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 June 30, 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 July 31, 2022: 224,840,799.

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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)	June 30, 2022	December 31, 2021
Assets		
Current assets		
Cash and cash equivalents	$ 310,445	$ 460,725
Investments	588,706	583,675
Accounts receivable, net	27,058	24,241
Inventory, net	36,121	24,599
Prepaid expenses and other current assets	7,657	7,394
Short-term restricted cash	300	500
Total current assets	970,287	1,101,134
Property and equipment, net	37,957	32,504
Operating lease right-of-use assets, net	43,274	46,617
Long-term restricted cash	2,922	4,592
Intangible assets, net	410,523	410,979
Goodwill	409,974	409,974
Other long-term assets	1,205	1,170
Total assets	$ 1,876,142	$ 2,006,970
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 12,883	$ 11,002
Accrued expenses	25,174	36,261
Deferred revenue, current	32,084	10,977
Operating lease liabilities, current	8,350	7,710
Other liabilities, current	5,905	5,759
Total current liabilities	84,396	71,709
Deferred revenue, non-current	1,827	25,049
Contingent consideration liability, non-current	163,216	169,717
Operating lease liabilities, non-current	45,497	49,970
Convertible senior notes, net, non-current	896,374	896,067
Other liabilities, non-current	2,946	3,471
Total liabilities	1,194,256	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 224,756 and 220,978 shares at June 30, 2022 and December 31, 2021, respectively	225	221
Additional paid-in capital	2,058,103	2,009,945
Accumulated other comprehensive loss	(5,457)	(1,087)
Accumulated deficit	(1,370,985)	(1,218,092)
Total stockholders' equity	681,886	790,987
Total liabilities and stockholders' equity	$ 1,876,142	$ 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 June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Revenue:				
Product revenue	$ 30,175	$ 26,533	$ 58,419	$ 51,836
Service and other revenue	5,292	4,077	10,221	7,771
Total revenue	35,467	30,610	68,640	59,607
Cost of revenue:				
Cost of product revenue	15,499	13,222	30,319	25,919
Cost of service and other revenue	3,592	3,635	7,607	6,958
Amortization of intangible assets	183	—	366	—
Total cost of revenue	19,274	16,857	38,292	32,877
Gross profit	16,193	13,753	30,348	26,730
Operating expense:				
Research and development	50,348	22,266	103,285	42,815
Sales, general and administrative	39,252	29,060	79,056	55,198
Change in fair value of contingent consideration	(5,438)	—	(6,501)	—
Total operating expense	84,162	51,326	175,840	98,013
Operating loss	(67,969)	(37,573)	(145,492)	(71,283)
Loss from Continuation Advances from Illumina	-	—	-	(52,000)
Interest expense	(3,681)	(3,589)	(7,378)	(5,378)
Other income (expense), net	256	161	(23)	225
Net loss	(71,394)	(41,001)	(152,893)	(128,436)
Other comprehensive loss:				
Unrealized loss on investments	(1,372)	(80)	(4,370)	(91)
Comprehensive loss	$ (72,766)	$ (41,081)	$ (157,263)	$ (128,527)
Net loss per share:				
Basic	$ (0.32)	$ (0.21)	$ (0.68)	$ (0.65)
Diluted	$ (0.32)	$ (0.21)	$ (0.68)	$ (0.65)
Weighted average shares outstanding used in calculating net loss per share:				
Basic	224,499	198,568	223,400	196,690
Diluted	224,499	198,568	223,400	196,690

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 June 30, 2022						
Balance at March 31, 2022	224,329	$ 224	$ 2,038,030	$ (4,085)	$ (1,299,591)	$ 734,578
Net loss	—	—	—	—	(71,394)	(71,394)
Other comprehensive loss	—	—	—	(1,372)	—	(1,372)
Issuance of common stock in conjunction with equity plans	427	1	847	—	—	848
Stock-based compensation expense	—	—	19,226	—	—	19,226
Balance at June 30, 2022	224,756	$ 225	$ 2,058,103	$ (5,457)	$ (1,370,985)	$ 681,886
For the three months ended June 30, 2021						
Balance at March 31, 2021	198,340	$ 198	$ 1,404,585	$ 74	$ (1,124,304)	$ 280,553
Net loss	—	—	—	—	(41,001)	(41,001)
Other comprehensive loss	—	—	—	(80)	—	(80)
Issuance of common stock in conjunction with equity plans	577	1	2,967	—	—	2,968
Stock-based compensation expense	—	—	15,805	—	—	15,805
Balance at June 30, 2021	198,917	$ 199	$ 1,423,357	$ (6)	$ (1,165,305)	$ 258,245
For the six months ended June 30, 2022						
Balance at December 31, 2021	220,978	$ 221	$ 2,009,945	$ (1,087)	$ (1,218,092)	$ 790,987
Net loss	—	—	—	—	(152,893)	(152,893)
Other comprehensive loss	—	—	—	(4,370)	—	(4,370)
Issuance of common stock in conjunction with equity plans	3,778	4	6,436	—	—	6,440
Stock-based compensation expense	—	—	41,722	—	—	41,722
Balance at June 30, 2022	224,756	$ 225	$ 2,058,103	$ (5,457)	$ (1,370,985)	$ 681,886
For the six months ended June 30, 2021						
Balance at December 31, 2020	192,294	$ 192	$ 1,372,083	$ 85	$ (1,036,869)	$ 335,491
Net loss	—	—	—	—	(128,436)	(128,436)
Other comprehensive loss	—	—	—	(91)	—	(91)
Issuance of common stock in conjunction with equity plans	6,623	7	25,304	—	—	25,311
Stock-based compensation expense	—	—	25,970	—	—	25,970
Balance at June 30, 2021	198,917	$ 199	$ 1,423,357	$ (6)	$ (1,165,305)	$ 258,245

See accompanying notes to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Condensed Consolidated Statements of Cash Flows

(Unaudited)

(in thousands)	Six Months Ended June 30, 2022	2021
Cash flows from operating activities		
Net loss	$ (152,893)	$ (128,436)
Adjustments to reconcile net loss to net cash used in operating activities		
Loss from Continuation Advances	—	52,000
Depreciation	4,591	3,198
Amortization of intangible assets	456	—
Amortization of right-of-use assets	3,412	1,591
Amortization of debt discount and financing costs	319	226
Stock-based compensation	41,722	25,970
Amortization from investment premium	1,143	1,782
Change in the estimated fair value of contingent consideration	(6,501)	—
Loss on disposition of equipment	77	—
Changes in assets and liabilities		
Accounts receivable	(2,817)	(3,099)
Inventory	(13,166)	(5,030)
Prepaid expenses and other assets	(340)	(307)
Accounts payable	1,331	1,403
Accrued expenses	(11,357)	5,560
Deferred revenue	(2,115)	9,402
Operating lease liabilities	(3,833)	(2,144)
Other liabilities	379	(932)
Net cash used in operating activities	(139,592)	(38,816)
Cash flows from investing activities		
Purchase of property and equipment	(7,657)	(1,970)
Purchase of investments	(241,086)	(635,400)
Sales of investments	—	34,557
Maturities of investments	230,515	150,175
Net cash used in investing activities	(18,228)	(452,638)
Cash flows from financing activities		
Continuation Advances	—	(52,000)
Proceeds from issuance of Convertible Senior Notes, net of issuance costs	—	895,536
Proceeds from issuance of common stock from equity plans	6,440	25,311
Notes payable principal payoff	(770)	—
Other	—	(246)
Net cash provided by financing activities	5,670	868,601
Net (decrease) increase in cash and cash equivalents and restricted cash	(152,150)	377,147
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	$ 313,667	$ 463,094
Cash and cash equivalents at end of period	310,445	459,794
Restricted cash at end of period	3,222	3,300
Cash and cash equivalents and restricted cash at end of period	$ 313,667	$ 463,094

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 June 30, 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. Cash equivalents may be comprised of money market funds, certificates of deposit, commercial paper, corporate bonds and notes, and government agencies' securities.

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 U.S. 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 June 30, 2022, one customer accounted for approximately 11% of total revenue during the period. For the six months ended June 30, 2022, no customers exceeded 10%. For the three and six months ended June 30, 2021, one customer accounted for approximately 17% and 14% of total revenue during the period. No other customers exceeded 10% during those periods.

As of June 30, 2022, 57% of our accounts receivable were from domestic customers, compared to 53% as of December 31, 2021. As of June 30, 2022, one customer represented 11% 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 that 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 first quarter of 2022, 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, 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. Upon achievement of the milestone, shares will be issued not in excess of an amount equal to 19.9% of our outstanding shares of common stock on the date of closing (prior to the issuance of any shares issued in connection with the transaction or the related private placement), less 11,500,000 shares.

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

NOTE 3. INVITAE COLLABORATION

On June 24, 2022, we entered into an Amended and Restated Development and Commercialization Agreement (the “Amended and Restated Agreement”) with Invitae Corporation (“Invitae”). The Amended and Restated Agreement amended and restated the existing Development and Commercialization Agreement, effective as of January 12, 2021, as amended by Amendment No. 1 to Development and Commercialization Agreement, entered into on June 3, 2021, by and between us and Invitae (together, the “Original Agreement”). Unless otherwise agreed in writing or terminated in accordance with the Amended and Restated Agreement, the term of the Amended and Restated Agreement shall continue until June 30, 2028 (“Term”).

Pursuant to the Original Agreement, Invitae provided certain funding to us to develop products relating to production-scale high-throughput sequencing (“Program Products”). If Program Products were to become commercially available, Invitae had the right to purchase the Program Products at preferred pricing.

Under the Amended and Restated Agreement, we will continue to receive feedback, input and insight from Invitae in connection with the intended development of our new sequencing systems; however, such feedback will not be contractually required, and Invitae has no contractual right to participate in decisions regarding the development program for such new sequencing systems. Our development plans for such new sequencing systems will be at our discretion and pursuant to our own internal processes and programs. Invitae will not be contractually obligated to reimburse us for development costs under the Amended and Restated Agreement. There can be no assurances that the in-development sequencing systems will continue to be developed, be successfully developed or become available for commercial sale.

In consideration of the non-refundable payments received from Invitae pursuant to the Original Agreement of $23.5 million, we will provide Invitae with credits in connection with Invitae’s anticipated purchase of certain currently available and in-development sequencing systems (instruments and consumables). The credits will expire on June 30, 2025 (“Credit Expiration Date”). Subject to certain conditions, Invitae will also be entitled to most favored pricing for the Company’s Sequel IIe systems and certain in-development systems through the Term.

We and Invitae may terminate the Amended and Restated Agreement if the other party remains in material breach of the Amended and Restated Agreement following a cure period to remedy the material breach.

The Amended and Restated Agreement is deemed a contract modification and accounted for on a prospective basis in accordance with ASC Topic 606. We will recognize proportionate amounts of the transaction price, including payments made by Invitae to us pursuant to the Original Agreement, in revenue as the remaining performance obligations are satisfied, which is when Invitae places purchase orders for certain currently available and in-development sequencing platforms and the associated goods are delivered. Any remaining unused credits will be recognized when they expire.

During the three months ended June 30, 2022, Invitae purchased certain currently available instruments, for which $3.7 million of revenue was recognized as Product Revenue on the Condensed Consolidated Statements of Operations and Comprehensive Loss under the terms of the Amended and Restated Agreement.

As of December 31, 2021, we have recognized payments received from Invitae of $23.5 million in deferred revenue, non-current, on the Consolidated Balance Sheet. As of June 30, 2022, $21.4 million of deferred revenue, current, is recorded on the Condensed Consolidated Balance Sheet relating to all future performance obligations under the Amended and Restated Agreement.

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 June 30, 2022 and December 31, 2021 respectively:

	June 30, 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	102,612	207,833	—	310,445	327,315	133,410	—	460,725
Investments:								
Commercial paper	—	120,495	—	120,495	—	187,632	—	187,632
Corporate debt securities	—	46,810	—	46,810	—	8,968	—	8,968
U.S. government & agency securities	—	421,401	—	421,401	—	387,075	—	387,075
Total investments	—	588,706	—	588,706	—	583,675	—	583,675
Short-term restricted cash	300	—	—	300	500	—	—	500
Long-term restricted cash	2,922	—	—	2,922	4,592	—	—	4,592
Total assets measured at fair value	$ 105,834	$ 796,539	$ —	$ 902,373	$ 332,407	$ 717,085	$ —	$ 1,049,492
Liabilities								
Contingent consideration	$ —	$ —	$ 163,216	$ 163,216	$ —	$ —	$ 169,717	$ 169,717
Total liabilities measured at fair value	$ —	$ —	$ 163,216	$ 163,216	$ —	$ —	$ 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.

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 10.0% to 10.2%. 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 $6.5 million decrease in liability at June 30, 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 six months ended June 30, 2022 were as follows:

(in thousands)	**Level 3**
Beginning balance as of December 31, 2021	$ 169,717
Change in estimated fair value	(6,501)
Ending balance as of June 30, 2022	$ 163,216

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 six months ended June 30, 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 June 30, 2022 and December 31, 2021:

	As of June 30, 2022			
(in thousands)	**Amortized Cost**	**Gross unrealized gains**	**Gross unrealized losses**	**Fair Value**
Cash and cash equivalents	310,508	8	(71)	310,445
Investments:				
Commercial paper	120,899	—	(404)	120,495
Corporate debt securities	47,083	—	(273)	46,810
U.S. government & agency securities	426,118	70	(4,787)	421,401
Total investments	594,100	70	(5,464)	588,706
Total cash, cash equivalents and investments	$ 904,608	$ 78	$ (5,535)	$ 899,151
Short-term restricted cash	$ 300	$ —	$ —	$ 300
Long-term restricted cash	$ 2,922	$ —	$ —	$ 2,922

	As of December 31, 2021			
(in thousands)	**Amortized Cost**	**Gross unrealized gains**	**Gross unrealized losses**	**Fair Value**
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	$ 500	$ —	$ —	$ 500
Long-term restricted 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 June 30, 2022:

(in thousands)	**Fair Value**
Due in one year or less	$ 687,193
Due after one year through five years	109,346
Total investments	$ 796,539

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 June 30, 2022 and December 31, 2021, the short-term restricted cash balance was $0.3 million and $0.5 million, respectively, which was comprised of security deposits for the credit cards of employees.

Inventory, net

As of June 30, 2022 and December 31, 2021, our inventory, net, consisted of the following components:

(in thousands)	June 30, 2022	December 31, 2021
Purchased materials	$ 15,451	$ 7,993
Work in process	12,808	8,611
Finished goods	7,862	7,995
Inventory	$ 36,121	$ 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, $2.5 million and $3.0 million was recorded in long-term restricted cash related to the O'Brien Lease in the Condensed Consolidated Balance Sheets as of June 30, 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. Long-term restricted cash related to this facility was $0 and $1.6 million in the Condensed Consolidated Balance Sheets as of June 30, 2022 and December 31, 2021, respectively. At June 30, 2022, we had an additional $0.4 million in long-term restricted cash primarily related to a letter of credit established for a facility lease.

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):

		As of June 30, 2022			As of December 31, 2021		
	Estimated Useful Life (in years)	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Developed technology	15	$ 11,000	$ (672)	$ 10,328	$ 11,000	$ (306)	$ 10,694
Customer relationships	2	360	(165)	195	360	(75)	285
Total		$ 11,360	$ (837)	$ 10,523	$ 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	$ 457
2023	838
2024	733
2025	733
2026	733
2027 and thereafter	7,029
Total	$ 10,523

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 performed our annual assessment for goodwill impairment in the second quarter of 2022, noting no impairment.

Deferred revenue

As of June 30, 2022, we had a total of $33.9 million of deferred revenue, $32.1 million of which was recorded as deferred revenue, current, and primarily relates to future performance obligations under the Amended and Restated Agreement with Invitae as described in *Note 3. Invitae Collaboration* in Part I, Item 1 of this Quarterly Report on Form 10-Q. The deferred revenue, non-current balance of $1.8 million primarily relates to deferred service contract revenues and is scheduled to be recognized in the next 5 years. Revenue recorded in the six months ended June 30, 2022 includes $9.2 million of previously deferred revenue that was included in deferred revenue as of December 31, 2021. Contract assets as of June 30, 2022 and December 31, 2021 were not material.

As of June 30, 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.

Product Warranties

We generally provide a one-year warranty on instruments. In addition, we provide a limited warranty on consumables. At the time revenue is recognized, an accrual is established for estimated warranty costs based on historical experience as well as anticipated product performance. We periodically review the warranty reserve for adequacy and adjust the warranty accrual, if necessary, based on actual experience and estimated costs to be incurred. Warranty expense is recorded as a component of cost of product revenue. There were no material changes in estimates for the periods presented below.

Changes in the reserve for product warranties were as follows for the periods indicated (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
(in thousands)	**2022**	**2021**	**2022**	**2021**
Balance at beginning of period	$ 1,174	$ 179	$ 594	$ 161
Additions charged to cost of product revenue	912	412	1,865	615
Repairs and replacements	(477)	(320)	(850)	(505)
Balance at end of period	$ 1,609	$ 271	$ 1,609	$ 271

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	$	838
2023		1,842
2024		490
Total	$	3,170

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 June 30, 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)	**June 30, 2022**	**December 31, 2021**
Principal amount	$ 900,000	$ 900,000
Unamortized debt issuance costs	(3,626)	(3,933)
Net carrying amount	$ 896,374	$ 896,067

For the three and six months ended June 30, 2022, interest expense for the Notes was as follows (in thousands):

(in thousands)	**Three Months Ended June 30,**		**Six Months Ended June 30,**	
	2022	**2021**	**2022**	**2021**
Contractual interest expense	$ 3,375	$ 3,375	$ 6,750	$ 5,063
Amortization of debt issuance costs	154	151	307	227
Total interest expense	$ 3,529	$ 3,526	$ 7,057	$ 5,290

As of June 30, 2022, the estimated fair value (Level 2) of the Notes was $559.8 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. 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. On December 1, 2021, PGI filed an appeal with the Beijing IP Court, contesting the CNIPA decision. We filed a petition with the Wuhan Intermediate People's court requesting dismissal of the infringement action based on the CNIPA invalidation decision, and PGI filed a petition to withdraw its complaint. The Wuhan Intermediate People's court granted PGI's petition and dismissed the infringement action in May 2022.

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 June 30, 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.

On May 25, 2022, stockholders approved an amendment to the 2020 Plan and we reserved an additional 18,000,000 shares of our common stock for issuance pursuant to equity awards granted under the 2020 Plan.

As of June 30, 2022, we had 19.5 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 for the six months ended June 30, 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	4,611	4.61 – 16.58	10.65
Exercised	(421)	1.16 – 8.90	4.21
Canceled	(1,050)	2.47 – 46.37	23.98
Outstanding at June 30, 2022	15,299	$ 1.16 – 46.37	$ 10.67

Performance-based Stock Options

The following table summarizes stock option activity for performance-based awards for the six months ended June 30, 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	(1)	4.71 – 4.90	4.75
Outstanding at June 30, 2022	303	$ 4.71 – 4.90	$ 4.71

For the three and six months ended June 30, 2022, we recognized stock-based compensation expense of $7.0 million and $14.5 million, respectively, related to time-based and performance-based options.

Restricted Stock Units ("RSUs")

The following table summarizes the time-based RSU activity for the six months ended June 30, 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	3,948	11.22
Vested	(2,026)	14.90
Forfeited	(922)	21.46
Outstanding at June 30, 2022	8,392	$ 16.75

For the three and six months ended June 30, 2022, we recognized stock-based compensation expense of $9.7 million and $21.6 million, respectively, related to restricted stock units.

Employee Stock Purchase Plan ("ESPP")

Shares issued under our ESPP were 1,316,923 and 983,180 during the six months ended June 30, 2022 and 2021, respectively. In February 2022, an additional 4.0 million shares were reserved under the ESPP. As of June 30, 2022, 10,493,750 shares of our common stock remain available for issuance under our ESPP.

For the three and six months ended June 30, 2022, we recognized stock-based compensation expense of $2.3 million and $5.6 million, respectively, related to our ESPP.

Stock-Based Compensation

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Cost of revenue	$ 988	$ 1,906	$ 2,746	$ 2,898
Research and development	7,748	4,310	16,713	7,357
Sales, general and administrative	10,283	9,589	22,263	15,715
Total stock-based compensation expense	$ 19,019	$ 15,805	$ 41,722	$ 25,970

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 the three and six months ended June 30, 2022 and 2021, the fair value of employee stock options was estimated using the following weighted average assumptions:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Expected term in years	4.6	4.6	4.6	4.6

Expected volatility	72%	70%	70% - 72%	68% - 70%
Risk-free interest rate	2.77%	0.74%	1.76% - 2.77%	0.50% - 0.74%
Dividend yield	—	—	—	—
Weighted average grant date fair value per share	$ 3.26	$ 14.54	$ 6.05	$ 18.86

ESPP

We estimate the fair value of shares to be issued under the ESPP using the Black-Scholes option pricing model. For the three and six months ended June 30, 2022 and 2021, the fair value of shares to be issued under the ESPP was estimated using the following assumptions:

	Six Months Ended June 30,	
	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 June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Numerator:				
Net loss	$ (71,394)	$ (41,001)	$ (152,893)	$ (128,436)
Denominator:				
Basic				
Weighted average shares used in computing basic net loss	224,499	198,568	223,400	196,690
Basic net loss per share	$ (0.32)	$ (0.21)	$ (0.68)	$ (0.65)
Diluted				
Weighted average shares used in computing diluted net loss per share	224,499	198,568	223,400	196,690
Diluted net loss per share	$ (0.32)	$ (0.21)	$ (0.68)	$ (0.65)

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 June 30,		Six Months Ended June 30,	
(in thousands)	2022	2021	2022	2021
Shares issuable upon conversion of convertible senior notes	20,690	20,690	20,690	20,690
Options to purchase common stock	15,602	12,335	15,602	12,335
RSUs	8,392	6,820	8,392	6,820
ESPP shares	1,931	2,336	1,931	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. As described in *Note 2. Business Acquisitions* in Part I, Item 1 of this Quarterly Report on Form 10-Q, the contingently issuable shares would be due upon the achievement of a milestone.

NOTE 11. REVENUE

A summary of our revenue by geographic location for the three and six months ended June 30, 2022 and 2021 is as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
(in thousands)	**2022**	**2021**	**2022**	**2021**
Americas	$ 21,722	$ 14,347	$ 40,804	$ 26,504
Europe, Middle East and Africa	5,735	6,494	11,435	14,819
Asia-Pacific	8,010	9,769	16,401	18,284
Total	$ 35,467	$ 30,610	$ 68,640	$ 59,607

A summary of our revenue by category for the three and six months ended June 30, 2022 and 2021 is as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
(in thousands)	**2022**	**2021**	**2022**	**2021**
Instrument revenue	$ 15,619	$ 14,282	$ 31,169	$ 29,221
Consumable revenue	14,556	12,251	27,250	22,615
Product revenue	30,175	26,533	58,419	51,836
Service and other revenue	5,292	4,077	10,221	7,771
Total revenue	$ 35,467	$ 30,610	$ 68,640	$ 59,607

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 into 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 June 30, 2022, our commercial team was comprised of over 189 employees, including 56 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 have already made and expect to continue to make during the remainder of 2022 will further help drive growth in our business.

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 2023. As a result, we expect our research and development expense to continue increasing during the remainder of 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

Broader macroeconomic dynamics including rising inflation, global supply chain constraints, volatile capital markets, competition and lockdown restrictions associated with COVID-19 have adversely impacted our customers and lengthened customer sales cycles. Additionally, lock downs in China have led to lower than previously anticipated revenue in the Asia-Pacific region as customers have difficulty accessing labs and lower sample volumes from which to sequence. We expect some headwinds from a strengthening U.S. dollar which impacts our revenue denominated in EUR and GBP but also impacts purchasing power of our customers in Asia as a stronger U.S. dollar makes buying our products more expensive.

Ongoing global supply chain constraints and rising inflation are also increasing our costs; therefore, we expect these costs to impact gross margins and cash flow. Due to the rising costs from global supply chain constraints and rising inflation, we are moderating our hiring with the aim of reducing our operating expenses growth in 2022. We will continue to prioritize investments in our next generation product launches and commercial expansion prioritizing opportunities that will generate a return over the near to mid-term.

The degree of further adverse impacts 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 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 some 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.

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

Key highlights of the six months ended June 30, 2022 consolidated financial results include the following:

- Revenue increased $9.0 million, or 15%, to $68.6 million for the six months ended June 30, 2022, as compared to $59.6 million for the six months ended June 30, 2021, driven primarily by an increase in consumable and service revenue from the growth of our installed base of Sequel II/IIe instruments since June 30, 2021. Future revenue growth is, in part, dependent on the sales of sequencing instruments, which are a leading indicator of consumables sales. While we expect to sell additional instruments, sales cycles are lengthening due to the global macroeconomic factors mentioned above. We also expect a potential slower ramp in the sales of consumables due to project delays, lower sample volumes and potential further lockdown restrictions, particularly in China.

- Gross profit as a percentage of revenue (gross margin) was 44.2% for the six months ended June 30, 2022, compared to 44.8% for the six months ended June 30, 2021. Gross margin declined due primarily to an increase in our average product costs. 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 and inflation 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 $74.2 million or 104%, to a loss of $145.5 million for the six months ended June 30, 2022, as compared to a loss of $71.3 million for the six months ended June 30, 2021, driven primarily by an increase of $77.8 million in operating expenses, including a $60.5 million increase in research and development expenses, primarily due to the Omniome acquisition and the establishment of an advanced research organization, $23.9 million increase in sales, general and administrative expenses, partially offset by a $6.5 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 $899.2 million at June 30, 2022, which represents a 13.9% decrease compared to the balance at December 31, 2021.

Results of Operations

Comparison of the Three Months Ended June 30, 2022 and 2021

	Three Months Ended June 30,			
	2022	2021	$ Change	% Change
	(in thousands, except percentages)			
Revenue:				
Product revenue	$ 30,175	$ 26,533	$ 3,642	14%
Service and other revenue	5,292	4,077	1,215	30%
Total revenue	35,467	30,610	4,857	16%
Cost of revenue:				
Cost of product revenue	15,499	13,222	2,277	17%
Cost of service and other revenue	3,592	3,635	(43)	(1%)
Amortization of intangible assets	183	—	183	100%
Total cost of revenue	19,274	16,857	2,417	14%
Gross profit	16,193	13,753	2,440	18%
Operating expense:				
Research and development	50,348	22,266	28,082	126%
Sales, general and administrative	39,252	29,060	10,192	35%
Change in fair value of contingent consideration	(5,438)	—	(5,438)	(100%)
Total operating expense	84,162	51,326	32,836	64%
Operating loss	(67,969)	(37,573)	(30,396)	(81%)
Interest expense	(3,681)	(3,589)	(92)	(3%)
Other income, net	256	161	95	59%
Net loss	$ (71,394)	$ (41,001)	$ (30,393)	(74%)

Revenue

Revenue increased $4.9 million, or 16%, to $35.5 million for the three months ended June 30, 2022, as compared to $30.6 million for the three months ended June 30, 2021, driven primarily by an increase in instrument and consumable revenue.

On January 12, 2021, we entered into the Development and Commercialization Agreement, as amended by Amendment No. 1 to Development and Commercialization Agreement, entered into on June 3, 2021 (together, the "Original Agreement"), by and between us and Invitae Corporation ("Invitae"). On June 24, 2022, we entered into an Amended and Restated Development and Commercialization Agreement (the "Amended and Restated Agreement"). In consideration of the non-refundable payments received from Invitae pursuant to the Original Agreement of $23.5 million, we will provide Invitae with credits in connection with Invitae's anticipated purchase of certain currently available and in-development sequencing systems (instruments and consumables). During the three months ended June 30, 2022, Invitae purchased certain currently available instruments, for which $3.7 million of revenue was recognized as Product Revenue on the Condensed Consolidated Statements of Operations and Comprehensive Loss under the terms of the Amended and Restated Agreement.

Instrument revenue increased $1.3 million, or 9%, to $15.6 million for the three months ended June 30, 2022, as compared to $14.3 million for the three months ended June 30, 2021, primarily due to a higher average selling price of instruments slightly offset by fewer instruments sold. At June 30, 2022, our installed base was 460 Sequel II and Sequel IIe systems compared to the 282 systems at June 30, 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 $2.4 million, or 19%, to $14.6 million for the three months ended June 30, 2022, as compared to $12.2 million for the three months ended June 30, 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 30%, to $5.3 million for the three months ended June 30, 2022, as compared to $4.1 million for the three months ended June 30, 2021, primarily due to service contracts sold on the growing installed base.

Cost of Revenue, Gross Profit and Gross Margin

Cost of product revenue increased by $2.3 million, or 17%, to $15.5 million for the three months ended June 30, 2022, compared to $13.2 million for the three months ended June 30, 2021. The increase in cost of product revenue was primarily due to higher manufacturing costs due to increased consumables sales and higher instrument warranty costs.

Gross profit increased $2.4 million, or 18%, to $16.2 million for the three months ended June 30, 2022, compared to $13.8 million for the three months ended June 30, 2021. Gross margin was 45.7% for the three months ended June 30, 2022, compared to gross margin of 44.9% for the three months ended June 30, 2021. The increase in gross margin percentage was partially driven by a multi-instrument order at higher average selling prices, as well as greater consumable and service revenue volume.

The global shortage of semiconductors and rising inflation continues to be a challenge 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. 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 $28.1 million, or 126%, to $50.3 million for the three months ended June 30, 2022, compared to the $22.3 million for three months ended June 30, 2021. The increase was primarily driven by increased personnel expenses of $9.0 million due to an increase in headcount, including the acquired workforce from the Omniome acquisition, and an increase of $11.3 million of product development costs and other related costs, which also included incremental expenses related to the acquisition of Omniome. In addition, facilities and information technology related expenses increased by $3.5 million during the three months ended June 30, 2022 compared to the three months ended June 30, 2021, primarily due to expenses related to our continuing operational expansion. Research and development expense included stock-based compensation expense of $7.7 million and $4.3 million during the three months ended June 30, 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 expect research and development expenses to continue increasing during the remainder of 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. We have collaborated and expect to continue to collaborate with strategic partners to develop sequencing solutions and expand the application of our technology.

Sales, General and Administrative Expense

Sales, general and administrative expense increased by $10.2 million, or 35%, to $39.3 million for the three months ended June 30, 2022, compared to $29.1 million for the three months ended June 30, 2021. The increase was primarily driven by a $2.6 million increase in personnel expenses, which included expenses for quota-carrying sales representatives, $2.0 million in travel expenses, $1.7 million increase in marketing expenses related to conferences and seminars and $1.6 million increase in consulting and professional fees. Sales, general and administrative expense included stock-based compensation expense of $10.3 million and $9.6 million during the three months ended June 30, 2022 and 2021, respectively.

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 $5.4 million during the three months ended June 30, 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. The decrease in contingent consideration liability was primarily due to the increase in discount rates.

Interest Expense

Interest expense for the three months ended June 30, 2022, was $3.7 million compared to $3.6 million for the three months ended June 30, 2021 which was primarily comprised of interest on the Convertible Senior Notes.

Comparison of the Six Months Ended June 30, 2022 and 2021

	Six Months Ended June 30,			
	2022	2021	$ Change	% Change
Revenue:	(in thousands, except percentages)			
Product revenue	$ 58,419	$ 51,836	$ 6,583	13%
Service and other revenue	10,221	7,771	2,450	32%
Total revenue	68,640	59,607	9,033	15%
Cost of revenue:				
Cost of product revenue	30,319	25,919	4,400	17%
Cost of service and other revenue	7,607	6,958	649	9%
Amortization of intangible assets	366	—	366	100%
Total cost of revenue	38,292	32,877	5,415	16%
Gross profit	30,348	26,730	3,618	14%
Operating expense:				
Research and development	103,285	42,815	60,470	141%
Sales, general and administrative	79,056	55,198	23,858	43%
Change in fair value of contingent consideration	(6,501)	—	(6,501)	(100%)
Total operating expense	175,840	98,013	77,827	79%
Operating loss	(145,492)	(71,283)	(74,209)	(104%)
Loss from continuation advances from Illumina	-	(52,000)	52,000	100%
Interest expense	(7,378)	(5,378)	(2,000)	(37%)
Other (expense) income, net	(23)	225	(248)	(110%)
Net loss	$ (152,893)	$ (128,436)	$ (24,457)	(19%)

Revenue

Revenue increased $9.0 million, or 15%, to $68.6 million for the six months ended June 30, 2022, as compared to $59.6 million for the six months ended June 30, 2021, driven primarily by an increase in consumable and service revenue from the growth in the installed base of Sequel II/IIe instruments.

In consideration of the non-refundable payments received from Invitae pursuant to the Original Agreement of $23.5 million, we will provide Invitae with credits in connection with Invitae's anticipated purchase of certain currently available and in-development sequencing systems (instruments and consumables). During the six months ended June 30, 2022, Invitae purchased certain currently available instruments, for which $3.7 million of revenue was recognized as Product Revenue on the Condensed Consolidated Statements of Operations and Comprehensive Loss under the terms of the Amended and Restated Agreement.

Instrument revenue increased $1.9 million, or 7%, to $31.2 million for the six months ended June 30, 2022, as compared to $29.2 million for the six months ended June 30, 2021, primarily due to an increase in instruments sold. At June 30, 2022, our installed base was 460 Sequel II and Sequel IIe systems compared to the 282 systems at June 30, 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 $4.6 million, or 20%, to $27.3 million for the six months ended June 30, 2022, as compared to $22.6 million for the six months ended June 30, 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 $2.5 million, or 32%, to $10.2 million for the six months ended June 30, 2022, as compared to $7.8 million for the six months ended June 30, 2021, primarily due to service contracts sold on the growing installed base.

Cost of Revenue, Gross Profit and Gross Margin

Cost of product revenue increased by $4.4 million, or 17%, to $30.3 million for the six months ended June 30, 2022, compared to $25.9 million for the six months ended June 30, 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 $0.6 million, or 9%, to $7.6 million for the six months ended June 30, 2022, compared to $7.0 million for the six months ended June 30, 2021, primarily due to higher service volumes from our growing installed base.

Gross profit increased $3.6 million, or 14%, to $30.3 million for the six months ended June 30, 2022, compared to the six months ended June 30, 2021. Gross margin was 44.2% for the six months ended June 30, 2022, compared to gross margin of 44.8% for the six months ended June 30, 2021. The slight decrease in gross margin percentage was primarily due to increased product costs during the six months ended June 30, 2022, compared to the six months ended June 30, 2021.

The global shortage of semiconductors 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 surge in COVID-19 infections in the first half of 2022, the Chinese government 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 $60.5 million, or 141%, to $103.3 million for the six months ended June 30, 2022, compared to $42.8 million for the six months ended June 30, 2021. This change was primarily driven by a $19.4 million increase in personnel expenses due to an increase in headcount, including the acquired workforce from the Omniome acquisition, and an increase of $23.2 million of product development costs and other related costs. In addition, facilities and information technology related expenses increased $7.0 million to support our operational expansion during the six months ended June 30, 2022 compared to the six months ended June 30, 2021. Research and development expense included stock-based compensation expense of $16.7 million and $7.4 million during the six months ended June 30, 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.

Sales, General and Administrative Expense

Sales, general and administrative expense increased by $23.9 million, or 43%, to $79.1 million for the six months ended June 30, 2022, compared to $55.2 million for the six months ended June 30, 2021. This increase was primarily driven by $4.6 million increase in personnel expenses due to an increase in headcount, $4.0 million increase in consulting and professional fees, $2.6 million increase in travel expenses, $2.2 million increase in marketing expenses related to conferences and seminars. Sales, general and administrative expense included stock-based compensation expense of $22.3 million and $15.7 million during the six months ended June 30, 2022 and 2021, respectively.

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 $6.5 million during the six months ended June 30, 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. The decrease in contingent consideration liability was primarily due to the increase in discount rates.

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 six months ended June 30, 2021.

Interest Expense

Interest expense for the six months ended June 30, 2022 was $7.4 million compared to $5.4 million for the six months ended June 30, 2021. The increase was primarily due to the six months of interest incurred on the $900 million of 1.50% Convertible Senior Notes due February 15, 2028 that we issued on February 16, 2021 during the six months ended June 30, 2022 compared to only four months of interest during the six months ended June 30, 2021.

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 June 30, 2022, we had cash, cash equivalents and investments of $899.2 million compared to $1.04 billion as of December 31, 2021. We believe that our existing cash, cash equivalents and investments will be sufficient to fund our projected operating requirements beyond the next 12 months from the date of filing of this Quarterly Report on Form 10-Q for the quarter ended June 30, 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

	Six Months Ended June 30,	
(in thousands)	**2022**	**2021**
Cash used in operating activities	$ (139,592)	$ (38,816)
Cash used in investing activities	(18,228)	(452,638)
Cash provided by financing activities	5,670	868,601
Net (decrease) increase in cash, cash equivalents and restricted cash	$ (152,150)	$ 377,147

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 $139.6 million of cash in operating activities for the six months ended June 30, 2022, compared to cash used in operating activities of $38.8 million for the six months ended June 30, 2021.

Cash used in operating activities for the six months ended June 30, 2022, of $139.6 million was due primarily to a $152.9 million net loss that included non-cash items such as stock-based compensation of $41.7 million, depreciation expense of $4.6 million, amortization of right-of-use assets of $3.4 million, amortization of investment premium of $1.1 million, partially offset by a $6.5 million decrease in liability due to the change in estimated fair value of contingent consideration, and a net cash outflow due to $31.9 million in net changes to operating assets and liabilities. The change in net operating assets and liabilities was primarily attributable to a $13.2 million increase in inventory, a $11.4 million decrease in accrued expenses, a $3.8 million decrease in operating lease liabilities, a $2.8 million increase in accounts receivable, a $2.1 million decrease in deferred revenue, partially offset by a $1.3 million increase in accounts payable.

Cash used in operating activities for the six months ended June 30, 2021 was due primarily to a $128.4 million net loss, partially offset by a loss of $52.0 million from Continuation Advances repaid to Illumina that is considered a financing activity, non-cash items such as stock-based compensation of $26.0 million and depreciation of $3.2 million and a net change in operating assets and liabilities of $4.9 million. The change in net operating assets and liabilities was primarily attributable to increases of $9.4 million in deferred revenue and $5.6 million in accrued expenses, partially offset by increases of $5.0 million in inventory and $3.1 million in accounts receivable and a decrease of $2.1 million in operating lease liabilities.

Investing Activities

Our investing activities consist primarily of capital expenditures and investment purchases, sales and maturities. Cash used in investing activities for the six months ended June 30, 2022, was due to $241.1 million in purchases of investments offset by $230.5 million in maturities of investments, and $7.7 million in purchases of property and equipment.

Cash used in investing activities for the six months ended June 30, 2021 was due primarily to net purchases of investments of $450.7 million and purchases of property and equipment of $2.0 million.

Financing Activities

Cash provided by financing activities was $5.7 million and $868.6 million for the six months ended June 30, 2022 and 2021, respectively. Cash provided by financing activities during the six months ended June 30, 2022 primarily resulted from proceeds of $6.4 million from the issuance of common stock through our equity compensation plans.

Cash provided by financing activities during the six months ended June 30, 2021 resulted from the net proceeds of $895.5 million from our February 2021 issuance of $900 million of 1.50% Convertible Senior Notes after deducting debt issuance costs and proceeds of $25.3 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 that 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 first quarter of 2022, 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 June 30, 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 June 30, 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.

During the six months ended June 30, 2022, we invested in cash equivalents, U.S. government and agency securities, U.S. Treasury securities, and corporate debt securities which were designated as cash equivalents and available-for-sale investments. Our cash equivalents and available-for-sale securities as of June 30, 2022 was $796.5 million.

Our exposure to market risk for changes in interest rates relates primarily to our investment portfolio comprising of marketable securities. We invest in a number of securities including U.S. government and agency securities, U.S. Treasury securities, and corporate debt securities and money market funds. We attempt to ensure the safety and preservation of our invested principal funds by limiting default risk, market risk and reinvestment risk. We mitigate default risk by investing in high grade investment securities. The fair market value of our fixed rate securities may be adversely impacted by increases in interest rates while income earned may decline as a result of decreases in interest rates. A hypothetical 100 basis-point (one percentage point) increase or decrease in interest rates compared to rates at June 30, 2022 would have affected the fair value of our investment portfolio by approximately $4.0 million.

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 June 30, 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 June 30, 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 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 a surge in COVID-19 infections in the first half of 2022, the Chinese government 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 COVID-19 pandemic 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, the risk of waning immunity among persons already vaccinated and an increase in fatigue or skepticism with respect to initial or booster vaccinations, 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 June 30, 2022, our installed based was 460 Sequel II and Sequel IIe systems compared to the 282 systems as of June 30, 2021, and we expect the number of Sequel II/IIe placements to continue to grow during the remainder of 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, has adversely impacted and could continue to 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. 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. For example, 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, which was amended and restated on June 24, 2022 (the "Amended and Restated Agreement"). While we anticipate that in connection with the Amended and Restated Agreement, we will continue to receive feedback, input and insight from Invitae in connection with our intended development of new high-throughput sequencing systems, such feedback will not be contractually required and Invitae has no contractual right to participate in decisions regarding the development program for such new sequencing systems. Invitae will not be contractually obligated to reimburse us for development costs under the Amended and Restated Agreement. In consideration of non-refundable Development Costs (as defined in the Development Agreement) paid by Invitae to us pursuant to the Development Agreement, we will provide Invitae with credits in connection with Invitae's anticipated purchase of currently available and in-development sequencing systems (instruments and consumables). In addition, subject to certain conditions, Invitae will be entitled to most favored pricing for our Sequel IIe systems and certain in-development systems. 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. Our experience in managing product transitions is limited, and 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, and any future long-read and short-read products, 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 was appointed effective January 8, 2021. Jeff Eidel has been appointed Chief Commercial Officer, effective August 16, 2022, succeeding Peter Fromen who resigned effective May 20, 2022. 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 in 2021 reported by employers nationwide and continued high rates of employee turnover continuing into 2022. To induce valuable employees to remain at our company, in addition to salary and cash incentives, we have issued stock options and restricted stock units that vest over time. The value to employees of stock options and restricted stock units that vest over time may be significantly affected by movements in our stock price that are beyond our control and may at any time be insufficient to counteract more lucrative offers from other companies. We may face challenges in retaining and recruiting such individuals due to sustained declines in our stock price that could reduce the retention value of equity awards. 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 products, 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 source these product components from sole-source third-party manufacturing and supply collaborators for any reason, including in connection with acts of terrorism, hostilities, military conflict and acts of war, including between China and Taiwan, or 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. Our suppliers have raised their prices and may continue to raise prices that we may not be able to pass on to our customers, which could adversely affect our business, including our competitive position, market share, revenues and profit margins in material ways. 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 a surge in COVID-19 infections in the first half of 2022, the Chinese government 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. If as a result of global economic or political instability, such as the ongoing escalation of the situation in Ukraine, other disease outbreaks, or supply issues, we or our contractors could experience shortages, business disruptions or delays for materials sourced or manufactured in the affected countries, and their ability to supply us with instruments or product components may be affected. From time to time, certain components of our systems and reagents may reach the end of their life cycles or become obsoleted by our suppliers, and we would have to procure alternative sources for these end-of-life products. If we encounter delays or difficulties in securing the quality and quantity of materials we require for our products, our supply chain would be interrupted which would adversely affect sales. If any of these events occur, our business and operating results could be harmed. Accordingly, if any of the foregoing occurs, our ability to commercialize our products, revenue and gross margins could suffer until lockdowns from COVID-19 infections are reduced, supply issues or business disruptions are resolved 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, particularly if high rates of inflation continue, 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 Fisher Scientific, Oxford Nanopore Technologies Ltd. ("ONT Ltd."), Roche, and Qiagen. Companies that may enter the market may include Ultima Genomics, Element Biosciences and Singular Genomics. 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.

Tariffs and or other trade barriers were previously imposed between the U.S. and China, the scope and duration of which, 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 have and could continue to raise our costs. China also has imposed tariffs on imports into China from the United States. 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. The Biden Administration has continued to provide updated lists of emerging technologies subject to national security consents, and it continues to include biotechnologies including "[g]enome and protein engineering including design tools" and "[b]iomanufacturing and bioprocessing technologies." Therefore, it is possible that our ability to export our products to China may be restricted in the future. 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 export controls, 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. Our supply of consumables chips and other critical components may be materially and adversely affected by diplomatic, geopolitical and other developments affecting the relationship between China and 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 and other critical components to us, which could limit or prohibit our ability to manufacture consumable chips and other critical components or lead to an increase in our supply costs if we cannot find a similar cost alternative supplier, which could materially and adversely impact our business, operations, prospects, financial condition and 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 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 an agreement we had entered into with Roche, 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 Personal Genomics of Taiwan, Inc.("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 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 increases 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, in 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 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, in 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 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 have and could continue to 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 export controls, 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.

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") and ongoing geopolitical tensions related to the ongoing escalation of the situation in Ukraine, resulting sanctions imposed by the U.S. and other countries, and retaliatory actions taken by Russia in response to such sanctions;
- 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, any 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 a further 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, and current macroeconomic trends and geopolitical events, and 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 (the “Private Placement”), and registered the Private Placement shares for resale on a registration statement on Form S-3. The Private Placement Investors may sell any or all of their shares pursuant to the registration statement from time to time.

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, the Private Placement included the sale of approximately $60 million of our common stock 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 any further 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 to sell products in the same market. Our revenue from international customers may be negatively impacted as increases in the U.S. dollar relative to our international customers' local 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. Our 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. Furthermore, there may be a heightened risk of potential cyberattacks to which we could be vulnerable by state-sponsored actors or others in connection with the escalation of the situation in Ukraine. 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, 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†	Amended and Restated Development and Commercialization Agreement by and between the Registrant and Invitae Corporation dated June 24, 2022			Filed herewith
10.2+	Pacific Biosciences of California, Inc. 2020 Equity Incentive Plan, as amended	8-K	10.1	May 26, 2022
10.3+	Form of Global Stock Option Agreement under the Pacific Biosciences of California, Inc. 2020 Equity Incentive Plan, as amended	8-K	10.2	May 26, 2022
10.4+	Form of Global Restricted Stock Unit Agreement under the Pacific Biosciences of California, Inc. 2020 Equity Incentive Plan, as amended	8-K	10.3	May 26, 2022
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	Inline XBRL Taxonomy Extension Schema Document			Filed herewith
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document			Filed herewith
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document			Filed herewith
101.LAB	Inline XBRL Taxonomy Extension Labels Linkbase Document			Filed herewith
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document			Filed herewith
104	Cover Page Interactive File (formatted as inline XBRL and contained in Exhibit 101)			Filed herewith

† Confidential portions of this exhibit have been omitted in accordance with Item 601(b)(10) of Regulation S-K because they are private, confidential and not material, and will be supplementally furnished to the SEC upon request.

+ 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: August 5, 2022

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

Date: August 5, 2022

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

Date: August 5, 2022

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

CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS ([***]), HAS BEEN OMITTED BECAUSE THE INFORMATION (I) IS NOT MATERIAL AND (II) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

AMENDED AND RESTATED

DEVELOPMENT AND COMMERCIALIZATION AGREEMENT

This AMENDED AND RESTATED DEVELOPMENT AND COMMERCIALIZATION AGREEMENT (the "**Agreement**"), effective as of June 24, 2022 (the "**Effective Date**"), is made by and between Pacific Biosciences of California, Inc., a Delaware corporation, having a place of business at 1305 O'Brien Dr., Menlo Park, CA 94025 ("**PacBio**") and Invitae Corporation, a Delaware corporation, having a place of business at 1400 16th St., San Francisco, CA 94103 ("**Invitae**" and, together with PacBio, the "**Parties**" and each, a "**Party**").

BACKGROUND

A. Invitae is working to bring comprehensive genetic information into mainstream medicine to improve healthcare.

B. PacBio is a leading provider of high-quality sequencing of genomes, transcriptomes and epigenomes employing SMRT Sequencing Technology to generate HiFi genomes.

C. PacBio and Invitae entered into that certain Development and Commercialization Agreement, effective as of January 12, 2021, as amended by that certain Amendment No. 1 to Development and Commercialization Agreement effective as of January 12, 2021 (as amended, the "**Original Agreement**" and "**Original Effective Date**").

D. PacBio and Invitae desire to amend and restate the Original Agreement in its entirety as set forth in this Agreement.

NOW, THEREFORE, PacBio and Invitae hereby amend, restate, and replace the Original Agreement in its entirety with this Agreement, effective as of the Effective Date, and agree to the following terms:

ARTICLE 1
DEFINITIONS

As used herein, the following terms will have the meanings set forth below:

1.1 "**Affiliate**" means, with respect to an entity, any other entity that controls, is controlled by, or is under common control with the first entity. For the purpose of this definition, "control" shall mean direct or indirect ownership of fifty percent (50%) or more of the shares of stock entitled to vote for the election of directors, in the case of a corporation, or fifty percent (50%) or more of the equity interest, in the case of any type of legal entity other than a corporation, status as a general partner in any partnership, or any other arrangement whereby the entity or person controls or has the right to control the board of directors or equivalent governing body of a corporation or other entity, or the ability to cause the direction of the management or policies of a corporation or other entity. In the case of entities organized under the laws of certain countries, the Parties acknowledge that the maximum percentage ownership permitted by law for a foreign investor may be less than fifty percent (50%) and, in such case, such lower percentage shall be substituted in the preceding sentence; provided, that such foreign investor has the power to direct the management and policies of such entity.

1.2 "**Business Day"** means a day other than a Saturday, Sunday, or other day on which commercial banks in San Francisco, CA are authorized or required by law to be closed for business.

1.3 "**[***]**" means, collectively, the **[***]** and the **[***]**.

1.4 "**[***]**" means the **[***]**, which **[***]** will use **[***]** technology to **[***]** and is expected to **[***]** or other substantially similar **[***]** that may be developed or available during the Term of the Agreement.

1.5 "**[***]**" means the **[***]** together with the **[***]**.

1.6 "**[***]**" means, collectively, the **[***]** and the **[***]**, and "**[***]**" means, individually, either of the **[***]**.

1.7 "**[***]**" means **[***]**'s **[***]** for the relevant product in **[***]** as of **[***]**.

1.8 "**[***]**" means the **[***]**, which **[***]**will use **[***]** technology to **[***]** and is expected to **[***]** or other substantially similar **[***]** that may be developed or available during the Term of the Agreement.

1.9 **"[***]**" means the **[***]** together with the **[***]**.

1.10 "**Third Party**" means any person or entity other than Invitae, PacBio or each's applicable Affiliates.

1.11 Additional Definitions. Each of the following definitions shall have the meanings defined in the corresponding sections of this Agreement indicated below:

Defined Term	Section
Claim	**6.3**
Confidential Information	**4.1**
Disclosing Party	**4.1**
Dispute	**8.2**
Escalation to Mediation Date	**8.2.1**
Force Majeure	**8.3**
[***]	**3.1.1**
Indemnitee	**6.3**
Indemnitor	**6.3**
[***] Claim	**6.1**
[***] Indemnitee	**6.1**
Notice of Dispute	**8.2**
[***]	**3.1.1**
[***] Claim	**6.2**
[***] Indemnitee	**6.2**
Prior CDA	**4.7**
Receiving Party	**4.1**
[***]	**3.1.1**

1.12 Interpretation. The captions and headings to this Agreement are for convenience only, and are to be of no force or effect in construing or interpreting any of the provisions of this Agreement. Unless specified to the contrary, references to Articles, Sections, Attachments or Exhibits mean the particular Articles, Sections, Attachments or Exhibits to this Agreement and references to this Agreement include all Attachments and Exhibits hereto. Unless the context otherwise clearly requires, whenever used in this Agreement: (a) the words “include” or “including” shall be construed as incorporating, also, “but not limited to” or “without limitation;” (b) the word “day” or “year” means a calendar day or year unless otherwise specified; (c) the word “notice” means notice in writing (whether or not specifically stated) and shall include notices, consents, approvals and other communications contemplated under this Agreement; (d) the words “hereof,” “herein,” “hereby” and derivative or similar words refer to this Agreement (including any Attachments); (e) the word “or” shall be construed as the inclusive meaning identified with the phrase “and/or;”(f) provisions that require that a Party, or the Parties hereunder “agree,” “consent” or “approve” or the like shall require that such agreement, consent or approval be specific and in writing, whether by written agreement, letter or otherwise; (g) words of any gender include the other gender; (h) words using the singular or plural number also include the plural or singular number, respectively; (i) references to any specific law, rule or regulation, or article, section or other division thereof, shall be deemed to include the then-current amendments thereto or any replacement law, rule or regulation thereof; and (j) neither Party or its Affiliates shall be deemed to be acting “on behalf of” or “under authority of” the other Party.

ARTICLE 2
DEVELOPMENT

2.1 Work under Original Agreement. Under the Original Agreement, the Parties had engaged in a **[***]**. For the avoidance of doubt, (a) the **[***]** and all **[***]** are hereby terminated; and (b) all **[***]** will be **[***]** by **[***]**, as provided in the Original Agreement. The Parties acknowledge that Invitae paid to PacBio **[***]** in the amount of $**[***]**. Such **[***]** is non-refundable and will be retained by PacBio. However, in partial consideration of such **[***]**, Invitae will receive credits and discounted prices for products, as provided in Article 3 below. Invitae will not be required to pay any additional **[***]** under this Agreement or the Original Agreement.

2.2 **[***]**. PacBio intends to **[***]**, in its discretion and pursuant to its own internal processes and programs; provided, however, that PacBio is under no obligation to **[***]**, and failure to do so will not constitute a breach of this Agreement. Invitae understands and agrees that **[***]** is **[***]**, and nothing in this Agreement is, or should be construed as, a representation, warranty, or covenant that **[***]**, that **[***]**, or that **[***]**.

2.3 **[***]** Updates. At least **[***]** a calendar year during the Term, **[***]** will present an update to **[***]** senior executives (and/or its delegates or other Invitae personnel on a need to know basis) regarding **[***]**. All information disclosed in such updates is **[***]**'s Confidential Information, and in addition to the requirements of Article 4, may only be shared with **[***]** senior executives (and/or its delegates or other **[***]** personnel on a need to know basis) who have a need to know such Confidential Information for the purposes of **[***]**, **[***]**, and such Confidential Information may be used solely for those purposes. **[***]** will not be entitled to seek monetary damages for any breach of this Section 2.3.

2.4 Feedback. **[***]** may from time to time provide **[***]** concerning the **[***]** (and their related **[***]**, **[***]**, and **[***]**) to **[***]** ("**Feedback**"). **[***]** hereby grants to **[***]** and **[***]** a non-exclusive, perpetual, irrevocable, worldwide, royalty-free, paid-up, sublicensable license to make, have made, import, use, have used, offer for sale, sell, lease, license, and otherwise commercialize and exploit the Feedback and **[***]** that **[***]** the Feedback.

ARTICLE 3
CREDITS AND PRICING DISCOUNTS

3.1 Products Eligible for Credits and Pricing Discounts.

3.1.1 "**[***]**" means the following **[***]** and related **[***]**:

Product name	Part Number	Number Reactions per kit	Reactions for [***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]

If PacBio replaces a product above with a new equivalent product before the Credit Expiration Date, the new equivalent product will replace the original product in the definition of "**[***]**."

For the **[***]**, the equivalent **[***]** and related **[***]** sold by PacBio for use with the **[***]** will be the "**[***]**", and for the **[***]**, the equivalent **[***]** and related **[***]** sold by PacBio for use with the **[***]** will be the "**[***].**" For clarity, **[***]** and **[***]** do not include any **[***]**, or any **[***]**, **[***]**, or **[***]** not equivalent to those listed above for the **[***]**.

3.1.2 "**Covered Products**" means **[***]**, **[***]**, **[***]**, **[***]**, **[***]**, and **[***]**.

3.2 Credits for **[***]** and **[***]**. Invitae will receive **[***]** credits which may be used solely for the purchase of the products specified below from PacBio, as follows (each a "**Credit**" and together the "**Credits**"). The Credits will expire on June 30, 2025 (the "**Credit Expiration Date**").

3.2.1 Subject to, and contingent upon compliance with, the terms and conditions of this Agreement, Invitae will receive a Credit in the amount of $[***] which may be applied against the purchase price of **[***]** and **[***]** before the Credit Expiration Date. **[***]** and **[***]** purchased using this Credit will be purchased at **[***]**. Subject to the amount of Credit remaining at the time of purchase, Invitae may use the Credit to offset up to [***]% of the purchase price for the **[***]** and **[***]**. If Invitae does not have enough remaining Credit to offset the entire purchase price, Invitae will pay the remaining purchase price balance out of pocket.

3.2.2 Subject to, and contingent upon compliance with, the terms and conditions of this Agreement, Invitae will receive a Credit in the amount of $[***] which may be applied against the purchase price of **[***]** and **[***]** before the Credit Expiration Date, as follows. For each purchase of **[***]** using this Credit, the purchase price will be **[***]**; Invitae will pay **[***]** and **[***]** will be deducted from the Credit. For each purchase of **[***]** using this Credit, the purchase price will be [***]; Invitae will pay **[***]** and **[***]** will be deducted from the Credit.

3.3 **[***]**. Following PacBio's **[***]**, subject to, and contingent upon compliance with, the terms and conditions of this Agreement, Invitae may purchase the **[***]** during the Term at **[***]** for each product included in the **[***]** (subject to **[***]** pursuant to the **[***]** described in Section 3.4 below).

3.4 **[***]**. If Invitae uses the entirety of both Credits before the Credit Expiration Date, then subject to, and contingent upon compliance with, the terms and conditions of this Agreement, Invitae will **[***]** during the remainder of the Term as follows. If **[***]**, then **[***]**, provided that this provision will not apply for **[***]**. PacBio will assess the **[***]** on a **[***]** basis, and will issue Invitae with **[***]** if the **[***]** has been triggered during the preceding **[***]**.

3.5 Reserved.

3.6 Adjustments to Purchase Prices. Upon written notice by PacBio (including by providing an updated quotation) or upon the written request of Invitae the purchase prices set forth in this Article 3 that are dependent upon **[***]** may be adjusted no more than **[***]** per year to reflect the change (up or down) in **[***]** in respect of each applicable product.

3.7 Terms and Conditions. The **[***]** will be labeled "for research use only" and, unless the Parties agree otherwise in a supply agreement, will be sold pursuant to the then-current PacBio standard terms and conditions of sale (available as of the Effective Date at https://www.pacb.com/legal-and-trademarks/terms-and-conditions-of-sale/) ("Online Terms and Conditions"). Nothing in this Agreement may be construed as a representation, warranty, or covenant that any PacBio product will be sold for any period of time. Notwithstanding anything to the contrary in the Online Terms and Conditions, in the event of any different, additional or inconsistent terms between this Agreement and the Online Terms and Conditions, this Agreement shall control.

3.8 Credits and Prices are Non-Transferable. The Credits and prices set forth above are personal and non-transferable, and may only be used by Invitae and its Affiliates to purchase products for its own use subject to the terms and conditions of this Agreement.

3.9 Concurrent **[***]**. Concurrent with the execution of this Agreement, Invitae will **[***]**. Invitae will **[***]**. This **[***]** will be made pursuant to **[***]** and the **[***]** (and any additional **[***]** will not apply). For clarity, the **[***]** and **[***]** do not apply toward **[***]**, and Invitae will **[***]** within **[***]** of **[***]**.

ARTICLE 4
CONFIDENTIALITY, PUBLIC ANNOUNCEMENTS

4.1 Confidential Information. Except as expressly provided herein, the Parties agree that, for the term of this Agreement and **[***]** years thereafter, the Receiving Party (as defined below) shall keep confidential and not publish or otherwise disclose and shall not use for any purpose Confidential Information of the Disclosing Party except in connection with the obligations and the rights of the Receiving Party under this Agreement or otherwise as expressly permitted hereunder or with the prior written consent of the Disclosing Party. Each Receiving Party agrees to treat the applicable Disclosing Party's Confidential Information with the same degree of care such Receiving Party uses to protect such Receiving Party's own confidential information, but in no event with less than a reasonable degree of care. "**Confidential Information**" means all confidential or proprietary information disclosed by the disclosing Party or any of its Affiliates (the "**Disclosing Party**") to the receiving Party or any of its Affiliates ("**Receiving Party**"), whether made available orally, in writing, or in electronic form, including information comprising or relating to concepts, discoveries, inventions, know how, data, designs, formulae, financial information, product roadmaps, operational information, specifications, processes, techniques, sequences, or models.

4.2 Exclusions. Notwithstanding the foregoing, Confidential Information shall not include information that, in each case as demonstrated by written documentation:

4.2.1 was already known to the Receiving Party, other than under an obligation of confidentiality to the Disclosing Party, at the time of disclosure;

4.2.2 was generally available to the public or otherwise part of the public domain at the time of its disclosure to the Receiving Party;

4.2.3 became generally available to the public or otherwise part of the public domain after its disclosure and other than through any act or omission of the Receiving Party in breach of this Agreement;

4.2.4 was subsequently lawfully disclosed to the Receiving Party by a Third Party; or

4.2.5 was developed by the Receiving Party without reference to any information or materials disclosed by the Disclosing Party.

4.3 Permitted Disclosures. Notwithstanding the provisions of Section 4.1, each Party hereto may disclose the other Party's Confidential Information to the extent such disclosure is reasonably necessary for complying with applicable law or governmental regulations, or submitting information to tax or other governmental authorities, provided that if a Party is required to make any such disclosure of the other Party's Confidential Information, to the extent it may legally do so, it will give reasonable advance notice to such other Party of such disclosure and, save to the extent inappropriate or unavailable, will use its reasonable efforts to secure confidential

treatment of such information prior to its disclosure (whether through protective orders or otherwise).

4.4 Ownership. The Receiving Party hereby acknowledges that, as between the Parties, the Disclosing Party is the owner or licensee of its Confidential Information, including originals and copies of all notes, reports and other documents prepared by the Receiving Party to the extent including such Confidential Information. Confidential Information shall not be reproduced by the Receiving Party in any form except as required to perform the obligations or to exercise the rights of the Receiving Party under this Agreement. Any reproduction of any Confidential Information shall remain the property of the Disclosing Party and shall contain any and all confidential or proprietary notices or legends which appear on the original, unless otherwise authorized in writing by the Disclosing Party. The Receiving Party does not and will not acquire by implication or otherwise any right in, title to or license in respect of the Confidential Information disclosed to it by the Disclosing Party, except as otherwise expressly set forth in this Agreement.

4.5 Return of Confidential Information. Upon receipt of a written request from the Disclosing Party following the expiration or termination of this Agreement, the Receiving Party will, at the election of the Disclosing Party, either destroy (with written confirmation thereof delivered to the Disclosing Party) or deliver to the Disclosing Party all documents and other materials provided by the Disclosing Party to the Receiving Party (or any reproductions thereof) constituting the Disclosing Party's Confidential Information.

4.6 Independent Development and Residuals. Notwithstanding any provision in this Agreement to the contrary: (a) this Agreement and the terms of confidentiality and nonuse hereunder shall not be construed to limit either Party's right to independently develop or acquire products or technology, including products or technology that are similar to, or that compete with, the **[***]**; and (b) the Receiving Party shall be free to use for any purpose the residuals resulting from access to or work with the Disclosing Party's Confidential Information. The term "residuals" means information in non-tangible form that may be retained in the unaided memories of individuals who have had rightful access to Confidential Information under this Agreement, including ideas, concepts, know-how or techniques contained therein. No Party shall have any obligation to limit or restrict the assignment or reassignment of such individuals or to pay royalties for any work resulting from the use of residuals. However, the provisions of this Section 4.6 shall not be deemed to grant to any Party a license under the other Party's copyrights or patents.

4.7 Prior CDA. This Agreement supersedes the Confidentiality Agreement between the Parties dated as of February 18, 2020 (the "**Prior CDA**") with respect to information disclosed thereunder. All information or materials disclosed or provided by a Party or its Affiliates to the other Party (or its representatives) under the Prior CDA shall be deemed Confidential Information of such Party (subject to the exceptions set forth herein).

4.8 Public Announcements; Confidential Terms. Neither Party shall disclose to any Third Party, or issue any other public announcement, press release, advertisement, promotion or other public disclosure regarding the terms of this Agreement or use the other Party's name or the name of any Affiliate of the other Party, without the other Party's prior written consent, except

any such disclosure that is required by applicable law or the rules of any securities exchange on which the securities of the disclosing Party are listed. In the event a Party determines in good faith that it is required by applicable law or the rules of any securities exchange on which its securities are listed to make a public disclosure regarding the terms of this Agreement, such Party shall submit the proposed disclosure in writing (including, as applicable, the proposed redacted form of this Agreement) to the other Party as far in advance as reasonably practicable (and in no event less than five (5) Business Days prior to the anticipated date of disclosure) so as to provide a reasonable opportunity for the other Party to comment thereon. The Party making such disclosure shall use good faith efforts to incorporate the reviewing Party's reasonable comments and, as applicable, seek confidential treatment for the redacted terms of this Agreement to the extent such confidential treatment is applicable and reasonably available. Each Party shall be responsible for its own legal and other external costs in connection with any such disclosure. Neither Party shall be required to seek the permission of the other Party to repeat any information regarding the terms of this Agreement or any amendment hereto that has already been publicly disclosed by such Party, or by the other Party, in accordance with this Section 4.8, provided that such information remains accurate as of such time and provided the frequency and form of such disclosure are reasonable.

ARTICLE 5
REPRESENTATIONS AND WARRANTIES

5.1 Mutual Warranties. Each Party represents, warrants and covenants to the other Party that:

5.1.1 it has and shall continue to maintain the full right and authority to enter into and perform this Agreement; and

5.1.2 it is not and shall not be party to any agreement that conflicts with its representations, warranties, or obligations under this Agreement.

5.2 PacBio Warranties. PacBio represents, warrants and covenants to Invitae that:

5.2.1 it has obtained and shall continue to maintain all licenses, authorizations, approvals, consents, or permits required by applicable law to conduct its business generally and to perform its obligations under this Agreement.

ARTICLE 6
INDEMNIFICATION, LIMITATION OF LIABILITY

6.1 Indemnification of **[***]**. **[***]**shall defend each of **[***]** and its directors, officers, and employees and the successors and assigns of any of the foregoing (each **[***] Indemnitee**"), and indemnify and hold harmless each **[***]** Indemnitee from and against any and all claims, actions, proceedings, liabilities, damages, settlements, penalties, fines, costs or expenses (including, without limitation, reasonable attorneys' fees and other expenses of litigation) in each

case brought by a Third Party against any **[***]** Indemnitee arising out of the following (each **[***] Claim**"): (i) any breach by **[***]** of any of its representations, warranties or covenants under this Agreement; (ii) any failure of **[***]** or any of its Affiliates or designees (including any of the employees, agents, or consultants of **[***]** or any of its Affiliates or designees) to comply with any applicable federal, state, local or foreign laws, regulations, or codes in the performance of the obligations of **[***]** under this Agreement;. **[***]** shall have no obligation to any **[***]** Indemnitee under this Section 6.1 to the extent an **[***]** Claim results from the breach of this Agreement, gross negligence or knowing and willful misconduct of the **[***]** Indemnitee.

6.2 Indemnification of **[***]**. **[***]**shall defend each of **[***]**and its directors, officers, and employees and the successors and assigns of any of the foregoing (each **[***] Indemnitee**"), and indemnify and hold harmless each **[***]** Indemnitee from and against any and all claims, actions, proceedings, liabilities, damages, settlements, penalties, fines, costs or expenses (including, without limitation, reasonable attorneys' fees and other expenses of litigation) in each case brought by a Third Party against any **[***]** Indemnitee arising out any breach by Invitae of any of its representations, warranties or covenants under this Agreement (**[***]** Claim"); provided that **[***]** shall have no obligation to any **[***]** Indemnitee under this Section 6.2 to the extent a **[***]** Claim results from the breach of this Agreement, gross negligence or knowing and willful misconduct of the **[***]** Indemnitee.

6.3 Procedure. A party (the "**Indemnitee**") that intends to require indemnification under this Article 6 shall promptly notify the other party (the "**Indemnitor**") in writing of any **[***]** Claim or **[***]** Claim (any, a "**Claim**") in respect of which the Indemnitee intends to require such indemnification in accordance with Article 6; provided, however, that the failure to give such notice shall not relive the Indemnitor of its obligations hereunder except to the extent that such Indemnitor is materially prejudiced by such failure. The Indemnitor will have the sole right to defend, negotiate, and settle such claims. The Indemnitee will be entitled to participate in the defense of such matter and to employ counsel at its expense to assist in such defense; provided, however, that the Indemnitor will have final decision-making authority regarding all aspects of the defense of the claim. The Indemnitee will provide the Indemnitor with such information and assistance as the Indemnitor may reasonably request, at the expense of the Indemnitor. Neither party will be responsible nor bound by any settlement of any claim or suit made without its prior written consent; provided, however, that the Indemnitee will not unreasonably withhold or delay such consent. It is understood that only **[***]** may claim indemnity under this Article 6 (on its own behalf or on behalf of an **[***]** Indemnitee), and other **[***]** Indemnitees may not directly claim indemnity hereunder. Likewise, it is understood that only **[***]** may claim indemnity under this Article 6 (on its own behalf or on behalf of a **[***]** Indemnitee), and other **[***]** Indemnitees may not directly claim indemnity hereunder.

6.4 Mitigation of Loss; Reliance. Each Indemnitee will take, and will procure that its Affiliates take, all such reasonable steps and action as are necessary (or, as the Indemnitor may reasonably require, at the Indemnitor's expense) in order to mitigate any Claims (or potential losses or damages) under this Article 6. Nothing in this Agreement shall or shall be deemed to relieve any Party of any common law or other duty to mitigate any losses incurred by it. The right of an Indemnitee to indemnification or to assert or recover on any Claim shall not be affected by any

investigation conducted with respect to matters relating thereto, or any knowledge acquired or capable of being acquired, at any time, whether before or after the execution and delivery of this Agreement, including with respect to the accuracy of or compliance with any of the representations, warranties, covenants, or agreements set forth in this Agreement. The waiver of any condition based on the accuracy of any representation or warranty, or on the performance of or compliance with any covenant or agreement, shall not affect the right to indemnification or other remedy based on such representation, warranty, covenant or agreement.

6.5 Special, Indirect, and Other Losses. NEITHER PARTY NOR ANY OF ITS AFFILIATES SHALL BE LIABLE IN CONTRACT, TORT, NEGLIGENCE, BREACH OF STATUTORY DUTY, OR OTHERWISE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES OR FOR ANY LOSS OF PROFITS SUFFERED BY THE OTHER PARTY. NOTWITHSTANDING THE FOREGOING, NOTHING IN THIS SECTION 6.5 IS INTENDED TO OR SHALL LIMIT OR RESTRICT: (A) THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF ANY PARTY UNDER SECTION 6.1 OR SECTION 6.2, AS APPLICABLE; OR (B) ANY DAMAGES AVAILABLE FOR A PARTY'S BREACH OF ITS CONFIDENTIALITY OBLIGATIONS IN ARTICLE 4.

ARTICLE 7
TERM AND TERMINATION

7.1 Term. Unless otherwise agreed in writing or terminated in accordance with this Article 7, the term of this Agreement shall commence on the Original Effective Date and shall continue in full force and effect until **[***]** (the "**Term**").

7.2 Termination for Cause. Subject to the requirements of this Section 7.2, either Party may terminate this Agreement in the event the other Party is in material breach of any material obligation hereunder. In the event of a material breach, the non-breaching Party shall give written notice to the breaching Party specifying the claimed particulars of such breach and, in the event such material breach is not cured within **[***]** after the breaching Party's receipt of such notice, the non-breaching Party shall have the right thereafter to terminate this Agreement immediately by giving written notice referencing this Section 7.2 to the breaching Party to such effect; provided, that if such breach is reasonably capable of being cured but cannot be cured within such **[***]** period and the breaching Party initiates actions to cure such breach within such period and thereafter diligently pursues such actions, the breaching Party shall have such additional period as is reasonable in the circumstances to cure such breach. In the event that dispute resolution procedures have commenced in accordance with Section 8.2 with respect to any alleged breach hereunder, no purported termination of this Agreement pursuant to this Section 7.2 shall take effect until the resolution of such procedure. Any termination by any Party under this Section 7.2 and the effects of termination provided herein shall be without prejudice to any damages or other legal or equitable remedies to which it may be entitled.

7.3 Accrued Liability. Except as expressly set forth herein, termination or expiration of this Agreement for any reason shall not release either Party hereto from any liability which at the time of such termination or expiration has already accrued to the other Party prior to such time. Such termination or expiration will not relieve a Party from accrued payment obligations or from other obligations which are expressly indicated in this Agreement to survive termination or expiration of this Agreement.

7.4 Survival. The following provisions shall survive the expiration or termination of this Agreement for any reason: Article 1, Section 2.4, Article 4, Article 6, Section 7.5, and Article 8.

7.5 Termination Not Sole Remedy. Termination is not the sole remedy under this Agreement and, whether or not termination is effected and notwithstanding anything contained in this Agreement to the contrary, all other remedies will remain available except as agreed to otherwise herein.

ARTICLE 8
MISCELLANEOUS

8.1 Governing Law. This Agreement and any dispute arising from the performance or breach hereof shall be governed by and construed and enforced in accordance with, the laws of the State of California, United States, without reference to conflicts of laws principles and without regard to the 1980 Convention on the International Sale of Goods.

8.2 Dispute Resolution. It is the Parties' objective to establish procedures to facilitate the resolution of all disputes or controversies arising out of, in relation to, or in connection with this Agreement, or the validity, enforceability, construction, performance or breach hereof (each a "**Dispute**"), in an expedient manner by mutual cooperation and without resort to arbitration. Unless otherwise expressly provided in this Agreement, all Disputes will be subject to this Section 8.2. Either Party may initiate the dispute resolution procedure of this Section 8.2 by giving the other Party written notice of any Dispute in accordance with the terms of Section 8.6 (a "**Notice of Dispute**").

8.2.1 Senior Executives. If the Parties are unable to resolve any Dispute between them, either Party may, by delivery of a Notice of Dispute to the other, have such Dispute referred to the Chief Executive Officers of the Parties for attempted resolution by good faith negotiations for a period of fifteen (15) Business Days after such Notice of Dispute is received. Unless otherwise mutually agreed, within five (5) Business Days of delivery of the Notice of Dispute, the Chief Executive Officers of the Parties shall meet in person, or by teleconference, at a mutually agreeable time and place, and thereafter as often as they reasonably deem necessary, to attempt in good faith to resolve the Dispute. If the Parties are unable to resolve such Dispute in accordance with the aforementioned procedure or within such fifteen (15) Business Day period (the last day of such time period, the "**Escalation to Mediation Date**"), either Party may initiate mediation under Section 8.2.2.

8.2.2 Mediation. Subject to Section 8.2.1, the Parties may, at any time after the Escalation to Mediation Date, submit the Dispute at issue to any mutually agreed upon mediation service for mediation by providing to the mediation service a joint, written request for mediation, setting forth the subject of the Dispute and the relief requested. The Parties shall cooperate with one another in selecting a mediation service, and shall cooperate with the mediation service and with one another in selecting a neutral mediator and in scheduling the mediation proceedings. The Parties acknowledge and agree that they will attempt in good faith to select a mediator with experience relevant to the Dispute (including, for example, that the mediator need not be a retired judge or lawyer, but could, as applicable, be someone with relevant business, industry or professional experience). The Parties covenant that they will use commercially reasonable efforts toward engagement in the mediation. The Parties agree that the mediator's fees and expenses and the costs incidental to the mediation will be shared equally between the Parties. The Parties further agree that all offers, promises, conduct, and statements, whether oral or written, made in the course of the discussions of the Chief Executive Officers of the Parties pursuant to Section 8.2.1 or of the mediation by any of the Parties, their agents, employees, experts, and attorneys, and by the mediator and any employees of the mediation service, are confidential, privileged, and inadmissible for any purpose, including impeachment, in any litigation, arbitration or other proceeding involving the Parties, provided that evidence that is otherwise admissible or discoverable shall not be rendered inadmissible or non-discoverable as a result of its use in the mediation.

8.2.3 Arbitration. If the Parties cannot resolve any Dispute for any reason, including the failure of either Party to agree to enter into mediation or agree to any settlement proposed by the mediator, within twenty (20) Business Days after the Escalation to Mediation Date, either Party may commence binding arbitration in accordance with this Section 8.2.3. Subject to Section 8.2.1 and Section 8.2.2, Invitae and PacBio agree that any Dispute shall be settled by binding arbitration administered by the American Arbitration Association in San Francisco, California (or virtually as the Parties agree), under the then-current Commercial or other Arbitration Rules by a single arbitrator agreeable to both Parties. If the Parties cannot agree on an arbitrator within five (5) Business Days after the commencement of the arbitration, each Party shall select an arbitrator who is not (and has not been within the past ten (10) years) employed by or a consultant to either Party or any of its Affiliates, and the two (2) selected arbitrators shall select a third (3rd) arbitrator who is not (and has not been within the past ten (10) years) employed by or a consultant to either Party or any of its Affiliates. Any arbitrator(s) chosen hereunder shall have reasonable educational training and industry experience relevant to the particular Dispute (including, for example, that an arbitrator need not be a retired judge or lawyer, but could, as applicable, be someone with relevant business, industry or professional experience). The arbitrator(s) shall determine what discovery will be permitted, based on the principle of limiting the cost and time which the Parties must expend on discovery; provided, the arbitrator(s) shall permit such discovery as deemed necessary to achieve an equitable resolution of the Dispute. The decision and/or award rendered by the arbitrator(s) shall be written, final and non-appealable and may be entered in any court of competent jurisdiction. The Parties agree that, any provision of applicable law notwithstanding, they will not request, and the arbitrator shall have no authority to award, punitive or exemplary damages against any Party (except to the extent of any Party's liability to a Third Party for such damages). The costs of any arbitration, including administrative

fees and fees of the arbitrator(s), shall be borne by the losing Party, if identified, and otherwise shared equally between the Parties. Additionally, the losing Party, if identified, shall reimburse the other Party for its costs and expenses incurred in connection with the arbitration (including attorneys' and expert fees and expenses). The arbitral proceedings and all pleadings shall be the Confidential Information of both Parties; provided, however, the foregoing shall not change either Party's rights or obligations with respect to any information that was the Confidential Information of a Party prior to its introduction into the arbitration. Any decision by the arbitrator(s) shall not be interpreted as an admission against interest of any Party and shall not be admissible as evidence in any subsequent court action with a Third Party. Notwithstanding any provision of this Section 8.2 to the contrary, either Party may initiate and engage in court proceedings in a court of competent jurisdiction at any time: (a) for breach of the other Party's confidentiality obligations; (b) to enforce any arbitration award between the Parties; or (c) for claims for equitable relief (including any preliminary injunction or temporary restraining order).

8.3 Force Majeure. In the event that either Party is prevented from performing its obligations under this Agreement as a result of any contingency beyond its reasonable control ("**Force Majeure**"), including any actions of governmental authorities or agencies, war, hostilities between nations, civil commotions, riots, national industry strikes, lockouts, sabotage, shortages in supplies, energy shortages, epidemics, pandemics, fire, floods, and acts of nature such as typhoons, hurricanes, earthquakes, or tsunamis, the Party so affected shall not be responsible to the other Party for any delay or failure of performance of its obligations hereunder for so long as Force Majeure prevents such performance. In the event of Force Majeure, the Party immediately affected thereby shall give prompt written notice to the other Party specifying the Force Majeure complained of, and shall use commercially reasonable efforts to resume performance of its obligations as promptly as possible.

8.4 No Implied Obligations. Nothing in this Agreement shall be deemed to create any implied obligations of either Party. No failure on the part of PacBio or Invitae to exercise and no delay in exercising any right under this Agreement, or provided by statute or at law or in equity or otherwise, shall impair, prejudice or constitute a waiver of any such right, nor shall any partial exercise of any such right preclude any other or further exercise thereof or the exercise of any other right.

8.5 Independent Contractors. The relationship between the Parties is that of independent contractors. Nothing contained in this Agreement shall be construed as creating any agency, partnership, joint venture, or other form of joint enterprise, employment, or fiduciary relationship between the Parties, and neither party shall have authority to contract for or bind the other Party in any manner whatsoever. PacBio is responsible for, and will withhold and/or pay, any and all applicable federal, state or local taxes, payroll taxes, workers' compensation contributions, unemployment insurance contributions, or other payroll deductions from the compensation of employees and other personnel of PacBio or its Affiliates or designees and no such employees or other personnel will be entitled to any benefits applicable to or available to employees of Invitae.

8.6 Notices. All notices, requests and other communications hereunder shall be in writing and shall be (i) personally delivered or (ii) sent by registered or certified mail, return receipt requested, postage prepaid, (iii) overnight courier service or (iv) or emailed, receipt confirmed, in each case to the respective address specified below, or such other address as may be specified in writing to the other Party:

Invitae: Invitae Corporation.
1400 16th Street
San Francisco, CA 94103
Attn: General Counsel
Email: **[***]**

PacBio: Pacific Biosciences of California, Inc.
1305 O'Brien Drive
Menlo Park, CA 94025
Attn: General Counsel

with a copy to: **[***]**

8.7 Assignment. Neither Party may assign this Agreement or any of its rights or obligations hereunder without the other Party's prior written consent; provided that each Party may assign without the other Party's consent (a) its rights or obligations under this Agreement to one (1) or more of its Affiliates or (b) this Agreement in its entirety to a successor to all or substantially all of the business or assets of such Party to which this Agreement relates whether by merger, acquisition (or stock or assets) or otherwise, provided that (x) any such successor (whether clause (a) or (b)) agrees in writing to be bound by the terms and conditions of this Agreement. Any permitted assignee will assume all obligations of its assignor under this Agreement. Any assignment shall not relieve the assignor of any of its obligations under this Agreement. Any attempted assignment in contravention of the foregoing will be null and void. Subject to the foregoing and the other terms of this Agreement, this Agreement will be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns.

8.8 Modification. No amendment or modification of any provision of this Agreement shall be effective unless in writing signed by both Parties. No provision of this Agreement shall be varied, contradicted or explained by any oral agreement, course of dealing or performance or any other matter not set forth in writing and signed by both Parties.

8.9 Severability. If any provision hereof should be held invalid, illegal or unenforceable in any jurisdiction, the Parties shall negotiate in good faith a valid, legal and enforceable substitute provision that most nearly reflects the original intent of the Parties and all other provisions hereof shall remain in full force and effect in such jurisdiction and shall be liberally construed in order to carry out the intentions of the Parties hereto as nearly as may be possible. Such invalidity, illegality or unenforceability shall not affect the validity, legality or enforceability of such provision in any other jurisdiction.

8.10 Entire Agreement. This Agreement together with the Exhibits hereto constitute the entire agreement, both written or oral, with respect to the subject matter hereof, and supersede all prior or contemporaneous understandings or agreements, whether written or oral, between PacBio and Invitae with respect to the subject matter hereof.

8.11 Counterparts. This Agreement may be executed and delivered in two counterparts, each of which shall be deemed an original, and all of which together, shall constitute one and the same instrument.

[Signature page follows]

IN WITNESS WHEREOF, each Party has caused this Agreement to be duly executed and delivered in duplicate originals as of the Effective Date.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.	INVITAE CORPORATION
By: /s/ Mark Van Oene	By: /s/ Sean George
Name: Mark Van Oene	Name: Sean George
Title: Chief Operating Officer	Title: Chief Executive Officer

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: August 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: August 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 June 30, 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 June 30, 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: August 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 June 30, 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 June 30, 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: August 5, 2022

/s/ Susan G. Kim

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