be harmed. Further tariffs may be imposed that could cover imports of components and materials used in our products, or our business may be adversely impacted by retaliatory trade measures taken by China or other countries, including restricted access to components or materials used in our products or increased amounts that must be paid for our products, which could materially harm our business, financial condition and results of operations. Further, the continued threats of tariffs, trade restrictions and trade barriers could have a generally disruptive impact on the global economy and, therefore, negatively impact our sales. Given the relatively fluid regulatory environment in China and the United States and uncertainty how the U.S. or foreign governments will act with respect to tariffs, international trade agreements and policies, there could be additional tax or other regulatory changes in the future. Any such changes could directly and adversely impact our financial results and results of operations.

Additionally, in November 2018, the U.S. Commerce Department's Bureau of Industry and Security ("BIS") released an advance notice of proposed rulemaking to control the export of emerging technologies. This notice included "[b]iotechnology, including nanobiology; synthetic biology; genomic and genetic engineering; or neurotech" as possible areas of increased export controls. BIS has implemented export controls on some items described in this notice, and we understand that BIS plans to continue to issue controls on additional emerging technologies. Therefore, it is possible that our ability to export our products may be restricted in the future, most notably China.

Our international business could expose us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

Engaging in international business inherently involves a number of difficulties and risks, including:

- required compliance with existing and changing foreign regulatory requirements and laws that are or may be applicable to our business in the future, such as the European Union's General Data Protection Regulation ("GDPR") and other data privacy requirements, labor and employment regulations, anti-competition regulations, the U.K. Bribery Act of 2010 and other anti-corruption laws, regulations relating to the use of certain hazardous substances or chemicals in commercial products, and require the collection, reuse, and recycling of waste from products we manufacture;
- required compliance with U.S. laws such as the Foreign Corrupt Practices Act, and other U.S. federal laws and regulations established by the Office of Foreign Asset Control;
- export requirements and import or trade restrictions;
- laws and business practices favoring local companies;
- foreign currency exchange, longer payment cycles and difficulties in enforcing agreements and collecting receivables through certain foreign legal systems;
- changes in social, economic, and political conditions or in laws, regulations and policies governing foreign trade, manufacturing, research and development, and investment both domestically as well as in the other countries and jurisdictions in which we operate and into which we may sell our products including as a result of the separation of the United Kingdom from the European Union ("Brexit");
- potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements, and other trade barriers;
- difficulties and costs of staffing and managing foreign operations; and
- difficulties protecting, maintaining, enforcing or procuring intellectual property rights and defending against intellectual property claims under the law and judicial systems of other countries.

If one or more of these risks occurs, it could require us to dedicate significant resources to remedy such occurrence, and if we are unsuccessful in finding a solution, our financial results will suffer.

Our operations involve the use of hazardous materials, and we must comply with environmental, health and safety laws, which can be expensive and may adversely affect our business, operating results and financial condition.

Our research and development and manufacturing activities involve the use of hazardous materials, including chemicals and biological materials, and some of our products include hazardous materials. Accordingly, we are subject to federal, state, local and foreign laws, regulations and permits relating to environmental, health and safety matters, including, among others, those governing the use, storage, handling, exposure to and disposal of hazardous materials and wastes, the health and safety of our employees, and the shipment, labeling, collection, recycling, treatment and disposal of products containing hazardous materials. Liability under environmental laws and regulations can be joint and several and without regard to fault or negligence. For example, under certain circumstances and under certain environmental laws, we could be held liable for costs relating to contamination at our or our predecessors' past or present facilities and at third-party waste disposal sites. We could also be held liable for damages arising out of human exposure to hazardous materials. There can be no assurance that violations of environmental, health and safety laws will not occur as a result of human error, accident, equipment failure or other causes. The failure to comply with past, present or future laws could result in the imposition of substantial fines and penalties, remediation costs, property damage and personal injury claims, investigations, the suspension of production or product sales, loss of permits or a cessation of operations. Any of these events could harm our business, operating results and financial condition. We also expect that our operations will be affected by new environmental, health and safety laws and regulations on an ongoing basis, or more stringent enforcement of existing laws and regulations. New laws or changes to existing laws may result in additional costs and may increase penalties

associated with violations or require us to change the content of our products or how we manufacture them, which could have a material adverse effect on our business, operating results and financial condition.

Ethical, legal, privacy, data protection and social concerns or governmental restrictions surrounding the use of genetic information could reduce demand for our technology.

Our products may be used to provide genetic information about humans, agricultural crops and other living organisms. The information obtained from our products could be used in a variety of applications which may have underlying ethical, legal, privacy, data protection and social concerns, including the genetic engineering or modification of agricultural products or testing for genetic predisposition for certain medical conditions. Governmental authorities could, for safety, social or other purposes, call for limits on or regulation of the use of genetic testing, and may consider or adopt such regulations or other restrictions. Such concerns or governmental restrictions could limit the use of our products or be costly and burdensome to comply with, and actual or perceived violations of any such restrictions may lead to the imposition of substantial fines and penalties, remediation costs, claims and litigation, regulatory investigations and proceedings, and other liability, and of which could have a material adverse effect on our business, financial condition and results of operations.

Regulations related to conflict minerals has caused us to incur, and will continue to cause us to incur, additional expenses and could limit the supply and increase the costs of certain materials used in the manufacture of our products.

We are subject to requirements under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 that require us to conduct diligence and report on whether or not our products contain conflict minerals. The implementation of these requirements could adversely affect the sourcing, availability and pricing of the materials used in the manufacture of components used in our products. Furthermore, the complex nature of our products requires components and materials that may be available only from a limited number of sources and, in some cases, from only a single source. We have incurred, and will continue to incur, additional costs to comply with the disclosure requirements, including costs related to conducting diligence procedures to determine the sources of conflict minerals that may be used or necessary to the production of our products and, if applicable, potential changes to components, processes or sources of supply as a consequence of such verification activities. We may face reputational harm if we determine that certain of our products contain minerals that are not determined to be conflict free or if we are unable to alter our processes or sources of supply to avoid using such materials. In such circumstances, the reputational harm could materially and adversely affect our business, financial condition or results of operations.

Risks Related to Owning Our Common Stock

The price of our common stock has been, is, and may continue to be, highly volatile, and you may be unable to sell your shares at or above the price you paid to acquire them.

The market price of our common stock is highly volatile, and we expect it to continue to be volatile for the foreseeable future in response to many risk factors listed in this section, and others beyond our control, including:

- actual or anticipated fluctuations in our financial condition and operating results;
- announcements of new products, technological innovations or strategic partnerships by us or our competitors;
- announcements by us, our customers, partners or suppliers relating directly or indirectly to our products, services or technologies;
- overall conditions in our industry and market;
- addition or loss of significant customers;
- changes in laws or regulations applicable to our products;
- actual or anticipated changes in our growth rate relative to our competitors;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures, capital commitments or achievement of significant milestones;
- additions or departures of key personnel;
- competition from existing products or new products that may emerge;
- issuance of new or updated research or reports by securities analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- disputes or other developments related to proprietary rights, including patents, litigation matters or our ability to obtain intellectual property protection for our technologies;
- announcement or expectation of additional financing efforts;
- sales of our common stock by us or our stockholders;
- stock price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- reports, guidance and ratings issued by securities or industry analysts;
operating results below the expectations of securities analysts or investors; and
- general economic and market conditions, which could be impacted by various events including COVID-19 or interest rate fluctuations, increases in fuel prices, foreign currency fluctuations, international tariffs, acts of terrorism, hostilities or the perception that hostilities may be imminent, military conflict and acts of war, including an escalation of the situation in Ukraine and the related response, including sanctions or other restrictive actions, by the United States and/or other countries.

If any of the forgoing occurs, it would cause our stock price or trading volume to decline. Stock markets in general and the market for companies in our industry in particular have experienced price and volume fluctuations, which have been exacerbated by the COVID-19 pandemic, that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions such as recessions, interest rate changes or international currency fluctuations, may negatively impact the market price of our common stock. You may not realize any return on your investment in us and may lose some or all of your investment. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We have been a party to this type of litigation in the past and may be the target of this type of litigation again in the future. Securities litigation against us could result in substantial costs and divert our management’s attention from other business concerns, which could seriously harm our business.

Sales of substantial amounts of our common stock in the public markets, or the perception that such sales might occur, could reduce the market price that our common stock might otherwise attain and may dilute your voting power and your ownership interest in us.

Sales of a substantial number of shares of our common stock in the public market, or the perception that such sales could occur, could adversely affect the market price of our common stock and may make it more difficult for existing stockholders to sell their common stock at a time and price that they deem appropriate and may dilute their voting power and ownership interest in us.

In addition, if our existing stockholders sell, or indicate an intent to sell, a large number of shares of our common stock in the public market, it could cause our stock price to fall. We may also issue shares of common stock or securities convertible into our common stock in connection with a financing, acquisition, our equity incentive plans, or otherwise. Any such issuances would result in dilution to our existing stockholders and the market price of our common stock may be adversely affected.

On September 20, 2021, in connection with the closing of the Omniome Merger, we completed a Private Placement for the sale of an aggregate of 11,214,953 shares of our common stock, at a price of $26.75 per share, for aggregate gross proceeds of approximately $300 million. In connection with the Private Placement, we entered into a Registration Rights Agreement with the Private Placement investors, providing them, among other things, certain registration rights, including our obligation to register the Private Placement shares for resale within 30 days following the closing of the Private Placement.

Concentration of ownership by our principal stockholders may result in control by such stockholders of the composition of our board of directors.

Our existing principal stockholders, executive officers, directors and their affiliates beneficially own a significant number of our outstanding shares of common stock. In addition, such parties may acquire additional control by purchasing stock that we issue in connection with our future fundraising efforts. Also, SB Northstar LP, a subsidiary of SoftBank Group Corp., purchased $900 million in aggregate principal amount of our 1.50% Convertible Senior Notes due 2028, convertible at the option of the holders at any time into shares of our common stock based on an initial conversion rate of 22.9885 shares of common stock per $1,000 principal amount of the Notes (which is equal to an initial conversion price of $43.50 per share). In addition, on September 20, 2021 in connection with the closing of the Omniome Merger, we completed a Private Placement for the sale of an aggregate of 11,214,953 shares of our common stock, at a price of $26.75 per share, for aggregate gross proceeds of approximately $300 million with certain qualified institutional buyers and institutional accredited investors, including approximately $60 million to SB Northstar LP. As a result, these current and future stockholders may now and in the future be able to exercise a significant level of control over all matters requiring stockholder approval, including the election of directors. This control could have the effect of delaying or preventing a change of control of our company or changes in management and will make the approval of certain transactions difficult or impossible without the support of these stockholders.

Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management and limit the market price of our common stock.

Provisions in our certificate of incorporation and bylaws, as amended and restated, may have the effect of delaying or preventing a change of control or changes in our management. Our amended and restated certificate of incorporation and bylaws include provisions that:

- authorize our board of directors to issue, without further action by the stockholders, up to 50,000,000 shares of undesignated preferred stock and up to approximately 1,000,000,000 shares of authorized but unissued shares of common stock;

require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;

specify that special meetings of our stockholders can be called only by our board of directors, the Chair of the Board, the Chief Executive Officer or the President;

establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;

establish that our board of directors is divided into three classes, Class I, Class II and Class III, with each class serving staggered terms;

provide that our directors may be removed only for cause; and

provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management. Furthermore, our amended and restated bylaws provide that unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for: (i) any derivative action or proceeding brought on our behalf**;** (ii) any action asserting a breach of fiduciary duty owed by any of our current or former directors, officers or other employees to us or our stockholders**;** (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law; (iv) any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our amended and restated bylaws**;** or (v) any action asserting a claim against us that is governed by the internal affairs doctrine, subject to the court having personal jurisdiction over the indispensable parties named as defendants therein. This provision is not intended to apply to actions arising under the Securities Act or the Exchange Act, or any claim for which the federal courts have exclusive jurisdiction. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and consented to this provision. This exclusive-forum provision may discourage lawsuits against us or our directors, officers, and employees. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

Our large number of authorized but unissued shares of common stock may potentially dilute existing stockholders' stockholdings.

We have a significant number of authorized but unissued shares of common stock. Our board of directors may issue shares of common stock from this authorized but unissued pool from time to time without stockholder approval, resulting in the dilution of our existing stockholders.

We do not intend to pay dividends for the foreseeable future.

We have never declared or paid any dividends on our common stock and do not intend to pay any dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the operation of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

Risks Related to Our Notes

We may not have the ability to raise the funds necessary to settle conversions of the Notes in cash or to repurchase the Notes upon a fundamental change, and our future debt may contain limitations on our ability to pay cash upon conversion or repurchase of the Notes.

In February 2021, we issued $900.0 million in aggregate principal amount of 1.50% Convertible Senior Notes due 2028, which we refer to as the Notes. The Notes will mature on February 15, 2028, subject to earlier conversion, redemption or repurchase, including upon a fundamental change. Holders of the Notes will have the right to require us to repurchase all or a portion of their Notes upon the occurrence of a fundamental change before the maturity date at a repurchase price equal to 100% of the principal amount of the Notes to be repurchased, plus unpaid interest to, but excluding, the maturity date. In addition, upon conversion of the Notes, unless we elect to deliver solely shares of our common stock to settle such conversion (other than paying cash in lieu of delivering any fractional share), we will be required to settle a portion or all of our conversion obligation in cash in respect of the Notes being converted. Moreover, we will be required to repay the Notes in cash at their maturity unless earlier converted, redeemed or repurchased. However, we may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of Notes surrendered therefor or pay cash with respect to Notes being converted or at their maturity.

In addition, our ability to repurchase Notes or to pay cash upon conversions of Notes or at their maturity may be limited by law, regulatory authority or agreements governing our future indebtedness. Our failure to repurchase Notes at a time when the repurchase is required by the indenture or to pay cash upon conversions of Notes or at their maturity as required by the indenture would constitute a default under the indenture. A default under the indenture or the fundamental change itself could also lead to a default under agreements governing our future indebtedness. Moreover, the occurrence of a fundamental change under the indenture could constitute an event of default under any such agreement. If the payment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness or to pay cash amounts due upon conversion, upon required repurchase or at maturity of the Notes.

If the Notes are converted, it may adversely affect our financial condition and operating results.

Holders of the Notes are entitled to convert their Notes at any time at their option. If one or more holders elect to convert their Notes, unless we elect to satisfy our conversion obligation by delivering solely shares of our common stock (other than paying cash in lieu of delivering any fractional share), we would be required to settle a portion or all of our conversion obligation in cash, which could adversely affect our liquidity.

General Risk Factors

Unfavorable global economic or political conditions could adversely affect our business, financial condition or results of operations.

General conditions in the global economy and in the global financial markets could adversely affect our results of operations, including the potential effects from the ongoing COVID-19 pandemic as discussed above, and the overall demand for nucleic acid sequencing products may be particularly vulnerable to unfavorable economic conditions. A global financial crisis, inflation or a global or regional political disruption, as well as acts of terrorism, hostilities, military conflict and acts of war, including an escalation of the situation in Ukraine and the related response, could cause extreme volatility in the capital and credit markets. A severe or prolonged economic downturn or political disruption could result in a variety of risks to our business, including weakened demand for our products and our ability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy or political disruption could also strain our manufacturers or suppliers, possibly resulting in supply disruption, or cause our customers to delay making payments for our product and services. An impairment in value of our tangible or intangible assets could also be recorded as a result of weaker economic conditions. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the political or economic climate and financial market conditions could adversely impact our business.

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

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

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

We currently conduct operations in various countries and jurisdictions, and continue to expand to new international jurisdictions as part of our growth strategy and have experienced an increasing concentration of sales in certain regions outside the U.S. We sell directly and through distribution partners throughout Europe, the Asia-Pacific region, Mexico, Brazil, and South Africa and have a significant portion of our sales and customer support personnel in Europe and the Asia-Pacific region. As a result, we or our distribution partners may be subject to additional regulations and increased diversion of management time and efforts. Conducting and launching operations on an international scale requires close coordination of activities across multiple jurisdictions and time zones and consumes significant management resources. If we fail to coordinate and manage these activities effectively, our business, financial condition or results of operations could be materially and adversely affected and failure to comply with laws and regulations applicable to business operations in foreign jurisdictions may also subject us to significant liabilities and other penalties. International operations entail a variety of other risks, including, without limitation:

- limits to travel as a result of the COVID-19 pandemic;
- challenges in staffing and managing foreign operations;
- potentially longer sales cycles and more time required to engage and educate customers on the benefits of our platform outside of the United States;
- the potential need for localized software and documentation;
- reduced protection for intellectual property rights in some countries and practical difficulties of enforcing intellectual property and contract rights abroad;
- defending against intellectual property claims in other countries;

- restriction on cross-border investment, including enhanced oversight by the Committee on Foreign Investment in the United States ("CFIUS") and substantial restrictions on investment from China;
- U.S. and foreign government trade restrictions, including those which may impose restrictions on the importation, exportation, re-exportation, sale, shipment or other transfer of programming, technology, components, and/or services to foreign persons;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes, sanctions and other trade barriers;
- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs by the U.S. government on various imports from China, Canada, Mexico and the European Union ("E.U.") and by the governments of these jurisdictions on certain U.S. goods, and any other possible tariffs that may be imposed on products such as ours, the scope and duration of which, if implemented, remains uncertain;
- deterioration of political relations between the U.S. and Russia, China, Japan, Korea, Canada, the United Kingdom ("U.K.") and the E.U., which could have a material adverse effect on our sales and operations in these countries;
- changes in social, political and economic conditions or in laws, regulations and policies governing foreign trade, manufacturing, development and investment both domestically as well as in the other countries and jurisdictions into which we sell our products, including as a result of the withdrawal of the U.K. from the E.U.;
- difficulties in obtaining export licenses or in overcoming other trade barriers and restrictions resulting in delivery delays;
- fluctuations in currency exchange rates and the related effect on our results of operations;
- increased financial accounting and reporting burdens and complexities;
- disruptions to global trade due to disease outbreaks or conflicts;
- potential increases on tariffs or restrictions on trade generally; and
- significant taxes or other burdens of complying with a variety of foreign laws and regulations, including laws and regulations relating to privacy and data protection such as the E.U. General Data Protection Regulation which took effect in the E.U. in 2018.

In conducting our international operations, we are subject to U.S. laws relating to our international activities, such as the Foreign Corrupt Practices Act of 1977, as well as foreign laws relating to our activities in other countries, such as the United Kingdom Bribery Act of 2010. Additionally, the inclusion of one of our foreign customers on any U.S. Government sanctioned persons list, including but not limited to the U.S. Department of Commerce's List of Denied Persons and the U.S. Department of Treasury's List of Specially Designated Nationals and Blocked Persons List, could be material to our earnings. Failure to comply with these laws may subject us to claims or financial and/or other penalties in the United States and/or foreign countries that could materially and adversely impact our operations or financial condition. These risks have become increasingly prevalent as we have expanded our sales into countries that are generally recognized as having a higher risk of corruption.

We face risks related to the current global economic environment, which could delay or prevent our customers from purchasing our products, which could in turn harm our business, financial condition and results of operations. The state of the global economy continues to be uncertain. The current global economic conditions and uncertain credit markets and concerns regarding the availability of credit pose a risk that could impact customer demand for our products, as well as our ability to manage normal commercial relationships with our customers, suppliers and creditors, including financial institutions. If the current global economic environment deteriorates, our business could be negatively affected.

Moreover, changes in the value of the relevant currencies may affect the cost of certain items required in our operations. Changes in currency exchange rates may also affect the relative prices at which we are able sell products in the same market. Our revenue from international customers may be negatively impacted as increases in the U.S. dollar relative to our international customers' local currencies could make our products more expensive, impacting our ability to compete or as a result of financial or other instability in such locations which could result in decreased sales of our products. Our costs of materials from international suppliers may also increase as the value of the U.S. dollar decreases relative to their local currency. Foreign policies and actions regarding currency valuation could result in actions by the United States and other countries to offset the effects of such fluctuations. Such actions may materially and adversely impact our financial condition and results of operations.

Violations of complex foreign and U.S. laws and regulations could result in fines and penalties, criminal sanctions against us, our officers, or our employees, prohibitions on the conduct of our business and on our ability to offer our products and services in one or more countries, and could also materially affect our brand, our international growth efforts, our ability to attract and retain employees, our business, and our operating results. Even if we implement policies or procedures designed to ensure compliance with these laws and regulations, there can be no assurance that our distribution partners, our employees, contractors, or agents will not violate our policies and subject us to potential claims or penalties.

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

Ensuring that we have adequate internal financial and accounting controls and procedures in place to produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be evaluated frequently. We may in the future discover areas of our internal financial and accounting controls and procedures that need improvement. Operating as a public company requires sufficient resources within the accounting and finance functions in order to produce timely financial information, ensure the level of segregation of duties, and maintain adequate internal control over financial reporting customary for a U.S. public company.

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

Pursuant to Section 404 of the Sarbanes-Oxley Act, we perform periodic evaluations of our internal control over financial reporting. While we have in the past performed this evaluation and concluded that our internal control over financial reporting was operating effectively, there can be no assurance that in the future material weaknesses or significant deficiencies will not exist or otherwise be discovered. In addition, if we are unable to produce accurate financial statements on a timely basis, investors could lose confidence in the reliability of our financial statements, which could cause the market price of our common stock to decline and make it more difficult for us to finance our operations and growth.

Our business could be negatively impacted by changes in the United States political environment.

There is significant ongoing uncertainty with respect to potential legislation, regulation and government policy at the federal level, as well as the state and local levels. Any such changes could significantly impact our business as well as the markets in which we compete. Specific legislative and regulatory proposals discussed during election campaigns and more recently that might materially impact us include, but are not limited to, changes to spending priorities and potential reductions in research funding. Uncertainty about U.S. government funding has posed, and may continue to pose, a risk as customers may choose to postpone or reduce spending in response to actual or

anticipated restraints on funding. To the extent changes in the political environment have a negative impact on us or on our markets, our business, results of operation and financial condition could be materially and adversely impacted in the future

Disruption of critical information technology systems or material breaches in the security of our systems could harm our business, customer relations and financial condition.

Information technology ("IT") helps us to operate efficiently, interface with customers, maintain financial accuracy and efficiently and accurately produce our financial statements. IT systems are used extensively in virtually all aspects of our business, including sales forecast, order fulfillment and billing, customer service, logistics, and management of data from running samples on our products. Our success depends, in part, on the continued and uninterrupted performance of our IT systems. IT systems may be vulnerable to damage from a variety of sources, including telecommunications or network failures, power loss, natural disasters, human acts, computer viruses, ransomware, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, disruption of our operations, which could harm our reputation and financial results.

If we do not allocate and effectively manage the resources necessary to build and sustain the proper IT infrastructure, we could be subject to transaction errors, processing inefficiencies, loss of customers, business disruptions or loss of or damage to intellectual property through security breach. If our data management systems do not effectively collect, store, process and report relevant data for the operation of our business, whether due to equipment malfunction or constraints, software deficiencies or human error, our ability to effectively plan, forecast and execute our business plan and comply with applicable laws and regulations will be impaired, perhaps materially. Any such impairment could materially and adversely affect our reputation, financial condition, results of operations, cash flows and the timeliness with which we report our internal and external operating results.

Security breaches and other disruptions could compromise our information and expose us to liability, which would cause our business and reputation to suffer.

In the ordinary course of our business, we collect and store sensitive data, including intellectual property, our proprietary business information and that of our customers, suppliers and business partners, and personally identifiable information of our customers and employees, in our data centers and on our networks. The secure processing, maintenance and transmission of this information is critical to our operations. Despite our security measures, our IT infrastructure may be vulnerable to attacks by hackers, computer viruses, malicious codes, ransomware, unauthorized access attempts, and cyber- or phishing-attacks, or breached or otherwise disrupted due to employee error, malfeasance, faulty password management or other disruptions. Third parties may attempt to fraudulently induce employees or other persons into disclosing usernames, passwords or other sensitive information, which may in turn be used to access our IT systems, commit identity theft or carry out other unauthorized or illegal activities. Any such breach could compromise our networks and the information stored there could be accessed, publicly disclosed, lost or stolen. We engage third-party vendors and service providers to store and otherwise process some of our data, including sensitive and personal information. Our vendors and service providers may also be the targets of the risks described above, including cyberattacks, malicious software, ransomware, phishing schemes, and fraud. Our ability to monitor our vendors and service providers' data security is limited, and, in any event, third parties may be able to circumvent those security measures, resulting in the unauthorized access to, misuse, disclosure, loss or destruction of our data, including sensitive and personal information, and disruption of our or third-party service providers' systems. We and our third-party service providers may face difficulties in identifying, or promptly responding to, potential security breaches and other instances of unauthorized access to, or disclosure or other loss of, information. Any hacking or other attack on our or our third-party service providers' or vendors' systems, and any unauthorized access to, or disclosure or other loss of, information suffered by us or our third-party service providers or vendors, or the perception that any of these have occurred, could result in legal claims or proceedings, loss of intellectual property, liability under laws that protect the privacy of personal information, negative publicity,

disruption of our operations and damage to our reputation, which could divert our management's attention from the operation of our business and materially and adversely affect our business, revenues and competitive position. Moreover, we may need to increase our efforts to train our personnel to detect and defend against cyber- or phishing-attacks, which are becoming more sophisticated and frequent, and we may need to implement additional protective measures to reduce the risk of potential security breaches, which could cause us to incur significant additional expenses. Retaliatory acts by Russia in response to Western sanctions could include cyber attacks that could disrupt the economy generally or that may either directly or indirectly impact our operations specifically.

In addition, our insurance may be insufficient to cover our losses resulting from cyber-attacks, breaches, or other interruptions, and any incidents may result in loss of, or increased costs of, such insurance. The successful assertion of one or more large claims against us that exceed available insurance coverage, the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, or denials of coverage, could have a material adverse effect on our business, including our financial condition, results of operations and reputation.

We are currently subject to, and may in the future become subject to additional, U.S. federal and state laws and regulations imposing obligations on how we collect, store and process personal information. Our actual or perceived failure to comply with such obligations could harm our business. Ensuring compliance with such laws could also impair our efforts to maintain and expand our future customer base, and thereby decrease our revenue.

In the ordinary course of our business, we currently, and in the future will, collect, store, transfer, use or process sensitive data, including personally identifiable information of employees, and intellectual property and proprietary business information owned or controlled by ourselves and other parties. The secure processing, storage, maintenance, and transmission of this critical information are vital to our operations and business strategy. We are, and may increasingly become, subject to various laws and regulations, as well as contractual obligations, relating to data privacy and security in the jurisdictions in which we operate. The regulatory environment related to data privacy and security is increasingly rigorous, with new and constantly changing requirements applicable to our business, and enforcement practices are likely to remain uncertain for the foreseeable future. These laws and regulations may be interpreted and applied differently over time and from jurisdiction to jurisdiction, and it is possible that they will be interpreted and applied in ways that may have a material adverse effect on our business, financial condition, results of operations and prospects.

In the United States, various federal and state regulators, including governmental agencies like the Consumer Financial Protection Bureau and the Federal Trade Commission, have adopted, or are considering adopting, laws and regulations concerning personal information and data security. Certain state laws may be more stringent or broader in scope, or offer greater individual rights, with respect to personal information than federal, international or other state laws, and such laws may differ from each other, all of which may complicate compliance efforts. For example, the California Consumer Privacy Act ("CCPA"), which increases privacy rights for California residents and imposes obligations on companies that process their personal information, came into effect on January 1, 2020. Among other things, the CCPA requires covered companies to provide new disclosures to California consumers and provide such consumers new data protection and privacy rights, including the ability to opt-out of certain sales of personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for certain data breaches that result in the loss of personal information. This private right of action may increase the likelihood of, and risks associated with, data breach litigation. In November 2020, California also passed the California Privacy Rights Act, or ("CPRA"), which significantly expands the CCPA, including by introducing additional obligations such as data minimization and storage limitations and granting additional rights to consumers, among others. In addition, laws in all 50 U.S. states require businesses to provide notice to consumers whose personal information has been disclosed as a result of a data breach. State laws are changing rapidly and there is discussion in the U.S. Congress of a new comprehensive federal data privacy law to which we would become subject if it is enacted. These and future laws and regulations may increase our compliance costs and potential liability.

Furthermore, regulations promulgated pursuant to the Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), establish privacy and security standards that limit the use and disclosure of individually identifiable health

information (known as "protected health information") and require the implementation of administrative, physical and technological safeguards to protect the privacy of protected health information and ensure the confidentiality, integrity and availability of electronic protected health information. Determining whether protected health information has been handled in compliance with applicable privacy standards and our contractual obligations can require complex factual and statistical analyses and may be subject to changing interpretation. Although we take measures to protect sensitive data from unauthorized access, use or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance or other malicious or inadvertent disruptions. Any such breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, manipulated, publicly disclosed, lost or stolen. Any such access, breach or other loss of information could result in legal claims or proceedings, and liability under federal or state laws that protect the privacy of personal information, such as the HIPAA, the Health Information Technology for Economic and Clinical Health Act ("HITECH"), and regulatory penalties. Notice of breaches must be made to affected individuals, the Secretary of the Department of Health and Human Services, and for extensive breaches, notice may need to be made to the media or State Attorneys General. Such a notice could harm our reputation and our ability to compete.

We are in the process of evaluating compliance needs, but do not currently have in place formal policies and procedures related to the storage, collection and processing of information, and have not conducted any internal or external data privacy audits, to ensure our compliance with all applicable data protection laws and regulations. Additionally, we do not currently have policies and procedures in place for assessing our third-party vendors' compliance with applicable data protection laws and regulations. All of these evolving compliance and operational requirements impose significant costs, such as costs related to organizational changes, implementing additional protection technologies, training employees and engaging consultants, which are likely to increase over time. In addition, such requirements may require us to modify our data processing practices and policies, distract management or divert resources from other initiatives and projects, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects. Any failure or perceived failure by us or our third-party vendors, collaborators, contractors and consultants to comply with any applicable federal, state or similar foreign laws and regulations relating to data privacy and security, or could result in damage to our reputation, as well as proceedings or litigation by governmental agencies or other third parties, including class action privacy litigation in certain jurisdictions, which would subject us to significant fines, sanctions, awards, penalties or judgments, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

Increased scrutiny of our environmental, social or governance responsibilities may result in additional costs and risks, and may adversely impact our reputation, employee retention, and willingness of customers and suppliers to do business with us.

Investor advocacy groups, institutional investors, investment funds, proxy advisory services, stockholders, and customers are increasingly focused on environmental, social and governance ("ESG") practices of companies. Additionally, public interest and legislative pressure related to public companies' ESG practices continues to grow. If our ESG practices fail to meet regulatory requirements or investor or other industry stakeholders' evolving expectations and standards for responsible corporate citizenship in areas including environmental stewardship, support for local communities, Board of Director and employee diversity, human capital management, employee health and safety practices, product quality, supply chain management, corporate governance and transparency and employing ESG strategies in our operations, our brand, reputation and employee retention may be negatively impacted and customers and suppliers may be unwilling to do business with us. In addition, as we work to align our ESG practices with industry standards, we will likely continue to expand our disclosures in these areas and doing so may result in additional costs and require additional resources to monitor, report, and comply with our various ESG practices. If we fail to adopt ESG standards or practices as quickly as stakeholders desire, report on our ESG efforts or practices accurately, or satisfy the expectations of stakeholders, our reputation, business, financial performance and growth may be adversely impacted.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

None.

Item 3. Default Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None.

Item 6. Exhibits

Exhibit No.	Description	Incorporated by reference herein		
		Form	Exhibit No.	Filing Date
10.1+	Pacific Biosciences of California, Inc. 2020 Inducement Equity Incentive Plan, as amended, and forms of agreement thereunder	8-K	10.1	November 19, 2021
10.2+	Change in Control and Severance Agreement, by and between the Registrant and Denis Zaccarin, Ph.D. effective November 4, 2020			Filed herewith
10.3+	Omniome Equity Incentive Plan of Pacific Biosciences of California, Inc. and related forms of agreement thereunder	10-Q	10.4	November 5, 2021
31.1	Certification of Chief Executive Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002			Filed herewith
31.2	Certification of Chief Financial Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002			Filed herewith
32.1*	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			Furnished herewith
32.2*	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			Furnished herewith
101.INS	XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL 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 Labels Linkbase Document			Filed herewith
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document			Filed herewith
104	Cover Page Interactive File (formatted as inline XBRL and contained in Exhibit 101)			Filed herewith

+ Indicates management contract or compensatory plan.

* The certifications attached as Exhibit 32.1 and 32.2 that accompany this Quarterly Report on Form 10-Q are deemed furnished and not filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of Pacific Biosciences of California, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Quarterly Report on Form 10-Q, irrespective of any general incorporation language contained in such filing

Signatures

Pursuant to the requirements of the Securities Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

Pacific Biosciences of California, Inc.

Date: May 5, 2022

By: /s/ Christian O. Henry
Christian O. Henry
Chief Executive Officer and President
(Principal Executive Officer)

Date: May 5, 2022

By: /s/ Susan G. Kim
Susan G. Kim
Chief Financial Officer
(Principal Financial Officer)

Date: May 5, 2022

By: /s/ Michele Farmer
Michele Farmer
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

PACIFIC BIOSCIENCES OF CALIFORNIA, INC. CHANGE IN CONTROL AND SEVERANCE AGREEMENT

This Change in Control and Severance Agreement (the "*Agreement*") is made and entered into by and between Denis Zaccarin ("*Executive*") and Pacific Biosciences of California, Inc., a Delaware corporation (the "*Company*"), effective as of November 4, 2020 (the "*Effective Date*").

RECITALS

1. It is expected that the Company from time to time will consider the possibility of an acquisition by another company or other change in control. The Board of Directors of the Company (the "*Board*") recognizes that such considerations can be a distraction to Executive and can cause Executive to consider alternative employment opportunities. The Board has determined that it is in the best interests of the Company and its stockholders to assure that the Company will have the continued dedication and objectivity of Executive, notwithstanding the possibility, threat or occurrence of such a termination of employment or the occurrence of a Change in Control (as defined herein) of the Company.

2. The Board believes that it is in the best interests of the Company and its stockholders to provide Executive with an incentive to continue Executive's employment and to motivate Executive to maximize the value of the Company for the benefit of its stockholders.

3. The Board believes that it is imperative to provide Executive with certain severance benefits upon Executive's termination of employment in connection with a Change in Control. These benefits will provide Executive with enhanced financial security, incentive and encouragement to remain with the Company.

4. Certain capitalized terms used in the Agreement are defined in Section 6 below.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the parties hereto agree as follows:

1. Term of Agreement. This Agreement will have an initial term of three (3) years commencing on the Effective Date (the "*Initial Term*"). On the third anniversary of the Effective Date, this Agreement will renew automatically for additional one (1) year terms (each an "*Additional Term*"), unless either party provides the other party with written notice of non-renewal at least sixty (60) days prior to the date of automatic renewal. Notwithstanding the foregoing provisions of this paragraph, if a Change in Control occurs when there are fewer than twelve (12) months remaining during the Initial Term or an Additional Term, the term of this Agreement will extend automatically through the date that is twelve (12) months following the effective date of the Change in Control. If Executive becomes entitled to benefits under Section 3(a) or Section 3(b) during the term of this Agreement, the Agreement will not terminate until all of the obligations of the parties hereto with respect to this Agreement have been satisfied.

2. At-Will Employment. The Company and Executive acknowledge that Executive's employment is and will continue to be at-will, as defined under applicable law. No payments, benefits, or provisions under this Agreement will confer upon Executive any right to continue Executive's employment with the Company, nor will they interfere with or limit in any way the right of the Company or Executive to terminate such relationship at any time, with or without cause, to the extent permitted by applicable laws.

3. Severance Benefits.

(a) Termination without Cause or Other than Death or Disability or Resignation for Good Reason Other than During the Change in Control Period. If a Qualifying Termination occurs other than during the Change in Control Period, then subject to Section 4, Executive will receive the following severance from the Company:

(i) Base Salary Severance. Executive will receive continuing payments of Salary, less any applicable withholdings, for a period of six (6) months following the date of such termination of employment, to be paid periodically in accordance with the Company's normal payroll policies.

(ii) Continued Employee Benefits. If Executive elects continuation coverage pursuant to the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("*COBRA*") for Executive and Executive's eligible dependents (as applicable), within the time period prescribed pursuant to COBRA, Executive will receive Company-paid group health, dental and vision coverage for Executive and Executive's eligible dependents, as applicable, at the coverage levels in effect immediately prior to the termination of Executive's employment (the "*COBRA Severance*") until the earliest of: (A) a period of six (6) months from the last date of employment of the Executive with the Company, (B) the date upon which Executive and/or Executive's eligible dependents becomes covered under similar plans, or (C) the expiration of Executive's and Executive's eligible dependents' (as applicable) eligibility for continuation coverage under COBRA.

(b) Termination without Cause or Other than Death or Disability or Resignation for Good Reason On or Within Twelve Months Following a Change in Control. If a Qualifying Termination occurs during the Change in Control Period, then subject to Section 4, Executive will receive the following severance from the Company:

(i) Base Salary Severance. Executive will receive continuing payments of Salary, less any applicable withholdings, for a period of nine (9) months following the date of such termination of employment, to be paid periodically in accordance with the Company's normal payroll policies.

(ii) Prorated Target Bonus Severance. Executive will receive a lump sum cash payment equal to Executive's annualized target bonus in effect for the year in which the Qualifying Termination occurs, provided that such amount will be prorated based on a fraction, the numerator of which is the number of days during which Executive was employed with the Company (or its successor) in the year that the Qualifying Termination occurs, and the denominator of which is the total number of days in such year (the "*Prorated Bonus Severance*").

(iii) Continued Employee Benefits. If Executive elects continuation coverage pursuant to COBRA for Executive and Executive's eligible dependents (as applicable), within the time period prescribed pursuant to COBRA, the Company will provide the COBRA Severance until the earliest of: (A) a period of nine (9) months from the last date of employment of the Executive with the Company, (B) the date upon which Executive and/or Executive's eligible dependents becomes covered under similar plans, or (C) the expiration of Executive's and Executive's eligible dependents' (as applicable) eligibility for continuation coverage under COBRA.

(iv) Equity. One hundred percent (100%) of the unvested portion of the Executive's then-outstanding equity awards (the "*Awards*") will immediately vest and, to the extent applicable, become exercisable, as of the date of such termination. To the extent that an Award is subject to performance-based vesting at the time of such termination, such performance goals will be deemed achieved at one hundred percent (100%) of target levels and all other terms and conditions met, unless specifically provided otherwise under the applicable Award agreement. The Awards will remain exercisable, to the extent applicable, following Executive's termination for the period prescribed in the applicable equity plan and agreement for each Award.

For the avoidance of doubt, in the event of Executive's Qualifying Termination that occurs prior to a Change in Control, any then outstanding and unvested portion of Executive's Awards will remain outstanding and unvested until the earlier of (x) three (3) months following the Qualifying Termination, solely so that any benefits due on a Qualifying Termination can be provided if the Qualifying Termination occurs during the Change in Control Period (provided that in no event will Executive's stock option Awards or similar Awards remain outstanding beyond the Award's maximum term to expiration). If no Change in Control occurs within three (3) months following the Qualifying Termination, any unvested portion of Executive's Awards automatically and permanently will be forfeited on the date three (3) months following the date of the Qualifying Termination without having vested.

(c) Other Termination. If Executive's employment with the Company terminates other than as set forth in Section 3(a) or 3(b) above, then (i) all vesting will terminate immediately with respect to Executive's outstanding Awards, (ii) all payments of compensation by the Company to Executive hereunder will terminate immediately (except as to amounts already earned), and
(iii) Executive will only be eligible for severance benefits in accordance with the Company's established policies, if any, as then in effect.

(d) Accrued Amounts. On any termination of Executive's employment with the Company, Executive will be entitled to receive all accrued but unpaid vacation, expense reimbursements, wages, and other benefits due to Executive under any Company-provided plans, policies, and arrangements.

(e) Non-duplication of Payment or Benefits. For purposes of clarity, in the event of a Qualifying Termination that occurs during the Change in Control Period but prior to the Change in Control, any severance payments and benefits to be provided to Executive under Section 3(b) will be reduced by any amounts that already were provided to Executive under Section 3(a). Notwithstanding any provision of this Agreement to the contrary, if Executive is entitled to any cash severance, continued health coverage severance benefits, vesting acceleration of any Awards, or other

severance or separation benefits similar to those provided under this Agreement, by operation of applicable law or under a plan, policy, contract, or arrangement sponsored by or to which the Company is a party other than this Agreement ("Other Benefits"), then the corresponding severance payments and benefits under this Agreement will be reduced by the amount of Other Benefits paid or provided to Executive.

4. Conditions to Receipt of Severance.

(a) Release of Claims Agreement. The receipt of any severance payments or benefits pursuant to this Agreement is subject to Executive signing and not revoking a separation agreement and release of claims in a form acceptable to the Company (the "*Release*"), which must become effective and irrevocable no later than the sixtieth (60th) day following Executive's termination of employment (the "*Release Deadline Date*"). If the Release does not become effective and irrevocable by the Release Deadline Date, Executive will forfeit any right to severance payments or benefits under this Agreement. No severance payments and benefits under Section 3(a) or 3(b) of this Agreement will be paid or provided until the Release becomes effective and irrevocable, and any such severance payments and benefits otherwise payable between the date of Executive's termination of employment and the date the Release becomes effective and irrevocable (including, if applicable, the lump sum cash payment under Section 4(c) below) will be paid, subject to the requirements of Section 4(d) below, on the Company's first regularly scheduled payroll date on or following the date the Release becomes effective and irrevocable or, with respect to the Prorated Bonus Severance, if later and in the event of a Qualifying Termination that occurs prior to a Change in Control, on the date of completion of the Change in Control. Any restricted stock units, performance units, performance shares, and/or similar full value awards that accelerate vesting under this Agreement ("*Full Value Awards*") will be settled (subject to Section 4(d) below and the terms of any award agreement or other Company plan, policy, or arrangement governing the settlement timing of such award to the extent such terms specifically require different payment timing in order to comply with the requirements of Section 409A, as applicable (the "*Full Value Settlement Provisions*"), (a) on a date within ten (10) days following the date the Release becomes effective and irrevocable, or (b) if later, in the event of a Qualifying Termination that occurs prior to a Change in Control, on the date of completion of the Change in Control.

(b) Confidential Information and Invention Assignment Agreements. Executive's receipt of any payments or benefits under Sections 3(a) and 3(b) will be subject to Executive continuing to comply with the terms of any confidential information and invention assignment agreement executed by Executive in favor of the Company and the provisions of this Agreement.

(c) COBRA Severance Limitations. Notwithstanding the provisions of Sections 3(a)(ii) and 3(b)(ii), if the Company determines in its sole discretion that it cannot provide the COBRA Severance without potentially violating applicable laws (including, without limitation, Section 2716 of the Public Health Service Act and the Employee Retirement Income Security Act of 1974, as amended), then in lieu of such COBRA Severance, and subject to any delay required by this Section 4, the Company will provide to Executive a taxable lump sum cash payment in an amount equal to the product of (x) the number of months of Salary severance specified in Section 3(a)(i) or 3(b)(i), as applicable, multiplied by (y) the monthly COBRA premium that Executive otherwise would be required to pay to continue the group health, dental and vision coverage for Executive and

Executive's eligible dependents, as applicable, as in effect on the date of termination of Executive's employment (which amount will be based on the premium for the first month of COBRA coverage for Executive and Executive's eligible dependents), which payment will be made regardless of whether Executive elects COBRA continuation coverage (the "*Taxable Payment*"). For the avoidance of doubt, the Taxable Payment may be used for any purpose, including, but not limited to continuation coverage under COBRA, and will be subject to all applicable tax withholdings. Notwithstanding anything to the contrary under this Agreement, if the Company determines in its sole discretion at any time that it cannot provide the COBRA Severance or the Taxable Payment without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act and the Employee Retirement Income Security Act of 1974, as amended), Executive will not receive any COBRA Severance or Taxable Amount under this Agreement.

(d) Section 409A.

(i) Notwithstanding anything to the contrary in this Agreement, no severance payments or benefits payable to Executive, if any, pursuant to this Agreement that, when considered together with any other severance payments or separation benefits, is considered deferred compensation under Internal Revenue Code Section 409A (together, the "*Deferred Payments*") will be payable until Executive has a "separation from service" within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the "*Code*"), and the Treasury Regulations and guidance thereunder, and any applicable state law equivalent, as each may be promulgated, amended or modified from time to time ("*Section 409A*"). Similarly, no severance payable to Executive, if any, pursuant to this Agreement that otherwise would be exempt from Section 409A pursuant to Treasury Regulations Section 1.409A-1(b)(9) will be payable until Executive has a "separation from service" within the meaning of Section 409A. To the extent required to be exempt from or comply with Section 409A, references to the termination of Executive's employment or similar phrases used in this Agreement will mean Executive's "separation from service" within the meaning of Section 409A.

(ii) Any severance payments or benefits under this Agreement that would be considered Deferred Payments will be paid on, or, in the case of installments, will not commence until, the sixtieth (60th) day following Executive's separation from service, or, if later, such time as required by Section 4(d)(iii) (or with respect to Full Value Awards, such time or times as required by any applicable Full Value Settlement Provisions and with respect to the Prorated Bonus Severance, if later and in the event of a Qualifying Termination that occurs prior to a Change in Control, on the date of completion of the Change in Control). Except as required by Section 4(d)(iii) and any applicable Full Value Settlement Provisions, any Deferred Payments payable in installments that would have been made to Executive during the sixty (60) day period immediately following Executive's separation from service but for the preceding sentence will be paid to Executive on the sixtieth (60th) day following Executive's separation from service and the remaining payments shall be made as provided in this Agreement.

(iii) Further, if Executive is a "specified employee" within the meaning of Section 409A at the time of Executive's separation from service (other than due to death), any Deferred Payments that otherwise are payable within the first six (6) months following Executive's separation from service will become payable on the first payroll date that occurs on or after the date six (6) months and one (1) day following the date of Executive's separation from service. All subsequent Deferred

Payments, if any, will be payable in accordance with the payment schedule applicable to each payment or benefit. Notwithstanding anything herein to the contrary, in the event of Executive's death following Executive's separation from service but prior to the six (6) month anniversary of Executive's separation from service (or any later delay date), then any payments delayed in accordance with this paragraph will be payable in a lump sum as soon as administratively practicable after the date of Executive's death and all other Deferred Payments will be payable in accordance with the payment schedule applicable to each payment or benefit. Each payment and benefit payable under the Agreement is intended to constitute a separate payment for purposes of Section 1.409A-2(b)(2) of the Treasury Regulations.

(iv) Any amount paid under this Agreement that satisfies the requirements of the "short-term deferral" rule set forth in Section 1.409A-1(b)(4) of the Treasury Regulations will not constitute Deferred Payments for purposes of clause (i) above. Any amount paid under this Agreement that qualifies as a payment made as a result of an involuntary separation from service pursuant to Section 1.409A-1(b)(9)(iii) of the Treasury Regulations that is within the limit set forth thereunder will not constitute Deferred Payments for purposes of clause (i) above.

(v) The foregoing provisions are intended to comply with, or be exempt from, the requirements of Section 409A so that none of the severance payments and benefits to be provided under the Agreement will be subject to the additional tax imposed under Section 409A, and any ambiguities and ambiguous terms herein will be interpreted to so comply or be exempt. Executive and the Company agree to work together in good faith to consider amendments to the Agreement and to take such reasonable actions which are necessary, appropriate or desirable to avoid imposition of any additional tax or income recognition prior to actual payment to Executive under Section 409A. In no event will the Company or any of its subsidiaries or other affiliates have any obligation, responsibility or liability to reimburse, indemnify or hold harmless Executive for any taxes imposed, or other costs incurred, as result of Section 409A.

5. Limitation on Payments. In the event that the severance and other benefits provided for in this Agreement or otherwise that Executive would receive from the Company or any other party whether in connection with the provisions of this Agreement or otherwise (the "*Payments*") would (i) constitute "parachute payments" within the meaning of Section 280G of the Code and (ii) but for this Section 5, would be subject to the excise tax imposed by Section 4999 of the Code, then the Payments will be either:

(a) delivered in full, or

(b) delivered as to such lesser extent which would result in no portion of such Payments being subject to excise tax under Section 4999 of the Code,

whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the excise tax imposed by Section 4999, results in the receipt by Executive on an after-tax basis, of the greatest amount of Payments, notwithstanding that all or some portion of such Payments may be taxable under Section 4999 of the Code. If a reduction in severance and other benefits constituting "parachute payments" is necessary so that benefits are delivered to a lesser extent, reduction will occur in the following order: (i) reduction of cash payments in reverse chronological

order (that is, the cash payment owed on the latest date following the occurrence of the event triggering the excise tax under Code Section 4999 will be the first cash payment to be reduced); (ii) cancellation of equity awards granted "contingent on a change in ownership or control" (within the meaning of Code Section 280G) in the reverse order of date of grant of the equity awards (that is, the most recently granted equity awards will be cancelled first), (iii) reduction of accelerated vesting of equity awards in the reverse order of date of grant of the equity awards (that is, the vesting of the most recently granted equity awards will be cancelled first); (iv) reduction of employee benefits in reverse chronological order (that is, the benefit owed on the latest date following the occurrence of the event triggering such excise tax will be the first benefit to be reduced). In no event will Executive have any discretion with respect to the ordering of Payment reductions. Executive will be solely responsible for the payment of all personal tax liability that is incurred as a result of the payments and benefits received under this Agreement, and neither the Company nor any parent, subsidiary or other affiliate of the Company will have any responsibility, liability or obligation to reimburse, indemnify or hold harmless Executive for any of those payments of personal tax liability.

Unless the Company and Executive otherwise agree in writing, any determination required under this Section 5 will be made in writing by a nationally recognized accounting or valuation firm (the "*Firm*") selected by the Company, whose determination will be conclusive and binding upon Executive and the Company for all purposes. For purposes of making the calculations required by this Section 5, the Firm may make reasonable assumptions and approximations concerning applicable taxes and may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and Executive will furnish to the Firm such information and documents as the Firm may reasonably request in order to make a determination under this Section. The Company will bear all costs and make all payments required to be made to the Firm for the Firm's services that are rendered in connection with any calculations contemplated by this Section 5. The Company will have no liability to Executive for the determinations of the Firm.

6. Definition of Terms. For purposes of this Agreement, the following terms referred to in this Agreement will have the following meanings:

(a) Cause. "*Cause*" means (i) conviction of any felony; (ii) conviction of any crime involving moral turpitude or dishonesty that causes, or is likely to cause, material harm to the Company; (iii) participation in a fraud or willful act of dishonesty against the Company that causes, or is likely to cause, material harm to the Company; (iv) intentional and material damage to the Company's property; or (v) material breach of the Company's Proprietary Information and Inventions Agreement.

(b) Change in Control. "*Change in Control*" means the first occurrence of any of the following on or after the Effective Date:

(i) A change in the ownership of the Company which occurs on the date that any one person, or more than one person acting as a group ("*Person*"), acquires ownership of the stock of the Company that, together with the stock held by such Person, constitutes more than 50% of the total voting power of the stock of the Company; provided, however, that for purposes of this subsection (i), the acquisition of additional stock by any one Person, who is considered to own more than 50% of the total voting power of the stock of the Company will not be considered a Change in

Control. Further, if the stockholders of the Company immediately before such change in ownership continue to retain immediately after the change in ownership, in substantially the same proportions as their ownership of shares of the Company's voting stock immediately prior to the change in ownership, direct or indirect beneficial ownership of fifty percent (50%) or more of the total voting power of the stock of the Company or of the ultimate parent entity of the Company, such event will not be considered a Change in Control under this subsection (i). For this purpose, indirect beneficial ownership will include, without limitation, an interest resulting from ownership of the voting securities of one or more corporations or other business entities which own the Company, as the case may be, either directly or through one or more subsidiary corporations or other business entities; or

(ii) A change in the effective control of the Company which occurs on the date that a majority of members of the Board (each, a "*Director*") is replaced during any twelve (12) month period by Directors whose appointment or election is not endorsed by a majority of the members of the Board prior to the date of the appointment or election. For purposes of this subsection (ii), if any Person is considered to be in effective control of the Company, the acquisition of additional control of the Company by the same Person will not be considered a Change in Control; or

(iii) A change in the ownership of a substantial portion of the Company's assets which occurs on the date that any Person acquires (or has acquired during the twelve (12) month period ending on the date of the most recent acquisition by such Person) assets from the Company that have a total gross fair market value equal to or more than 50% of the total gross fair market value of all of the assets of the Company immediately prior to such acquisition or acquisitions; provided, however, that for purposes of this subsection (iii), the following will not constitute a change in the ownership of a substantial portion of the Company's assets: (A) a transfer to an entity that is controlled by the Company's stockholders immediately after the transfer, or (B) a transfer of assets by the Company to: (1) a stockholder of the Company (immediately before the asset transfer) in exchange for or with respect to the Company's stock, (2) an entity, 50% or more of the total value or voting power of which is owned, directly or indirectly, by the Company, (3) a Person, that owns, directly or indirectly, 50% or more of the total value or voting power of all the outstanding stock of the Company, or (4) an entity, at least 50% of the total value or voting power of which is owned, directly or indirectly, by a Person described in this subsection (iii)(B)(3). For purposes of this subsection (iii), gross fair market value means the value of the assets of the Company, or the value of the assets being disposed of, determined without regard to any liabilities associated with such assets.

For purposes of this definition of Change in Control, persons will be considered to be acting as a group if they are owners of a corporation that enters into a merger, consolidation, purchase or acquisition of stock, or similar business transaction with the Company.

Notwithstanding the foregoing, a transaction will not be deemed a Change in Control unless the transaction qualifies as a change in control event within the meaning of Section 409A.

Further and for the avoidance of doubt, a transaction will not constitute a Change in Control if: (i) its sole purpose is to change the jurisdiction of the Company's incorporation, or (ii) its sole purpose is to create a holding company that will be owned in substantially the same proportions by the persons who held the Company's securities immediately before such transaction.

(c) Change in Control Period. "*Change in Control Period*" means the period beginning upon the date that is three (3) months prior to a Change in Control and continuing through the date that is twelve (12) months following a Change in Control.

(d) Disability. "*Disability*" means Executive is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months.

(e) Good Reason. "*Good Reason*" means Executive's termination of his or her employment with the Company within thirty (30) days following the expiration of any cure period (discussed below) following the occurrence of one or more of the following, without Executive's express written consent: (i) a material reduction of Executive's duties, authority, or responsibilities, relative to Employee's duties, authority, or responsibilities as in effect immediately prior to such reduction; *provided, however,* that a reduction in duties, authority, or responsibilities solely by virtue of the Company being acquired and made part of a larger entity (for example, where Executive retains essentially the same responsibility and duties of the subsidiary, business unit or division substantially containing the Company's business following a Change in Control) shall not constitute "Good Reason"; (ii) a material reduction by the Company in Executive's annualized base pay as in effect immediately prior to such reduction (in other words, a reduction of more than ten percent (10%) of Executive's annualized base compensation in any one year, other than a reduction applicable to executives generally that does not adversely affect Executive to a greater extent than other similarly situated executives); (iii) the relocation of Executive's principal place of performing his or her duties as an employee of the Company by more than fifty (50) miles; or (iv) the failure of the Company to obtain the assumption of this Agreement by a successor. In order for an event to qualify as Good Reason, Executive must not terminate employment with the Company without first providing the Company with written notice of the acts or omissions constituting the grounds for "Good Reason" within ninety (90) days of the initial existence of the grounds for "Good Reason" and a reasonable cure period of not less than thirty (30) days following the date of such notice. To the extent Executive's primary work location is not the Company's corporate offices due to a shelter-in-place order, quarantine order, or similar work-from-home requirement that applies to Executive, Executive's primary office location, from which a change in location under the foregoing clause (iii) will be measured, will be considered the Company's office location where Executive's employment with the Company primarily was based immediately prior to the commencement of such shelter-in-place order, quarantine order, or similar work-from-home requirement.

(f) Qualifying Termination. "*Qualifying Termination*" means either (i) the Company terminates Executive's employment with the Company for a reason other than (A) Cause, (B) Executive's death, or (C) Executive's Disability or (ii) Executive resigns for Good Reason.

(g) Salary. "*Salary*" means Executive's base salary as in effect immediately prior to the termination of Executive's employment (unless such termination occurs as a result of clause (ii) of the definition of "Good Reason" under Section 6(e), in which case the amount will be equal to Executive's base salary as in effect immediately prior to such reduction) or, if greater in the case of a Qualifying Termination during the Change in Control Period, as in effect immediately prior to the Change in Control.

7. Successors.

(a) The Company's Successors. Any successor to the Company (whether direct or indirect and whether by purchase, merger, consolidation, liquidation or otherwise) to all or substantially all of the Company's business and/or assets will assume the obligations under this Agreement and agree expressly to perform the obligations under this Agreement in the same manner and to the same extent as the Company would be required to perform such obligations in the absence of a succession. For all purposes under this Agreement, the term "Company" will include any successor to the Company's business and/or assets which executes and delivers the assumption agreement described in this Section 7(a) or which becomes bound by the terms of this Agreement by operation of law.

(b) Executive's Successors. The terms of this Agreement and all rights of Executive hereunder will inure to the benefit of, and be enforceable by, Executive's personal or legal representatives, executors, administrators, successors, heirs, distributees, devisees and legatees. Notwithstanding the foregoing, none of the rights of Executive to receive any form of compensation payable pursuant to this Agreement may be assigned or transferred except by will or the laws of descent and distribution. Any other attempted assignment, transfer, conveyance, or other disposition of Executive's right to compensation or other benefits will be null and void.

8. Notice.

(a) General. Notices and all other communications contemplated by this Agreement will be in writing and will be deemed to have been duly given (a) upon actual delivery to the party to be notified, (b) twenty-four (24) hours after confirmed facsimile transmission, (c) one (1) business day after deposit with a recognized overnight courier, or (d) three (3) business days after deposit with the U.S. Postal Service by first class certified or registered mail, return receipt requested, postage prepaid, addressed: (i) if to Executive, at the address Executive will have most recently furnished to the Company in writing, or (ii) if to the Company, to its corporate headquarters and all notices will be directed to the General Counsel of the Company.

(b) Notice of Termination. Any termination of Executive's employment by the Company for Cause or by Executive for Good Reason or as a result of a voluntary resignation will be communicated by a notice of termination to the other party hereto given in accordance with Section 8(a) of this Agreement. Such notice will indicate the specific termination provision in this Agreement relied upon, will set forth in reasonable detail the facts and circumstances claimed to provide a basis for termination under the provision so indicated, and will specify the termination date (which will be not more than thirty (30) days after the giving of such notice or in the case of Executive's resignation for Good Reason, in accordance with the requirements under Section 6(e)). The failure by Executive to include in the notice any fact or circumstance which contributes to a showing of Good Reason will not waive any right of Executive hereunder or preclude Executive from asserting such fact or circumstance in enforcing Executive's rights hereunder.

(c) Resignation. The termination of Executive's employment for any reason also will constitute, without any further required action by Executive, Executive's voluntary resignation from all officer and/or director positions held at the Company or any of its subsidiaries or affiliates,

and at the Board's request, Executive will execute any documents reasonably necessary to reflect the resignations.

9. Miscellaneous Provisions.

(a) No Duty to Mitigate. Executive will not be required to mitigate the amount of any payment contemplated by this Agreement, nor will any such payment be reduced by any earnings that Executive may receive from any other source except as specified in Sections 3(e), 4(d) and 5.

(b) Waiver. No provision of this Agreement will be modified, waived or discharged unless the modification, waiver or discharge is agreed to in writing and signed by Executive and by an authorized officer of the Company (other than Executive). No waiver by either party of any breach of, or of compliance with, any condition or provision of this Agreement by the other party will be considered a waiver of any other condition or provision or of the same condition or provision at another time.

(c) Headings. All captions and section headings used in this Agreement are for convenient reference only and do not form a part of this Agreement.

(d) Entire Agreement. This Agreement constitutes the entire agreement of the parties hereto and supersedes in their entirety all prior representations, understandings, undertakings or agreements (whether oral or written and whether expressed or implied) of the parties. No waiver, alteration, or modification of any of the provisions of this Agreement will be binding unless in writing and signed by duly authorized representatives of the parties hereto and which specifically mention this Agreement.

(e) Choice of Law. The validity, interpretation, construction, and performance of this Agreement will be governed by the laws of the State of California (with the exception of its conflict of laws provisions). Any claims or legal actions by one party against the other arising out of the relationship between the parties contemplated herein (whether or not arising under this Agreement) will be commenced or maintained in any state or federal court located in San Mateo County, California, and Executive and the Company hereby submit to the jurisdiction and venue of any such court.

(f) Severability. The invalidity, illegality, or unenforceability of any provision or provisions of this Agreement will not affect the validity, legality or enforceability of any other provision hereof, which will remain in full force and effect, and this Agreement will be construed and enforced as if the invalid, illegal, or unenforceable provision had not been included.

(g) Withholding. The Company (and any parent, subsidiary or other affiliate of the Company, as applicable) will have the right and authority to deduct from any payments or benefits all applicable federal, state, local, and/or non-U.S. taxes or other required withholdings and payroll deductions ("*Withholdings*"). Prior to the payment of any amounts or provision of any benefits under this Agreement, the Company (and any parent, subsidiary or other affiliate of the Company, as applicable) is permitted to deduct or withhold, or require Executive to remit to the Company, an amount sufficient to satisfy any applicable Withholdings with respect to such payments and benefits.

Neither the Company nor any parent, subsidiary or other affiliate of the Company will have any responsibility, liability or obligation to pay Executive's taxes arising from or relating to any payments or benefits under this Agreement.

(h) Counterparts. This Agreement may be executed in counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

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IN WITNESS WHEREOF, each of the parties has executed this Agreement, in the case of the Company by its duly authorized officer, as of the Effective Date set forth above.

DocuSigned by:
Natalie Welch
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COMPANY PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

By:

Name:

Natalie Welch

Title:

Vice President, Human Resources and Organization Dev

DocuSigned by:
Denis Zaccarin
8B75867F4B3C401...

EXECUTIVE By:

Name: Denis Zaccarin

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO SECURITIES EXCHANGE ACT RULES 13a-15(e), AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Christian Henry, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Pacific Biosciences of California, Inc.;

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: May 5, 2022

By: /s/ Christian O. Henry
Christian O. Henry
Chief Executive Officer and President
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO SECURITIES EXCHANGE ACT RULES 13a-15(e), AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Susan Kim, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Pacific Biosciences of California, Inc.;

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: May 5, 2022

By: /s/ Susan G. Kim
Susan G. Kim
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

Certification of CEO Furnished Pursuant to 18 U.S.C. Section 1350,
As Adopted Pursuant To
Section 906 of The Sarbanes-Oxley Act of 2002

In connection with the Quarterly Report of Pacific Biosciences of California, Inc. (the "Company") on Form 10-Q for the period ended March 31, 2022, as filed with the Securities and Exchange Commission on the date hereof, I, Christian Henry, Chief Executive Officer of the Company, certify for the purposes of section 1350 of chapter 63 of title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge,

(i) the Quarterly Report of the Company on Form 10-Q for the period ended March 31, 2022 (the "Report"), fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, and

(ii) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 5, 2022

/s/ Christian O. Henry

Christian O. Henry
Chief Executive Officer and President
(Principal Executive Officer)

Exhibit 32.2

Certification of CFO Furnished Pursuant to 18 U.S.C. Section 1350,
As Adopted Pursuant To
Section 906 of The Sarbanes-Oxley Act of 2002

In connection with the Quarterly Report of Pacific Biosciences of California, Inc. (the "Company") on Form 10-Q for the period ended March 31, 2022, as filed with the Securities and Exchange Commission on the date hereof, I, Susan Kim, Chief Financial Officer of the Company, certify for the purposes of section 1350 of chapter 63 of title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge,

(i) the Quarterly Report of the Company on Form 10-Q for the period ended March 31, 2022 (the "Report"), fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, and

(ii) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 5, 2022

/s/ Susan G. Kim

Susan G. Kim
Chief Financial Officer
(Principal Financial Officer)