

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

Form 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2020

Or

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____
Commission File Number 001-34899

Pacific Biosciences of California, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

1305 O'Brien Drive
Menlo Park, CA 94025
(Address of principal executive offices)

16-1590339
(I.R.S. Employer
Identification No.)

94025
(Zip Code)

(Registrant's telephone number, including area code)
(650) 521-8000

Securities registered pursuant to Section 12(b) of the Act:
Trading Symbol(s)

PACB

Name of each exchange on which registered
The NASDAQ Stock Market LLC

Title of each class
Common Stock, par value \$0.001 per share

Securities registered pursuant to Section 12(g) of the Act:
None

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

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

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

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

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

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. Yes No

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

Aggregate market value of registrant's common stock held by non-affiliates of the registrant on June 30, 2020, based upon the closing price of Common Stock on such date as reported by NASDAQ Global Select Market, was approximately \$498,891,052. Shares of voting stock held by each officer and director have been excluded in that such persons may be deemed to be affiliates. This assumption regarding affiliate status is not necessarily a conclusive determination for other purposes.

Number of shares outstanding of the issuer's common stock as of January 31, 2021: 193,102,689

DOCUMENTS INCORPORATED BY REFERENCE:

Portions of the registrant's definitive Proxy Statement relating to its 2021 Annual Meeting of Stockholders to be held on June 16, 2021 are incorporated by reference into Part III of this Annual Report on Form 10-K where indicated. Such Proxy Statement will be filed with the U.S. Securities and Exchange Commission within 120 days after the end of the fiscal year to which this report relates.

Pacific Biosciences of California, Inc.
Annual Report on Form 10-K

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Discussions under the captions “Business,” “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” contain or may contain forward-looking statements that are based on the beliefs and assumptions of the management of Pacific Biosciences of California, Inc. (the “Company,” “we,” “us,” or “our”) and on information currently available to our management. The statements contained in this Annual Report on Form 10-K that are not purely historical are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and include, but are not limited to, the attributes and sequencing advantages of SMRT® technology, our current and future products, market opportunities, strategic and commercial plans, including strategy for our business and related financing, expectations regarding the conversion of backlog to revenue and the pricing and gross margin for products, manufacturing plans including developing and scaling of manufacturing and delivery of our products, research and development plans, product development including, among other things, statements relating to future uses, quality or performance of, or benefits of using, products or technologies, updates or improvements of our products, intentions regarding seeking regulatory approval for our products, competition, expectations regarding unrecognized income tax benefits, expectations regarding the impact of an increase in market rates on the value of our investment portfolio, the sufficiency of cash, cash equivalents and investments to fund projected operating requirements, the effects of recent accounting pronouncements on our financial statements and other future events. Such statements may be signified by terms such as “anticipates,” “believes,” “could,” “estimates,” “expects,” “intends,” “may,” “plans,” “potential,” “predicts,” “projects,” “seeks,” “should,” “target,” “will,” “would” or similar expressions and the negatives of those terms. Forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed under the heading “Risk Factors” in this report and in other documents we file with the Securities and Exchange Commission (“SEC”). Given these risks and uncertainties, you should not place undue reliance on forward-looking statements. Also, forward-looking statements represent management’s beliefs and assumptions as of the date of this report. Except as required by law, we assume no obligation to update forward-looking statements publicly, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future.

ITEM 1. BUSINESS

Overview

We develop solutions that allow scientists to fundamentally transform how data from living systems are acquired, processed, and interpreted. Our products provide the most accurate and complete views of the genetic code of all living things, empowering scientists to improve the human condition – from curing diseases, to feeding a hungry world, to conserving our planet's ecosystems.

Based on our novel Single Molecule, Real-Time (SMRT®) sequencing technology, our products enable: de novo genome assembly to finish genomes in order to more fully identify, annotate and decipher genomic structures; full-length transcript analysis to improve annotations in reference genomes, characterize alternatively spliced isoforms in important gene families, and find novel genes; targeted sequencing to more comprehensively characterize genetic variations; and real-time kinetic information for epigenome characterization. Our technology provides highly accurate, long reads, otherwise referred to as HiFi reads, with uniform coverage and the ability to simultaneously detect epigenetic changes. PacBio® sequencing systems, including associated consumables and software, provide a simple and fast end-to-end workflow for SMRT sequencing.

Our current products include our Sequel II and Sequel IIE instruments, which when used together with our SMRT Cell 8M, are capable of sequencing up to approximately eight million DNA molecules simultaneously, and our previous generation Sequel instrument, which when used together with our SMRT Cell 1M, are capable of sequencing up to approximately one million DNA molecules simultaneously.

Our customers and our scientific collaborators have published over 8000 peer-reviewed articles in journals including Nature, Science, Cell, PNAS and The New England Journal of Medicine highlighting the power and applications of SMRT sequencing in projects such as finishing genomes, structural variation discovery, isoform transcriptome characterization, rare mutation discovery and the identification of chemical modifications of DNA related to virulence and pathogenicity. Our research and development efforts are focused on developing new products and further improving our existing products including continuing chemistry and sample preparation improvements to increase throughput and expand our supported applications.

Pacific Biosciences of California, Inc., formerly Nanofluidics, Inc., was incorporated in the State of Delaware in 2000. Our executive offices are located at 1305 O'Brien Drive, Menlo Park, California 94025, and our telephone number is (650) 521-8000.

The Underlying Science

Genetic inheritance in living systems is conveyed through a naturally occurring information storage system known as deoxyribonucleic acid, or DNA. DNA stores information in linear chains of the chemical bases adenine, cytosine, guanine and thymine, represented by the symbols A, C, G and T respectively.

In humans, the human genome is comprised of approximately three billion DNA base-pairs, which, are divided into 23 chromosomes ranging in size from 50 million to 250 million bases. Within these chromosomes are approximately 23,000 smaller regions, called genes, which contain the blueprints for protein production. The proteins synthesized from these blueprints essentially underlie the operation of all biological systems.

The first few whole-genome sequencing studies of disease have shown that rare mutations play a critical role in human disease, which has contributed to the burgeoning field of genomics. Since then, recent discoveries have highlighted additional complexities in the building blocks of DNA and ribonucleic acid, or RNA, including the presence of modified bases, the discovery of new modified bases, and the processing of RNA, molecules after such molecules are transcribed from the genome, thereby affecting the synthesis of proteins.

Recent advances in our understanding of biological complexity have highlighted the need for advanced tools, such as our Sequel® System, Sequel II System, and Sequel IIE System, to study DNA, RNA, and proteins. Incremental technological advances in nucleic acid sequencing have provided novel insights into the structure and function of the genome. With our technology, we hope to help scientists to one day fully characterize genomes in both humans and other living organisms.

Evolution of Sequencing

In order to understand the limitations of current nucleic acid sequencing technologies, it is important to understand the sequencing process. This process consists of three phases: sample preparation, physical sequencing, and analysis. In the sample preparation phase, the target genome is broken into multiple small fragments and, depending on the amount of sample DNA available, these fragments may be copied multiple times through a process known as amplification, using a variety of molecular methods. In the physical sequencing phase, the individual bases in each fragment are identified in order, creating individual reads. The number of individual bases identified contiguously is defined as read length. In the analysis phase, bioinformatics software is used to align overlapping reads, which allows the original genome to be assembled into contiguous sequence. The longer the read length, the easier it is to accurately assemble the genome.

Sanger Sequencing

The first automated sequencing methodology, often referred to as "Sanger sequencing," was developed by Frederick Sanger in 1977. With this technology, during sample preparation, scientists first make different sized fragments of DNA each starting from the same location. Each fragment ends with a particular base that is labeled with one of four fluorescent dyes corresponding to that particular

base. Then all of the fragments are distributed in order of their length by driving them through a gel. Information regarding the last base is used to determine the original sequence. Under standard conditions, this method results in a read length that is approximately 700 bases on average, but may be extended to 1,000 bases. These are relatively long read lengths compared with many next-generation sequencing methods. However, Sanger sequencing is limited by the small amounts of data that can be processed per unit of time, referred to as throughput.

Short-read Sequencing

Several commercial DNA sequencing tools emerged in 2005 in response to the low throughput of Sanger sequencing. Now commonly referred to as “short-read sequencing”, these methods achieve much higher throughput by sequencing a large number of DNA molecules in parallel, but with the tradeoff of shorter read lengths.

In most short-read sequencing methodologies, tens of thousands of identical strands are anchored to a given location to be read in a process consisting of successive flushing and scanning operations. The “flush and scan” sequencing process involves sequentially flushing in reagents, such as labeled nucleotides, incorporating nucleotides into the DNA strands, stopping the incorporation reaction, washing out the excess reagent, scanning to identify the incorporated base and finally treating that base so that the strand is ready for the next “flush and scan” cycle. This cycle is repeated until the reaction is no longer viable.

Due to the large number of flushing, scanning and washing cycles required, the time to result for short-read sequencing methods can be longer, sometimes taking days. This repetitive process also limits the average read length produced by most of these systems under standard sequencing conditions to approximately 35 to 600 bases.

The short-read sequencing technologies require a large number of DNA molecules during the sequencing process. To generate enough DNA molecules, a copying method called PCR amplification is required during the sample preparation phase. This amplification process can introduce errors known as amplification bias. The effect of this bias is that resulting copies are not uniformly representative of the original template DNA. In cases where the original template DNA contains regions of relatively high G-C content or relatively high A-T content, the PCR amplification process tends to under-represent these regions. As a result, these regions, which may contain entire genes, can be completely missed.

In summary, while short-read sequencing methods can offer very high throughput and low cost per identified base, their disadvantages can include limited read length, variation in sequence coverage with regard to representation bias and accuracy, dependence on amplification, long time to result, and/or a need for many samples to justify machine operation.

The PacBio Solution — Single Molecule, Real-Time Technology

We have developed our SMRT technology, which enables single molecule, real-time detection of nucleic acid sequences, to address many of the limitations of previous sequencing technologies. By providing long read lengths, elimination of the dependence on amplification during sample preparation (which can result in amplification bias), very high consensus accuracy, and the ability to detect DNA base modifications, PacBio’s systems can provide more comprehensive and higher quality information of DNA and RNA sequence as well as epigenetic regulation and DNA damage.

Pacific Biosciences’ SMRT Technology

SMRT technology enables the observation of DNA synthesis as it occurs in real time by harnessing the natural process of DNA replication, which in nature is a highly efficient and accurate process actuated by DNA polymerases, enzymes measuring approximately 15 nanometers (nm) in diameter. DNA polymerases attach themselves to a strand of DNA to be replicated, examines the individual base at the point it is attached, and then determines which of four building blocks, or nucleotides, is required to complement that individual base. After determining which nucleotide is required, the polymerases incorporate that nucleotide into the growing strand being produced. After incorporation, the enzyme advances to the next base to be replicated and the process is repeated.

To overcome the challenges inherent in real-time observation of the natural activity of the DNA polymerase, we offer and support four key innovations:

- The SMRT Cell
- Phospholinked nucleotides
- The Sequel, Sequel II, or Sequel IIe instruments
- Circular Consensus Sequencing or “HiFi Reads”

The SMRT Cell

One of the fundamental challenges with observing a single DNA polymerase molecule working in real time is the ability to detect the incorporation of a single nucleotide, taken from a large pool of potential nucleotides, during DNA synthesis. To resolve this problem, we utilize our nanoscale innovation, the zero-mode waveguide, or ZMW.

The ZMWs in our SMRT Cells consist of holes in an opaque layer, measuring only tens of nanometers in diameter forming nanoscale wells. The small size of the ZMW causes the intensity of visible laser light, which has a wavelength of approximately 600nm, to decay exponentially in the ZMW. Therefore, laser light shined into the ZMW from below is blocked from reaching the sequencing

solution above the ZMW, providing selective illumination of only the bottom portion of the nanoscale well. DNA polymerases are anchored to the bottom of the glass surface of the nanoscale wells using proprietary techniques. Nucleotides, each type labeled with a different colored fluorophore, are then flooded above an array of ZMWs at the required concentration. When the labeled nucleotides diffuse into the bottom portion of the nanoscale wells, which contain the anchored DNA polymerases, their fluorescence can be monitored. When the correct nucleotide is detected by the polymerase, it is incorporated into the growing DNA strand in process that takes milliseconds in contrast to simple diffusion which takes microseconds. This difference in time results in higher signal intensity for incorporated versus unincorporated nucleotides, which creates a high signal-to-noise ratio. Thus, the ZMW provides the ability to detect a single incorporation event against the background of fluorescently labeled nucleotides at biologically relevant concentrations. Our DNA sequencing is performed on proprietary SMRT Cells, each having an array of ZMWs. The SMRT Cells for the Sequel System each contain approximately one million ZMWs and the SMRT Cells for the Sequel II or IIE System contain approximately eight million ZMWs. Each ZMW is capable of containing a DNA polymerase molecule bound to a single DNA template. Currently, our immobilization process randomly distributes polymerases into ZMWs across the SMRT Cell, typically resulting in approximately one-third to two-thirds of the ZMWs having a single template.

Phospholinked Nucleotides

Our proprietary phospholinked nucleotides have a fluorescent dye attached to the phosphate chain of the nucleotide rather than to the base. As a natural step in the synthesis process, the phosphate chain is cleaved when the nucleotide is incorporated into the DNA strand. Thus, upon incorporation of a phospholinked nucleotide, the DNA polymerase naturally frees the dye molecule from the nucleotide when it cleaves the phosphate chain. Upon cleaving, the label quickly diffuses away, leaving a natural piece of DNA without evidence of labeling.

The Sequel, Sequel II and Sequel IIE Instruments

The Sequel, Sequel II and Sequel IIE instruments conduct, monitor, and analyze single molecule biochemical reactions in real time. The instruments use extremely sensitive imaging systems to collect the light pulses emitted by fluorescent reagents allowing the observation of biological processes. Computer algorithms are used to translate the information that is captured by the optics system. Using the recorded information, light pulses are converted into either an A, C, G or T base call with associated quality metrics. Once sequencing is started, the real-time data is delivered to the system's primary analysis pipeline, which outputs base identity and quality values, or QVs.

HiFi Reads

We enable our customers to achieve very high accuracy on long, individual DNA fragments using our Circular Consensus Sequencing method, whereby the same DNA fragment is repetitively read to overcome random errors that can occur on each pass. This proprietary method of producing what we call "HiFi reads" differentiates PacBio sequencing from other long-read technologies. Users who generate HiFi reads with PacBio systems can sequence single molecule DNA fragments up to 25,000 base pairs in length with an average accuracy of 99.9%.

SMRT Sequencing Advantages

Sequencing based on our SMRT technology offers the following key benefits:

Longer read lengths

SMRT technology has been demonstrated to produce read lengths that are significantly longer than those of previous sequencing technologies. With reads of tens of kilobases in length, users can assemble complete genomes and sequence full-length transcripts. Long read lengths are an important factor in enabling a comprehensive view of the genome, as they can reveal multiple types of genetic variation such as structural variants.

High accuracy

Users of SMRT technology can achieve very high accuracy due to the attributes of SMRT sequencing, including accurate mapping of long reads, lack of reliance on amplification during sample preparation (which can result in amplification bias), and lower systematic bias. In addition, using PacBio's proprietary Circular Consensus Sequencing method, our customers can generate HiFi reads on single molecule DNA fragments up to 25,000 base pairs in length with an average accuracy of 99.9%. This accuracy provides the information users need to confidently call and detect all types of variants.

More uniformity and less systematic error

The sample preparation step for SMRT sequencing is compatible with but does not require amplification; when amplification is not used during sample preparation, the reads are not subject to amplification bias. Importantly, this allows for uniform identification of all bases present in a DNA sample and uniform sequence coverage. As a result, SMRT sequencing can detect and identify regions and entire genes that may be missed by short-read sequencing technologies. In addition, SMRT sequencing can achieve high accuracy when sequencing through complex and highly repetitive regions, whereas other sequencing methods are unable to resolve such regions, which can often result in poor accuracy.

Ability to observe and capture kinetic information

The ability to observe the activity of a DNA polymerase in real time enables the PacBio RS II, Sequel, and Sequel II Systems to collect, measure and assess the dynamics and timing of nucleotides being added to a growing DNA strand, referred to as kinetics. It is well established in the scientific community that chemical modification of DNA such as the addition of a methyl group, known as methylation, can alter the biological activity of the affected nucleotide. The Sequel and Sequel II Systems detect changes in kinetics automatically by capturing and recording changes in the duration of, and time period between, each of the fluorescent pulses during a typical sequencing analysis. Integrated software can then translate these kinetic signatures into uniquely characterized modified bases such as 6-mA, 4-mC and 5-mC. Other sequencing systems, which rely on a sample preparation amplification step or are limited by signal resolution, are unable to directly measure this type of kinetic data.

Flexibility

Our sequencing systems have the ability to scale the throughput and cost of sequencing across a range of small to large projects. They can be used with a variety of sample types and can output a range of DNA lengths.

Our Products

We entered the market with our first commercial product, the PacBio RS System, during the second quarter of 2011 and launched the higher performance PacBio RS II System during the second quarter of 2013. In September 2015, we announced the Sequel System, which is based on the same underlying SMRT technology as the PacBio RS II System, but the Sequel System can achieve up to approximately seven times the throughput using the SMRT Cell 1M chip. In April 2019, we introduced the Sequel II System, which can achieve approximately eight times the throughput of the Sequel System, utilizing our new SMRT Cell 8M chip. Coupled with chemistry and software improvements for the Sequel II System released during the fourth quarter of 2019, customers commonly generate up to 15 times as much throughput on Sequel II Systems, compared with the throughput generated on Sequel systems. Our sequencing systems provide access to a wide range of applications and are designed for expandable improvements to performance capability and new application capabilities through chemistry and software enhancements without necessitating changes to instrument hardware. 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.

PacBio's Systems

The PacBio RS II, Sequel, Sequel II and Sequel IIe Systems conduct, monitor, and analyze biochemical sequencing reactions. PacBio systems are integrated units that include high performance optics, automated liquid handling, a touchscreen control interface and computational hardware and software. Each instrument's high performance optics monitor the ZMWs in a SMRT Cell in real time. The automated liquid handling system performs reagent mixing and prepares SMRT Cells. Each instrument's touchscreen control interface is the user's primary control center to design and monitor experiments. The computational hardware and software in each instrument is responsible for processing the sequencing data produced by the SMRT Cells. The PacBio Systems have been designed to allow for performance improvements to be easily integrated into the systems. We no longer manufacture the PacBio RS II instrument.

Consumables

Customers must purchase proprietary consumable products to run their PacBio Systems. Our consumable products include our proprietary SMRT Cells and reagent kits. One SMRT Cell is consumed per sequencing reaction, and scientists can choose the number of SMRT Cells they use per experiment. SMRT Cells are individually and hermetically sealed, then packaged together into a streamlined four-pack tray.

We offer several reagent kits, each designed to address a specific step in the workflow. A template preparation kit is used to convert DNA into SMRTbell® double-stranded DNA library formats and includes typical molecular biology reagents, such as ligase, buffers and exonucleases. Our binding kits include our modified DNA polymerase, and are used to bind SMRTbell libraries to the polymerase in preparation for sequencing. Our sequencing kits contain reagents required for on-instrument, real-time sequencing, including the phospholinked nucleotides.

Product Enhancements

Since the introduction of our products in 2011, we have continued to significantly enhance the performance of PacBio sequencing systems through a combination of sample preparation protocol enhancements, software releases, and new sequencing reagent chemistries. By providing an increasing number of longer reads per instrument run, the new chemistries have enabled users to assemble more genomes to a high quality. We have continually improved our software to expand the number of supported applications such as large genome assembly, structural variant analysis, variant detection, sequencing of transcript isoforms produced from genes, metagenomics, and phasing of haplotypes in large amplicons.

Market for Our Products

Our customers use our products for sequencing genomes and transcriptomes across a wide range of organisms. Initially, customers in research, government and commercial markets used PacBio Systems to generate more complete assemblies of small and medium size genomes, such as bacteria and fungi, and for sequencing targeted regions of larger genomes such as humans and plants. As throughput and read lengths have increased, the complexity and size of genomes being resolved with SMRT sequencing have grown. Scientists now use SMRT sequencing to generate genome assemblies of numerous plant, human and other animal genes, including characterization of

transcriptomes through full-length isoform sequencing, and phase complex genomic regions like full-length human leukocyte antigen, or HLA, genes. With continued performance improvements of our products, we anticipate increasing both mindshare and market share within research, government and commercial markets such as human biomedical research, plant and animal sciences, microbiology & infectious disease, and immunogenomics.

There are a number of emerging markets for sequencing-based tests, including molecular diagnostics, which represent significant potential opportunities for our products. The development of these markets is subject to variability driven by ongoing changes in the competitive landscape, evolving regulatory requirements, government funding of research and development activities, and macroeconomic conditions. Introductions of new technologies and products, while positive to the overall development of these markets, may result in greater competition for the limited financial resources available. As we continue to expand into these emerging markets, the development of our business will be impacted by the variability of the factors affecting the growth of these markets.

Marketing, Sales, Service and Support

We market our products through a direct sales force in North America and parts of Europe and through distribution partners in Asia, certain other parts of Europe, the Middle East and Africa, and Latin America. Our sales strategy involves the use of a combination of sales personnel and field application scientists. The role of our sales personnel is to educate customers on the advantages of SMRT technology and the applications that our technology makes possible. The role of our field application scientists is to provide on-site training and scientific technical support to prospective and existing customers and to encourage customer utilization of our SMRT sequencing technology. Our field application scientists are technical experts, often with advanced degrees, and generally have extensive experience in academic research and core sequencing lab experience.

Service for our instruments is performed by field service engineers. These field service engineers are trained by experienced personnel to test, trouble-shoot, and service instruments installed at customer sites.

In addition, we maintain an applications lab team in Menlo Park, California composed of scientific experts who can transfer knowledge from the research and development team to the field application scientists. The applications lab team also runs foundational scientific collaborations and proof of principle studies, which help demonstrate the value of our product offering to prospective customers.

Our business is subject to seasonal trends. See “Risk Factors—Seasonality may cause fluctuations in our revenue and results of operations” for additional information.

Customers

Our customers include research institutions, commercial laboratories, genome centers, clinical, government and academic institutions, genomics service providers, pharmaceutical companies and agricultural companies. In general, our customers will isolate, prepare and analyze genetic samples using PacBio sequencing systems in their own research labs, or they will send their genetic samples to third party service providers who in turn will sequence the samples with PacBio systems and provide the sequence data back to the customer for further analysis. For example, customers in academic research institutions may have bacteria, animal, or human DNA samples isolated from various sources while agricultural biology companies may have DNA samples isolated from different strains of rice, corn or other crops. For the years ended December 31, 2020, 2019 and 2018, one customer, Gene Company Limited, our primary distributor for China and Hong Kong, accounted for approximately 14%, 17% and 26% of our total revenue, respectively.

We believe that the majority of our current customers are early adopters of sequencing technology. By focusing our efforts on high-value applications, and developing whole product solutions around these applications, we seek to drive the adoption of our products across a broader customer base and into numerous large-scale projects. In general, the broader adoption of new technologies by mainstream customers can take a number of years.

We currently sell our products to a number of customers outside the United States, including customers in other areas of North America, Europe, Middle East, Africa, Asia Pacific and South America. Revenue from customers outside the United States totaled \$43.1 million, or 55% of our total revenue during fiscal 2020, compared to \$48.1 million, or 53% of our total revenue during fiscal 2019 and \$44.7 million, or 57% of our total revenue during fiscal 2018.

Backlog

As of December 31, 2020, our instrument backlog was approximately \$10.1 million, compared to \$6.6 million as of December 31, 2019. We define backlog as purchase orders or signed contracts from our customers which we believe are firm and for which we have not yet recognized revenue. We expect to convert this backlog to revenue during 2021; however, our ability to do so is subject to customers who may seek to cancel or delay their orders even if we are prepared to fulfill them.

Manufacturing

Our principal manufacturing activities are performed at our headquarters in Menlo Park, California. We currently perform some of the manufacturing and all of the final integration of our instruments in-house, while outsourcing most sub-assemblies to third-party manufacturers. With respect to the manufacture of SMRT Cells, we subcontract wafer fabrication and processing to semiconductor processing facilities, but conduct critical surface treatment processes internally. We also subcontract the packaging of SMRT Cells, and bring them back in-house for final testing. In addition, we manufacture critical reagents in-house, including our phospholinked nucleotides and our DNA polymerase.

We purchase both custom and off-the-shelf components from a large number of suppliers and subject them to significant quality specifications. We periodically conduct quality audits of most critical suppliers and have established a supplier certification program. Some of the components required in our products are currently either sole sourced or single sourced. If the capabilities of our suppliers and component manufacturers are limited or stopped, due to disasters, quality, regulatory, or other reasons, it could negatively impact our ability to manufacture our products.

Research and Development

Our SMRT technology requires the blending of a number of unique disciplines, namely nanofabrication, physics, photonics, optics, molecular biology, engineering, signal processing, high performance computing, and bioinformatics. Our research and development team is a blend of these disciplines creating a single, cross-functional /operating unit. We have also established productive working relationships with technology industry leaders, as well as leading academic centers, to augment and complement our internal research and development efforts. We plan to continue our investment in research and development to enhance the performance and expand the application of our current products, and introduce additional products based on our SMRT technology. Our goals include further improvements in sequencing read length and mappable data per SMRT Cell, chemistry and software enhancements, and enhancements in sample preparation and bioinformatics tools that take advantage of the capabilities of our products. In addition, our engineering teams will continue their focus on increasing instrument component and system reliability, reducing costs, and implementing additional system flexibility and versatility through the enhancement of existing products and development of new products.

Intellectual Property

Developing and maintaining a strong intellectual property position is an important element of our business. We have sought, and will continue to seek, patent protection for our SMRT technology, for improvements to our SMRT technology, as well as for any of our other technologies where we believe such protection will be advantageous.

Our current patent portfolio, including patents exclusively licensed to us, is directed to various technologies, including SMRT nucleic acid sequencing and other methods for analyzing biological samples, ZMW arrays, surface treatments, phospholinked nucleotides and other reagents for use in nucleic acid sequencing, optical components and systems, processes for identifying nucleotides within nucleic acid sequences and processes for analysis and comparison of nucleic acid sequence data. Some of the patents and applications that we own, as well as some of the patents and applications that we have licensed from other parties, are subject to U.S. government march-in rights, whereby the U.S. government may disregard our exclusive patent rights on its own behalf or on behalf of third parties by imposing licenses in certain circumstances, such as if we fail to achieve practical application of the U.S. government funded technology, because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations, or to give preference to U.S. industry. In addition, U.S. government funded inventions must be reported to the government and U.S. government funding must be disclosed in any resulting patent applications.

As of December 31, 2020, we own or hold exclusive licenses to 332 issued U.S. patents, 64 pending U.S. patent applications, 220 granted foreign patents and 63 pending foreign patent applications, including foreign counterparts of U.S. patent and patent applications. The full term of the issued U.S. patents will expire between 2021 and 2038. We also have non-exclusive patent licenses with various third parties to supplement our own large and robust patent portfolio.

Of our exclusively licensed patent applications, 6 issued U.S. patents are licensed to us by the Cornell Research Foundation, which manages technology transfers on behalf of Cornell University.

Other Sequencing Solutions

There are a significant number of companies offering nucleic acid sequencing equipment or consumables. These include, but are not limited to, Illumina, Inc. ("Illumina"), BGI Genomics, Thermo Fisher Scientific Inc. ("Thermo"), Oxford Nanopore Technologies Ltd. ("ONT Ltd."), Roche, and Qiagen N.V. ("Qiagen"). Many of these companies currently have greater financial, technical, research and/or other resources than we do. They also have larger and more established manufacturing capabilities and marketing, sales and support functions. We expect the competition to intensify within the overall nucleic acid sequencing market as there are also several companies developing new sequencing technologies, products and/or services. Increased competition may result in pricing pressures, which could harm our sales, profitability or share of supply.

In order for us to maintain and increase our sales, we will need to demonstrate that our products deliver superior performance and value as a result of our key differentiators, including single molecule, real-time resolution, the combination of very high consensus accuracy and long read lengths with the ability to detect real-time kinetic information, fast time to result and flexibility, as well as the breadth and depth of current and future products and applications.

Government Regulation

Our products are not currently subject to U.S. Food and Drug Administration (FDA) clearance or approval since they are not intended or labeled for use in the diagnosis, prevention, or treatment of any disease, and are labeled and promoted as "For Research Use Only" (RUO) products. 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 FDA regulation, or the FDA's regulatory jurisdiction could be expanded to include our products.

As we expand product lines to potentially address clinical applications including the diagnosis of disease, regulation by governmental authorities in the United States and other countries may become an increasingly significant factor in development, testing,

production, and marketing. In the future, products that we develop in the molecular diagnostic markets, depending on their intended use, may be regulated as medical devices or in vitro diagnostic products (IVDs) by the FDA and comparable agencies in other countries. Obtaining the requisite regulatory approvals can be expensive and may involve considerable delay. Some countries have regulatory review processes that are substantially longer than U.S. processes. Failure to obtain regulatory approval in a timely manner and meet all of the local requirements including language and specific safety standards in any foreign country in which we plan to market our products could prevent us from marketing products in such countries or subject us to sanctions and fines. Changes to the current regulatory framework, including the imposition of additional or new regulations, could arise at any time during the development or marketing of our products.

If our products that are labeled as RUO are or could be used for the diagnosis of disease, the regulatory requirements related to marketing, selling, and supporting such products could be uncertain. This is true even if such use by our customers occurs 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.

Certain of our products are currently available through laboratories that are certified under the Clinical Laboratory Improvements Amendments (CLIA) of 1988. These products are commonly called "laboratory developed tests" (LDTs). For a number of years, the FDA has exercised its regulatory enforcement discretion not to regulate LDTs as medical devices if created and used within a single laboratory. However, the FDA is continually reexamining this regulatory approach and changes to the agency's handling of LDTs could impact our business in ways that we cannot predict at this time. We cannot predict the nature or extent of the FDA's final guidance or regulation of LDTs, in general, or with respect to our or our customers' LDTs, in particular.

Certification of CLIA laboratories includes standards in the areas of personnel qualifications, administration, and participation in proficiency testing, patient test management, and quality control procedures. CLIA also mandates that, for high complexity labs such as ours, to operate as a lab, we must have an accreditation by an organization recognized by CLIA such as the College of American Pathologists (CAP), which we have obtained and must maintain. If we were to lose our CLIA certification or CAP accreditation, our business, financial condition, or results of operations could be adversely affected. In addition, state laboratory licensing and inspection requirements may also apply to our products, which, in some cases, are more stringent than CLIA requirements.

We are committed to the protection of our employees and the environment. Our operations require the use of hazardous materials that subject us to various federal, state, and local environmental and safety laws and regulations. We believe that we are in material compliance with current applicable laws and regulations. However, we could be held liable for damages and fines should contamination of the environment or individual exposures to hazardous substances occur. In addition, we cannot predict how changes in these laws and regulations, or the development of new laws and regulations, will affect our business operations or the cost of compliance.

Additionally, we must comply with complex foreign and U.S. laws and regulations, such as the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act, and other local laws prohibiting corrupt payments to governmental officials, anti-competition regulations and sanctions imposed by the U.S. Office of Foreign Assets Control and other similar laws and regulations. Violations of these laws and regulations could result in fines and penalties, criminal sanctions, restrictions on our business conduct and on our ability to offer our products in one or more countries, and could also materially affect our brand, our ability to attract and retain employees, our international operations, our business and our operating results. Although we have implemented policies and procedures designed to ensure compliance with these laws and regulations, there can be no assurance that our employees, contractors, or agents will not violate our policies.

As we continue to expand our business into multiple international markets, our success will depend, in large part, on our ability to anticipate and effectively manage these and other risks associated with our international operations. Any of these risks could harm our international operations and negatively impact our sales, adversely affecting our business, results of operations, financial condition and growth prospects.

Human Capital

As of December 31, 2020, we had 412 full-time employees. Of these employees, 158 were in research and development, 94 were in operations and service, 101 were in marketing, sales and customer support, and 59 were in general and administration. With the exception of our field-based sales, marketing and service teams, the majority of our employees are based out of our headquarters in Menlo Park, California. None of our employees are represented by labor unions or are covered by a collective bargaining agreement with respect to their employment. We have not experienced any work stoppages, and we consider our relationship with our employees to be good.

Talent Acquisition and Retention

We recognize that our employees largely contribute to our success. To this end, we support business growth by seeking to attract and retain best-in-class talent. Our talent acquisition team uses internal and external resources to recruit highly skilled candidates globally. In 2020, we have been successful in hiring key positions throughout the organization that will help advance the company's growth. This includes an appointment of a new Chief Executive Officer, Chief Financial Officer, Chief Operating Officer, and Chief Commercial Officer. We continue to attract and retain superior talent as measured by our minimal turnover rate and high employee service tenure.

Total Rewards

Our total rewards philosophy has been to create investment in our workforce by offering competitive compensation and benefits package. We provide employees with compensation packages that include base salary, annual incentive bonuses, and long-term equity

awards. We also offer comprehensive employee benefits, which vary by country and region, such as life, disability, and health insurance, health savings and flexible spending accounts, paid time off, paid parental leave, Employee Stock Purchase Program, and a 401(k) plan. It is our expressed intent to be an employer of choice in our industry by providing market-competitive compensation and benefits package.

Health, Safety, and Wellness

The health, safety, and wellness of our employees is a priority in which we have always invested and will continue to do so. We provide our employees and their families with access to a variety of innovative, flexible, and convenient health and wellness programs. Program benefits are intended to provide protection and security, so employees can have peace of mind concerning events that may require time away from work or that may impact their financial well-being. These programs are highlighted regularly in our monthly human resources newsletters.

These investments and the prioritization of employee health, safety, and wellness took on particular significance in 2020 in light of COVID-19. To protect and support our essential team members, we have implemented health and safety measures that included maximizing personal workspaces, changing shift schedules, providing personal protective equipment (PPE), instituting mandatory screening before accessing buildings and performing asymptomatic COVID-19 testing regularly for employees who work on site. We have also supported access to testing by holding on-site testing clinics available to employees and their family members. In response to local stay-at-home orders and in alignment with CDC recommendations, we have limited our manufacturing and commercial operations based in Menlo Park, California. To aid in containing the spread of COVID-19, we have implemented remote-work options and are limiting employee travel. We are monitoring this rapidly evolving situation and will continue to seek programs to educate and assist employees whenever possible.

Diversity, Equity, and Inclusion

We believe a diverse workforce is critical to our success. Our mission is to value differences in races, ethnicities, religions, nationalities, genders, ages, sexual orientations, as well as education, skill sets and experience. In 2020, we implemented a global training program on diversity awareness to help employees understand, recognize, respond, and prevent bias at all levels of our organization. This is the first of our multi-pronged approach in building an inclusive culture. We are focused on inclusive hiring practices, fair and equitable treatment, organizational flexibility, and training and resources.

Training and Development

We believe in encouraging employees in becoming lifelong learners by providing ongoing learning and leadership training opportunities. We provide a scaled learning platform of on-demand and virtual classroom learning focused on personal and professional development. While we strive to provide real-time recognition of employee performance, we have a formal annual review process not only to determine pay and equity adjustments tied to individual contributions, but to identify areas where training and development may be needed.

Available Information

Our website is located at www.pacb.com. The information posted on or that can be accessed through our website is not incorporated by reference into this Annual Report on Form 10-K, and the inclusion of our website address is an inactive textual reference only. Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 10-K and amendments to reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, are available free of charge through the "Investors" section of our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. The SEC also maintains a website that contains our SEC filings. The address of the site is www.sec.gov.

Additionally, we use our website as a channel of distribution for important company information. Important information, including press releases, analyst presentations and financial information regarding us, as well as corporate governance information, is routinely posted and accessible on the "Investor Relations" section of the website, which is accessible by clicking on the tab labeled "About Us - Investors" on our website home page. In addition, important information is routinely posted and accessible on the blog section of our website, which is accessible through our website at www.pacb.com/blog, as well as our Twitter account (@pacbio). Information on or that can be accessed through our website or our Twitter account is not incorporated by reference into this Annual Report on Form 10-K, and the inclusion of our website address is an inactive textual reference only.

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 Securities and Exchange Commission, 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 COVID-19 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 recent coronavirus outbreak;
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 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 consumable kits 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;
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 recent coronavirus outbreak.

Our business could be adversely impacted by the effects of COVID-19 or other epidemics or pandemics. As a result of COVID-19, our 2020 financial results were impacted negatively as our customers in multiple regions around the world suspended their normal operations in efforts to curb the spread of the COVID-19 pandemic. However, a significant number of our customer sites that had shut down due to COVID-19 have re-opened. In addition, a significant number of customers have delayed purchases of capital 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/Ile instruments and the associated consumables and software. The negative impacts of COVID-19 on our customers will likely continue to adversely impact our revenues during the first half of 2021. The inability to receive or accept shipment 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. In response to local stay-at-home orders and in alignment with CDC recommendations, we have

limited our manufacturing and commercial operations based in Menlo Park, California. We will, however, continue to provide consumables and support to scientists at government, academic, and commercial labs that remain open. To aid in containing the spread of COVID-19, we have implemented remote-work options and are limiting employee travel. We are monitoring this rapidly evolving situation.

Our manufacturing partners and suppliers could also 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. At this point in time, there is significant uncertainty relating to the potential 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.

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, increased and prolonged unemployment or a decline in consumer confidence as a result of the COVID-19 pandemic, as well as limited or significantly reduced points of access of our products, could have a continuing adverse effect on the demand for some of our products and, consequently, related maintenance and support services. The degree of impact of COVID-19 on our business will depend on several factors, such as the duration and the extent of the pandemic, as well as actions taken by governments, businesses and consumers in response to the pandemic, all of which continue to evolve and remain uncertain at this time.

We have limited commercial sales to date and the commercialization and sales of our current or future products may be unsuccessful or less successful than anticipated.

Our first commercial product launched in 2011 and we have had limited sales to date. As such, we have limited historical financial data upon which to base our projected revenue and planned operating expenses or upon which to evaluate our company and our commercial prospects. Furthermore, 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. Based on our limited 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;
- drive adoption of our current and future products, including the Sequel II/IIe Systems;
- 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;
- grow our share by marketing and selling our products for new and additional applications;
- 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. 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), and December 31, 2020 (as a result of recognition of gain relating to the Reverse Termination Fee), 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. While we achieved profitability for the quarter ended March 31, 2020, this result was largely due to income recognition of the Continuation Advances. Even if profitability is achieved in the future, we may not be able to sustain profitability on a consistent basis. Excluding the recognition in October 2020 of gain relating to the Reverse Termination Fee and the recognition in the first quarter of 2020 of gain relating to the Continuation Advances, 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.

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 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. 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/Ile Systems. Our existing resources 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.

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 recently 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.

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.

If we are unable to successfully develop and timely manufacture our current and future products, including with respect to the Sequel System, the SMRT Cell 8M and Sequel II/Ile Systems 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/Ie 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 the SMRT Cell 8M, reagents and Sequel II/Ie Systems, 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 System, and may need to develop in the future, other customized SMRT Cells and consumables for our future products, including the SMRT Cell 8M for the Sequel II/Ie Systems. Our production of the SMRT Cells for the Sequel System has been and may in the future be below desired levels, 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 recent COVID-19 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/Ie 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/Ie 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/Ie 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 with respect to the SMRT Cell 8M and the Sequel II/Ie Systems. Our research and development efforts are complex and require us to incur substantial expenses. We may not be able to develop, manufacture and commercialize new products, obtain regulatory approval if necessary, or achieve an acceptable return, if any, on our research and development efforts and expenses or joint research and development efforts with partners. Our joint research and development efforts with partners require significant management attention and operational resources. If we are unable to successfully manage such joint research and development efforts, our future results may be adversely impacted. In January 2021, we entered into a multi-year collaboration with Invitae Corporation to begin development of a production-scale high-throughput sequencing platform; in certain termination circumstances of this collaboration, we may be obligated to refund all or a portion of the development funds advanced by Invitae and/or we may owe Invitae a share of the revenue generated from the sale of the program products. 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/Ie Systems, we may incur significant costs during these transitions, and they 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/Ie Systems and also 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 the SMRT Cell 8M and Sequel II/Ile Systems, has and may in the future lead to our limiting or ceasing development of further enhancements to our existing products as we focus our resources on new products, and has resulted and could in the future result in reduced marketplace acceptance and loss of sales of our existing products, materially adversely affecting our revenue and operating results. The introduction of new products has had and may in the future also have a negative impact on our revenue in the near-term as our current and future customers have delayed or cancelled and may in the future delay or cancel orders of existing products in anticipation of new products and we may also be pressured to decrease prices for our existing products. Further, we have experienced, and may in the future experience, difficulty in managing or forecasting customer reactions, purchasing decisions or transition requirements with respect to newly launched products. We have incurred and may continue to incur significant costs in completing these transitions, including costs of write-downs of our products, as current or future customers' transition to new products. If we do not successfully manage these product transitions, including with respect to the SMRT Cell 8M and Sequel II/Ile System, our business, operations, financial condition, and prospects may be materially and adversely affected.

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

We have recently experienced significant changes to our leadership team. Our President and Chief Executive Officer Christian O. Henry was appointed effective September 14, 2020, succeeding Dr. Michael Hunkapiller who retired on December 31, 2020. Our Chief Financial Officer Susan G. Kim was appointed effective September 28, 2020, succeeding Susan K. Barnes who retired on August 7, 2020. Our Chief Operating Officer, Mark Van Oene, and our Chief Commercial Officer, Peter Fromen, were each appointed effective January 8, 2021. Also, our Vice President and Chief Accounting Officer Eric E. Schaefer was appointed effective May 26, 2020, and our Chairman 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. 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. 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 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/Ile 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/Ile Systems. 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 assure that we can successfully acquire additional customers. Furthermore, we cannot guarantee that our products will be satisfactory to potential customers we seek to reach or that our products will perform in accordance with customer expectations.

These 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 they will be receptive to any of our products. 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, including with respect to the SMRT Cell 8M and Sequel II/Ile Systems. 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 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 precision in 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 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. For our current and future sole source third-party manufacturing and supply collaborators, we may be unable to negotiate binding agreements with them or find replacement manufacturers to support our development and commercial activities at commercially reasonable terms in the event that their services to us becomes interrupted for any reason. 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 do not timely provide sufficient quantities to us. If we are required to purchase these components from alternative sources, it could take several months or longer to qualify the alternative sources. If we are unable to secure a sufficient supply of these product components on a timely basis, or if these components do not meet our expectations or specifications for quality and functionality, our operations and manufacturing will 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 could be disrupted by conditions unrelated to our business or operations or that are beyond our control, including but not limited to international trade restrictions 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. Our current manufacturing process is characterized by long lead times between the placement of orders for and delivery of our products. If we have received 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 consumable kits, including SMRT Cells, 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, has been and may in the future be below desired levels, and we have experienced and may experience in the future manufacturing delays, product defects, variability in the performance of SMRT Cells and other products, inadequate reserves for inventory, or other issues.

There is no assurance that we will be able to manufacture our products so that they consistently achieve the product specifications and quality that our customers expect, including any products developed for clinical uses. Problems in the design or quality of our products, including low manufacturing yields of SMRT Cells, or sub-performing reagent lots may have a material adverse effect on our brand, business, financial condition, and operating results, and could result in us losing our ISO certifications. If we were to lose our ISO certifications, then our customers might choose not to purchase products from us. There is also no assurance that we will be able to increase manufacturing yields and decrease costs, or that we will be successful in forecasting customer demand or manufacturing and supply costs, or that product supplies, including reagents or integrated chips, will not be limited or interrupted, or will be of satisfactory quality or continue to be available at acceptable prices. Furthermore, we may not be able to increase manufacturing to meet anticipated demand or may experience downtime in our manufacturing facilities. 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, financial condition and results of operations.

Rapidly changing technology in life sciences and 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/Ile 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, ONT Ltd., Roche, and Qiagen. Many of these companies currently have greater name recognition, more substantial intellectual property portfolios, longer operating histories, significantly greater financial, technical, research and/or other resources, more experience in new product development, larger and more established manufacturing capabilities and marketing, sales and support functions, and/or more established distribution channels to deliver products to customers than we do. These companies may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or customer requirements.

There are also several companies that are in the process of developing or have already developed and commercialized new, competing or potentially competing technologies, products and/or services, including ONT Ltd. and its subsidiaries, against whom we have filed complaints for patent infringement in the U.S. District Court for the District of Delaware and, previously, with the U.S.

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

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

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

- our ability to attract, retain and manage qualified sales, marketing and service personnel necessary to expand market acceptance for our technologies;
- the performance and commercial availability expectations of our existing and potential customers with respect to new and existing products;

- availability of potential sales and distribution partners to sell our technologies, and our ability to attract and retain such sales and distribution partners;
- the time and cost of maintaining and growing a specialized sales, marketing and service force for a particular application, which may be difficult to justify in light of the revenue generated; and
- our sales, marketing and service force may be unable to execute successful commercial activities.

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

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

We receive a significant portion of our revenue from a limited number of customers. For example, for the fiscal year ended December 31, 2020, 2019 and 2018, one of our customers, Gene Company Limited, accounted for approximately 14%, 17% and 26% of our total revenue, respectively. Gene Company Limited is our primary distributor in China. 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/Ile 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/Ile 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 generally ship our sequencing instruments with one year of service included in the purchase price with an option to purchase one or more additional years of service. We also provide a warranty for our consumables, which is generally limited to replacing, or at our option, giving credit for any consumable with defects in material or workmanship. 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. 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.

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 cycles 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 such funds remain unspent at such fiscal year-end. Furthermore, celebrations of the Lunar New Year, which occurs during our first quarter, may last for a week or longer, during which time many of our customers' offices in China and elsewhere in the Asia-Pacific region may be closed due to the holiday, and have in the past caused, and may in the future cause, decreased sales of our consumables during such 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 become in the future, more or less pronounced over time, and have in the past materially affected, and may in the future materially affect, our business, financial condition, results of operations and prospects.

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

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

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

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

Risks Related to Our Intellectual Property

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

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

- we or our licensors might not have been the first to make the inventions covered by each of our pending patent applications or issued patents;
- we or our licensors might not have been the first to file patent applications for these inventions;
- it is possible that neither our pending patent applications nor the pending patent applications of our licensors will result in issued patents;
- the scope of the patent protection we or our licensors obtain may not be sufficiently broad to prevent others from practicing our technologies, developing competing products, designing around our patented technologies or independently developing similar or alternative technologies;
- our and our licensors' patent applications or patents have been, are and may in the future be, subject to interference, opposition or similar administrative proceedings, which could result in those patent applications failing to issue as patents, those patents being held invalid or the scope of those patents being substantially reduced;
- our enforcement of patents and proprietary rights in other countries may be problematic or unpredictable;
- we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions;
- we or our partners may not adequately protect our trade secrets;
- we may not develop additional proprietary technologies that are patentable; or
- the patents of others may limit our freedom to operate and prevent us from commercializing our technology in accordance with our plans.

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

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

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

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

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

third parties at all or on reasonable terms. The occurrence of these events may have a material adverse effect on our business, financial condition or results of operations.

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

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

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

Our pending, issued and granted U.S. and foreign patents and patent applications have been, are and may in the future be, subject to challenges by ONT Ltd., ONT Inc. and Metrichor, Ltd. ("Metrichor" and, together with ONT Ltd. and ONT Inc., "ONT") and 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, 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 affect 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 ONT and with PGI, and we were previously involved in other legal proceedings with ONT and Harvard University in several United States and European jurisdictions. We have in the past received adverse rulings against us with respect to our complaint with the United States International Trade Commission for one of these proceedings. Legal actions to enforce our patent rights have been, and will continue to be, expensive, and may divert significant management time and resources. Adverse parties from previous legal actions have brought, and they and others may in the future bring, claims against us and/or our intellectual property. Litigation is a significant ongoing expense, recognized in sales, general and administrative expense, with an uncertain outcome, and has been, and may in the future be, a material expense for us. Our enforcement actions may not be successful, have given rise to legal claims against us and could result in some of our intellectual property rights being determined to be invalid or not enforceable. Furthermore, an adverse determination or judgement could lead to an award of damages against us, or the issuance of an injunction against us or our products that could prevent us from selling any products found to be infringing the intellectual property rights of another party.

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

Our products are based on complex, rapidly developing technologies. We may not be aware of issued or previously filed patent applications that belong to third parties that mature into issued patents that cover some aspect of our products or their use. In addition, because patent litigation is complex and the outcome inherently uncertain, our belief that our products do not infringe third-party patents of which we are aware or that such third-party patents are invalid and unenforceable may be determined to be incorrect. As a result, third parties have claimed, and may in the future claim, that we infringe their patent rights and have filed, and may in the future file, lawsuits or engage in other proceedings against us to enforce their patent rights. For example, ONT Ltd. and Harvard University have, in the past, filed claims against us in the High Court of England and Wales and the District Court of Mannheim, Germany for patent infringement, and 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, even when we hope not. A determination that we illegally used the confidential or proprietary information or misappropriated technologies of others in our products could result in us paying substantial damage awards or being prevented from further developing or selling some or all of our products, which could materially and adversely affect our business.

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

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

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

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

Risks Related to Regulation

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

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

Our business is also directly affected by a wide variety of government regulations applicable to business enterprises generally and to companies operating in the life science industry in particular. Failure to comply with government regulations or obtain or maintain necessary permits and licenses could result in a variety of fines or other censures or an interruption in our business operations which may have a negative impact on our ability to generate revenue and the cost of operating our business. In addition, changes to laws and government regulations could cause a material adverse effect on our business as we will need to adapt our business to comply with such changes. For example, a governmental prohibition on the use of human *in vitro* diagnostics 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 not currently subject to U.S. Food and Drug Administration (“FDA”) clearance or approval since they are not intended or labeled for use in the diagnosis, prevention, or treatment of any disease, and are labeled and promoted as research use only (RUO) products. 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 FDA regulation, 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 RUO products. For example, our customers may independently elect to use our RUO labeled products in their own laboratory developed tests (LDTs) for clinical diagnostic use, which could subject our products to government regulation, and the regulatory clearance or approval and maintenance process for such products may be uncertain, expensive, and time-consuming. Regulatory requirements related to marketing, selling, and distribution of RUO products could change or be uncertain, even if clinical uses of our RUO products by our customers were done without our consent. If the FDA or other regulatory authorities assert that any of our RUO products are subject to regulatory clearance or approval, our business, financial condition, or results of operations could be adversely affected. In the event that we fail to obtain and maintain necessary regulatory clearances or approvals for products that we develop for clinical uses, or if clearances or approvals for future products and indications are delayed or not issued, our commercial operations may be materially harmed. Furthermore, even if we are granted regulatory clearances or approvals, they may include significant limitations on the indicated uses for the product, which may limit the market for the product. We do not have experience in obtaining FDA approvals

and no assurance can be given that we will be able to obtain or to maintain such approvals. Furthermore, any approvals that we may obtain can be revoked if safety or efficacy problems develop.

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

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

Additionally, on November 25, 2013, the FDA issued Final Guidance "Distribution of In Vitro Diagnostic Products Labeled for Research Use Only." The guidance emphasizes that the FDA will review the totality of the circumstances when it comes to evaluating whether equipment and testing components are properly labeled as RUEO. 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.

Recently, as part of the Trump Administration's efforts to combat COVID-19 and consistent with the President's direction in 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, for an LDT may nonetheless voluntarily submit a premarket approval application, 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. While this action by HHS is expected to reduce the regulatory burden on clinical laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 that develop LDTs, it is unclear how this action as well as future legislation by federal and state governments and the FDA will impact the industry, including our business and that of our customers. Such HHS measure may compel the FDA to formalize earlier enforcement discretionary policies and informal guidance through notice-and-comment rulemaking and/or impose further restrictions on LDTs. HHS' rescission policy may change over time. Congress could also enact legislation restricting LDTs. Any restrictions on LDTs by the FDA, HHS, Congress, or state regulatory authorities may decrease the demand for our products. The adoption of new restrictions on RUEO products, whether by the FDA or Congress, could adversely affect demand for our specialized reagents and instruments. Further, we could be required to obtain premarket clearance or approval before we can sell our products to certain customers.

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 premarket approval application (PMA) or a *de novo* application is required for some of our products. If such applications were required, greater time and investment would be required to obtain FDA approval. Even if the FDA agreed that a 510(k) was appropriate, FDA clearance can be expensive and time consuming. It generally takes a significant amount of time to prepare a 510(k), including conducting appropriate testing on our products, and several months to years for the FDA to review a submission. Notwithstanding the effort and expense, FDA clearance or approval could be denied for some or all of our products for which we choose to market as a medical device or a clinical diagnostic device. Even if we were to seek and obtain regulatory approval or clearance, it may not be for the intended uses we request or that we believe are

important or commercially attractive. There can be no assurance that future products for which we may seek premarket clearance or approval will be approved or cleared by FDA or a comparable foreign regulatory authority on a timely basis, if at all, nor can there be assurance that labeling claims will be consistent with our anticipated claims or adequate to support continued adoption of such products. Compliance with FDA or comparable foreign regulatory authority regulations will require substantial costs, and subject us to heightened scrutiny by regulators and substantial penalties for failure to comply with such requirements or the inability to market our products. The lengthy and unpredictable premarket clearance or approval process, as well as the unpredictability of the results of any required clinical studies, may result in our failing to obtain regulatory clearance or approval to market such products, which would significantly harm our business, results of operations, reputation, and prospects.

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

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

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

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

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

If we commercialize any of our products outside of the United States, our international business could expose us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

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

required compliance with existing and changing foreign regulatory requirements and laws that are or may be applicable to our business in the future, such as the European Union's General Data Protection Regulation (GDPR) and other data privacy requirements, labor and employment regulations, anti-competition regulations, the U.K. Bribery Act of 2010 and other anti-corruption laws, regulations relating to the use of certain hazardous substances or chemicals in commercial products, and require the collection, reuse, and recycling of waste from products we manufacture;

required compliance with U.S. laws such as the Foreign Corrupt Practices Act, and other U.S. federal laws and regulations established by the office of Foreign Asset Control;

export requirements and import or trade restrictions;

laws and business practices favoring local companies;

foreign currency exchange, longer payment cycles and difficulties in enforcing agreements and collecting receivables through certain foreign legal systems;

changes in social, economic, and political conditions or in laws, regulations and policies governing foreign trade, manufacturing, research and development, and investment both domestically as well as in the other countries and jurisdictions in which we operate and into which we may sell our products including as a result of the separation of the United Kingdom from the European Union (Brexit);

potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements, and other trade barriers;

difficulties and costs of staffing and managing foreign operations; and

difficulties protecting, maintaining, enforcing or procuring intellectual property rights.

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

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

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

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

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

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

We are subject to requirements under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 that require us to conduct diligence, and report 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.

If any of the foregoing 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 COVID-19, that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions such as recessions, interest rate changes or international currency fluctuations, may negatively impact the market price of our common stock. You may not realize any return on your investment in us and may lose some or

all of your investment. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We have been a party to this type of litigation in the past and may be the target of this type of litigation again in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

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

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

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

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). 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 Chairman 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 make cash payments 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 COVID-19 as discussed above, the overall demand for nucleic acid sequencing products may be particularly vulnerable to unfavorable economic conditions. A global financial crisis or a global or regional political disruption 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. 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 and acceptance of our products by our customers may be delayed, which could harm our business and financial results. The failure to deliver our products in a 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 COVID-19
- 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;
- 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 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 EU 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 China, Canada, the U.K. and the EU, 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 United Kingdom from the European Union;
- 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;
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 EU General Data Protection Regulation (“GDPR”) which took effect in the European Union in 2018.

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

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

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

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

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

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

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. Generally Accepted Accounting Principles (“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, such as during this presidential election year. Any such changes could significantly impact our business as well as the markets in which we compete. Specific legislative and regulatory proposals discussed during election campaigns and more recently that might materially impact us include, but are not limited to, changes to spending priorities and potential reductions in research funding. Uncertainty about U.S. government funding has posed, and may continue to pose, a risk as customers may choose to postpone or reduce spending in response to actual or anticipated restraints on funding. To the extent changes in the political environment have a negative impact on us or on our markets, our business, results of operation and financial condition could be materially and adversely impacted in the future

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

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

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

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

In the ordinary course of our business, we collect and store sensitive data, including intellectual property, our proprietary business information and that of our customers, suppliers and business partners, and personally identifiable information of our customers and employees, in our data centers and on our networks. The secure processing, maintenance and transmission of this information is critical to our operations. Despite our security measures, our IT infrastructure may be vulnerable to attacks by hackers, computer viruses, malicious codes, 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, 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.

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 other. In addition, laws in all 50 U.S. states require businesses to provide notice to consumers whose personal information has been disclosed as a result of a data breach. State laws are changing rapidly and there is discussion in the U.S. Congress of a new comprehensive federal data privacy law to which we would become subject if it is enacted. These and future laws and regulations may increase our compliance costs and potential liability.

Furthermore, regulations promulgated pursuant to the Health Insurance Portability and Accountability Act of 1996 (HIPAA), establish privacy and security standards that limit the use and disclosure of individually identifiable health information (known as “protected health information”) and require the implementation of administrative, physical and technological safeguards to protect the privacy of protected health information and ensure the confidentiality, integrity and availability of electronic protected health information. Determining whether protected health information has been handled in compliance with applicable privacy standards and our contractual obligations can require complex factual and statistical analyses and may be subject to changing interpretation. Although we take measures to protect sensitive data from unauthorized access, use or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance or other malicious or inadvertent disruptions. Any such breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, manipulated, publicly disclosed, lost or stolen. Any such access, breach or other loss of information could result in legal claims or proceedings, and liability under federal or state laws that protect the privacy of personal information, such as the HIPAA, the Health Information Technology for Economic and Clinical Health Act (HITECH), and regulatory penalties. Notice of breaches must be made to affected individuals, the Secretary of the Department of Health and Human Services, and for extensive breaches, notice may need to be made to the media or State Attorneys General. Such a notice could harm our reputation and our ability to compete.

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

reputation, as well as proceedings or litigation by governmental agencies or other third parties, including class action privacy litigation in certain jurisdictions, which would subject us to significant fines, sanctions, awards, penalties or judgments, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

As of December 31, 2020, we lease approximately 180,000 square feet in Menlo Park, California, where we house our headquarters, and our laboratory, in-house manufacturing, service and support functions. We also lease a sales office facility in Singapore, and engineering support facilities in Allen, Texas.

We believe that our existing facilities, together with suitable additional or alternative space available on commercially reasonable terms, will be sufficient to meet our needs.

ITEM 3. LEGAL PROCEEDINGS

Please see "Note 6. Commitments and Contingencies," subsection titled "Legal Proceedings", in Part II, Item 8 of this Annual Report on Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock is traded on The Nasdaq Global Select Market under the symbol "PACB."

Holders of Record

As of January 31, 2021, there were approximately 20 stockholders of record of our common stock, although we believe that there are a significantly larger number of beneficial owners of our common stock.

Dividend Policy

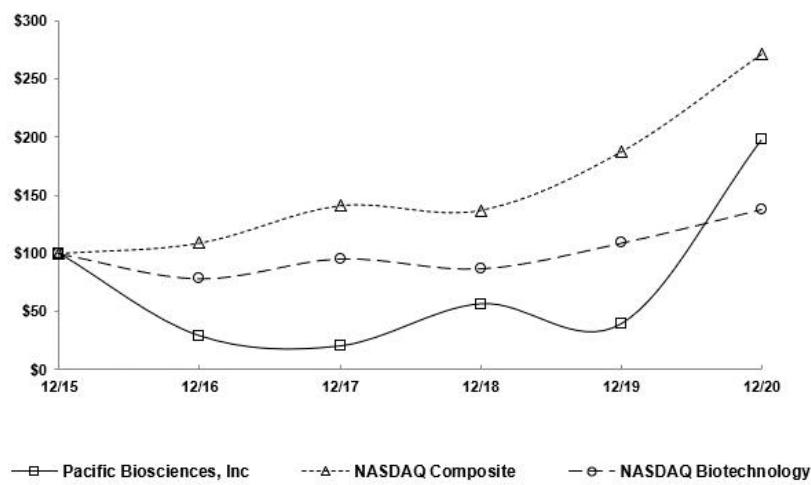
We have never declared or paid any cash dividend on our common stock and have no present plans to do so. We intend to retain earnings for use in the operation and expansion of our business.

Performance Graph

The performance graph included in this Annual Report on Form 10-K shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), or incorporated by reference into any filing of Pacific Biosciences under the Securities Act of 1933, as amended, or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

The following graph shows a comparison from December 31, 2015 through December 31, 2020 of the cumulative total return for our common stock, the Nasdaq Composite Index and the Nasdaq Biotechnology Index. Such returns are based on historical results and are not intended to suggest future performance. Data for The Nasdaq Composite Index and the Nasdaq Biotechnology Index assume reinvestment of dividends.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*
Among Pacific Biosciences, Inc, the NASDAQ Composite Index
and the NASDAQ Biotechnology Index



*\$100 invested on 12/31/15 in stock or index, including reinvestment of dividends.
Fiscal year ending December 31.

Recent Sales of Unregistered Securities

None.

ITEM 6. SELECTED FINANCIAL DATA

Our historical results are not necessarily indicative of the results to be expected for any future period. The following selected financial data should be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K.

	Year Ended December 31,				
	2020	2019	2018	2017	2016
(in thousands except per share amounts)					
Total revenue	\$ 78,893	\$ 90,891	\$ 78,626	\$ 93,468	\$ 90,714
Total cost of revenue	46,327	56,315	53,530	58,809	46,554
Gross profit	32,566	34,576	25,096	34,659	44,160
Total operating expense	136,951	135,121	126,083	124,443	115,404
Operating loss	(104,385)	(100,545)	(100,987)	(89,784)	(71,244)
Gain from Reverse Termination Fee from Illumina (1)	98,000	—	—	—	—
Gain from Continuation Advances from Illumina (1)	34,000	18,000	—	—	—
Net Income (loss)	\$ 29,403	\$ (84,134)	\$ (102,562)	\$ (92,189)	\$ (74,375)
Net loss per share:					
Net income (loss) per share	Basic \$ 0.18	\$ (0.55)	\$ (0.76)	\$ (0.87)	\$ (0.83)
Diluted \$ 0.17	\$ (0.55)	\$ (0.76)	\$ (0.87)	\$ (0.83)	
Weighted average shares outstanding used in calculating net income (loss) per share	Basic 165,187	152,527	135,094	105,682	89,148
Diluted 174,970	152,527	135,094	105,682	105,682	89,148
As of December 31,					
	2020	2019	2018	2017	2016
(in thousands)					
Cash, cash equivalents and investments	\$ 318,814	\$ 49,099	\$ 102,354	\$ 62,872	\$ 71,978
Working capital	317,085	31,893	104,775	72,984	75,237
Total assets	413,980	147,985	170,275	144,084	137,884
Total liabilities	78,489	93,068	56,214	57,981	53,216
Total stockholders' equity (2)	\$ 335,491	\$ 54,917	\$ 114,061	\$ 86,103	\$ 84,668

(1) In accordance with the terms of the Merger Agreement, Illumina paid us cash payments ("Continuation Advances"), of \$34.0 million and \$18.0 million for the year ended December 31, 2020 and 2019, respectively, which we reflected as a part of Other income for the year ended December 31, 2020 and 2019, respectively. In addition, as part of the Termination Agreement, Illumina paid us a Reverse Termination Fee of \$98.0 million, which we reflected as a part of other income for the year ended December 31, 2020. Please see "Note 2. Termination of Merger with Illumina" in Part II, Item 8 of this Annual Report on Form 10-K for additional information.

(2) For the year ended December 31, 2020, we issued 29.4 million shares of our common stock through our two underwritten public offerings with an average offering price of \$6.40. The total net proceeds to us from the two offerings, after deducting the underwriting commission and offering expenses, were approximately \$187.2 million. Please see "Note 8. Stockholders' Equity" in Part II, Item 8 of this Annual Report on Form 10-K for additional information.

ITEM 7. 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 our consolidated financial statements and the related notes included in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business and related financing, includes forward-looking statements that involve risks and uncertainties. You should read the "Risk Factors" section of this Annual Report on Form 10-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We design, develop and manufacture sequencing systems to help scientists resolve genetically complex problems. Based on our novel Single Molecule, Real-Time (SMRT®) sequencing technology, our products enable: de novo genome assembly to finish genomes in order to more fully identify, annotate and decipher genomic structures; full-length transcript analysis to improve annotations in reference genomes, characterize alternatively spliced isoforms in important gene families, and find novel genes; targeted sequencing to more comprehensively characterize genetic variations; and real-time kinetic information for epigenome characterization. Our technology provides high accuracy, ultra-long reads, uniform coverage and the ability to simultaneously detect epigenetic changes. PacBio® sequencing systems, including consumables and software, provide a simple and fast end-to-end workflow for SMRT sequencing.

Our current products include the Sequel II and Sequel IIE instruments, and SMRT Cell 8M, which when used together are capable of sequencing up to approximately eight million DNA molecules simultaneously, and the previous generation Sequel instrument and Sequel SMRT Cell 1M, which, when used together are capable of sequencing up to approximately one million DNA molecules simultaneously. 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.

Our customers and our scientific collaborators have published numerous peer-reviewed articles in journals including Nature, Science, Cell, PNAS and The New England Journal of Medicine highlighting the power and applications of SMRT sequencing in projects such as finishing genomes, structural variation discovery, isoform transcriptome characterization, rare mutation discovery and the identification of chemical modifications of DNA related to virulence and pathogenicity. Our research and development efforts are focused on developing new products and further improving our existing products including continuing chemistry and sample preparation improvements to increase throughput and expand our supported applications. By providing access to genetic information that was previously inaccessible, we enable scientists to confidently increase their understanding of biological systems.

Senior Management

Our President and Chief Executive Officer Christian O. Henry was appointed effective September 14, 2020, succeeding Dr. Michael Hunkapiller who announced his retirement, which was effective at the end of the year 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 Vice President and Chief Accounting Officer Eric E. Schaefer was appointed effective May 26, 2020, and our Chairman of the Board Dr. John F. Milligan was appointed effective September 14, 2020. On December 31, 2020, the Board of Directors appointed Mark Van Oene to the role of Chief Operating Officer and designated him as the Company's principal operating officer, and appointed Peter Fromen to the role of Chief Commercial Officer, effective in each case upon his commencement of employment with the Company on January 8, 2021.

2021 Strategic Objectives

For 2021, we have outlined three strategic objectives:

- Expand our commercial reach;
- Accelerate our product development pipeline; and
- Drive market leadership in whole-genome clinical sequencing

Expanding our commercial reach includes hiring senior level team members with extensive commercial experience. From December 2020 through January 2021, we hired a Chief Commercial Officer, a Vice President of Commercial Operations, a Vice President of Strategic Marketing, a Vice President of Product Marketing, and a Senior Director of Product Marketing. During 2021, we expect to more than double our number of quota-carrying field sales personnel from 22 at the end of 2020 to more than double by the end of 2021. In addition, we plan to expand our commercial support activities and invest in more sales tools. We also intend to invest more heavily in marketing programs to increase the awareness of our products to a broader number of potential customers. As a result of these commercial expansion activities, we expect our sales, general, and administrative expense to increase significantly in 2021 as compared to 2020.

Accelerating our product development pipeline includes significantly expanding our research and development team in an effort to accelerate the development of multiple new products. In association with the collaboration we entered into with Invitae Corporation ("Invitae") in January 2021, as described below, we plan to develop a new platform with production-scale high-throughput capability, which will be in addition to other new products we already have in development. In order to develop these multiple products in parallel, we anticipate hiring over 50 additional people into our Research and Development departments. In addition, we expect to increase our spending on outside development costs. As a result, we expect our research and development expense to increase significantly in 2021 as compared to 2020.

We believe that with the capabilities of our SMRT technology, we can be a market leader in whole-genome clinical sequencing. Leading institutions such as Children's Mercy Kansas City, Invitae and Stanford University have adopted the use of our products to study rare and inherited disease. We believe the market opportunity for clinical sequencing is very large, and could drive significant revenue growth for the company. In an effort to accelerate this growth, we entered into the collaboration with Invitae, who is a market leader in medical genetic testing, and has the desire to sequence hundreds of thousands of genomes annually with our technology. We will continue to pursue additional partnerships to further drive the adoption of whole-genome clinical sequencing.

Cash Position

Cash, cash equivalents and investments, excluding short-term and long-term restricted cash, at December 31, 2020 totaled \$318.8 million, compared to \$49.1 million at December 31, 2019. In February 2021, we issued the 1.50% Convertible Senior Notes due 2028 (the "Notes") in the aggregate principal amount of \$900.0 million. Please refer to the Liquidity and Capital Resources section below for additional details relating to the Notes and other financing and cash considerations.

Invitae Collaboration

In January 2021 we entered into a multi-year collaboration with Invitae Corporation, or Invitae, to begin development of a production-scale high-throughput sequencing platform, or Program Products, leveraging the power of PacBio's highly accurate HiFi sequencing to expand Invitae's whole genome testing capabilities in the future. In connection with the development of the Program Products, Invitae will provide funds to the Company equal to certain development costs incurred by the Company. Under the development agreement, we will be primarily responsible for conducting a development program to develop the Program Products pursuant to a schedule and budget. We will make decisions regarding the development program jointly with Invitae. The development program is expected to last approximately sixty months, but may be shorter or longer. We have the right to broadly commercialize Program Products with other customers.

As a benefit of its contribution, Invitae will be entitled to preferred pricing on the Program Products if and when they are available for commercial sale. Each Program Product will have a preferential pricing period. During the initial period of preferred pricing for each Program Product, Invitae may purchase the Program Product at a substantially reduced margin until it has recouped a mutually agreed multiple of its contributed funds. Subsequently, for up to three years after the initial period of preferred pricing, Invitae has the right to purchase the Program Product at a price higher than the initial preferred pricing period but within a specified price range.

We and Invitae may terminate our collaboration if the other party remains in material breach of agreement following a cure period to remedy the material breach. In addition, our agreement with Invitae includes certain other circumstances for termination by each party, including circumstances where Invitae may terminate for delays, IP concerns, change in control, or without cause.

In certain termination circumstances, (i) we will be obligated to refund all or a portion of the development funds advanced by Invitae and/or (ii) we will owe Invitae a share of the revenue generated from the sale of the Program Products if and when they are commercialized until such time as Invitae has recouped the funds provided to us, and in certain circumstances, a mutually agreed-upon return.

We expect to incur significant development costs over the duration of the collaboration, including \$20-25 million expected to be incurred during 2021. The Company is still evaluating the accounting impact of the agreement, including whether the funding received by the Company from Invitae represents discounts toward future supplies, funding of development efforts, or a combination of both. There can be no assurances that the development program will be successful or that the Program Products will become ready for commercial sale.

COVID-19 Update

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. The financial results for the year ended December 31, 2020 were impacted negatively as many of our customers in multiple regions around the world shut down operations for various periods of time in efforts to curb the spread of the COVID-19 pandemic. This resulted in lower product revenues for the year ended December 31, 2020 as compared to 2019. A significant number of our customer sites that had shut down due to COVID-19 have reopened. In addition, a significant number of customers have delayed purchases or difficulties obtaining funding for capital expenditures 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 associate consumables and software. Due to the uncertain scope and duration of the pandemic, we cannot reasonably estimate the future impact to our operations and financial results.

In response to local stay-at-home orders and in alignment with CDC recommendations, we have limited our manufacturing and commercial operations based in Menlo Park, California. We will, however, continue to provide consumables, instruments and support to scientists at government, academic, and commercial labs that remain open. To aid in containing the spread of COVID-19, we have implemented remote-work options and are limiting employee travel. We are monitoring this rapidly evolving situation.

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, decreases in discretionary capital spending, increased and prolonged unemployment or a decline in consumer confidence as a result of the COVID-19 pandemic could have a continuing adverse effect on the demand for some of our products. Such economic disruption could have a material adverse effect on our business, results of operations and liquidity. The degree of impact of COVID-19 on our business will depend on several factors, such as the duration and the extent of the pandemic, as well as actions taken by governments, businesses and consumers in response to the pandemic, all of which continue to evolve and remain uncertain at this time. See the Risk Factors section for further discussion of the possible impact of the COVID-19 pandemic on our business.

A discussion of our comparison between 2020 and 2019 is presented below. A discussion of the changes in our results of operations between the years ended December 31, 2019 and December 31, 2018 has been omitted from this Annual Report on Form 10-K but may be found in Item 7. *Management's Discussion and Analysis of Financial Condition and Results of Operations* of our Annual Report on Form 10-K for the year ended December 31, 2019, filed with the Securities and Exchange Commission on February 28, 2020, which is available free of charge on the SEC's website at www.sec.gov and our corporate website (www.pacb.com).

Results of Operations

Comparison of the Years Ended December 31, 2020 and 2019

	Year Ended December 31,		\$ Change	% Change
	2020	2019		
Revenue:				
Product revenue	\$ 65,424	\$ 77,742	\$ (12,318)	(16%)
Service and other revenue	13,469	13,149	320	2%
Total revenue	78,893	90,891	(11,998)	(13%)
Cost of Revenue:				
Cost of product revenue	35,424	44,771	(9,347)	(21%)
Cost of service and other revenue	10,903	11,544	(641)	(6%)
Total cost of revenue	46,327	56,315	(9,988)	(18%)
Gross profit	32,566	34,576	(2,010)	(6%)
Operating Expense:				
Research and development	64,152	59,630	4,522	8%
Sales, general and administrative	72,799	75,491	(2,692)	(4%)
Total operating expense	136,951	135,121	1,830	1%
Operating loss	(104,385)	(100,545)	(3,840)	(4%)
Gain from reverse termination fee from Illumina	98,000	—	98,000	—
Gain from continuation advances from Illumina	34,000	18,000	16,000	89%
Interest expense	(267)	(2,611)	2,344	90%
Other income, net	2,055	1,022	1,033	101%
Net income (loss)	\$ 29,403	\$ (84,134)	\$ 113,537	135%

Revenue

Total revenue for the year ended December 31, 2020 was \$78.9 million compared to \$90.9 million for 2019.

Product revenue for the year ended December 31, 2020 was \$65.4 million, compared to \$77.7 million for the year ended December 31, 2019. Product revenue of \$65.4 million for the year ended December 31, 2020 consisted of \$34.3 million from sales of Sequel, Sequel II and Sequel IIE instruments and \$31.1 million from sales of consumables, compared to total product revenue of \$77.7 million for the same period during 2019, consisting of \$45.1 million from sales of Sequel and Sequel II instruments and \$32.6 million from sales of consumables. The decrease in instrument sales was primarily attributable to a lower number of instrument shipments and installations due to COVID-19 as discussed above. The decrease in consumable sales was primarily attributable to lower utilization of the installed base of instruments during certain periods of 2020 due to COVID-19 as discussed above. The negative impact of COVID-19 on our customers will likely continue to adversely impact our revenues during 2021.

Service and other revenue was \$13.5 million and \$13.1 million for the years ended December 31, 2020 and 2019, respectively, and was primarily derived from product maintenance agreements sold for our installed instrument base.

Gross Profit

Gross profit for the year ended December 31, 2020 was \$32.6 million, resulting in a gross margin of 41% while gross profit for the year ended December 31, 2019 was \$34.6 million, resulting in a gross margin of 38%. Gross margin for the year ended December 31, 2019 was negatively impacted by product transition costs, including inventory reserves taken in connection with the transition from Sequel to Sequel II.

Cost of product revenue was \$35.4 million for the year ended December 31, 2020, compared to \$44.8 million for 2019. Cost of product revenue decreased by \$9.4 million for the year ended December 31, 2020 compared to 2019 primarily resulting from lower product shipments. In addition, during the year ended December 31, 2019, we incurred product transition costs including an inventory reserve taken in connection with the transition from Sequel to Sequel II.

Cost of service revenue was \$10.9 million for the year ended December 31, 2020, compared to \$11.5 million for 2019.

Research and Development Expense

Research and development expense for the year ended December 31, 2020 increased by \$4.5 million, or 8%, compared to 2019. The increase in research and development expense was primarily driven by an increase of \$3.4 million in compensation expenses and an increase of \$1.7 million of higher product development costs. Research and development expenses included stock-based compensation expenses of \$7.1 million and \$7.7 million for the years ended December 31, 2020 and December 31, 2019, respectively.

We expect research and development expenses to increase significantly in 2021, as we intend to hire a significant number of additional personnel in our research and development departments. We estimate costs associated with the *Invitae* collaboration will amount to \$20 - \$25 million during 2021. Stock-based compensation included in research and development expense is expected to increase significantly in 2021.

Sales, General and Administrative Expense

Sales, general and administrative expense for the year ended December 31, 2020 decreased by \$2.7 million, or 4%, to \$72.8 million compared to \$75.5 million for the year ended December 31, 2019. The decrease in sales, general and administrative expense was primarily attributable to a decrease in professional services of \$6.7 million, primarily resulting from \$12.7 million higher acquisition-related legal and professional fees incurred for the year ended December 31, 2019, partially offset by a \$6.0 million merger advisory fee incurred in the first quarter of 2020; an increase of \$2.9 million in salary and bonus expenses for the year ended December 31, 2020 and an increase of \$1.0 million in stock-based compensation as a result of resuming the Employee Stock Purchase Plan ("ESPP") in 2020 and higher executive-level stock-based compensation. Sales, general and administrative expense included stock-based compensation expense of \$8.2 million and \$6.8 million during the year ended December 31, 2020 and 2019, respectively.

We expect sales, general, and administrative expense to increase significantly in 2021, as we added a number of senior level executives to our commercial organization in early 2021, and we plan to more than double our number of quota-carrying sales representatives during the year. Stock-based compensation included in sales, general, and administrative expense is expected to increase significantly in 2021.

Gain from Reverse Termination Fee from Illumina

As part of the Termination Agreement, Illumina paid us a Reverse Termination Fee of \$98.0 million in the first quarter of 2020. Pursuant to the Termination Agreement, in the event that, on or prior to September 30, 2020, we entered into a definitive agreement providing for, or consummated, a Change of Control Transaction, then we may have been required to repay the Reverse Termination Fee (without interest) to Illumina in connection with the consummation of such Change of Control Transaction. We deferred the gain from the Reverse Termination Fee from Illumina until the date when the associated contingency was resolved. On October 1, 2020, the contingency clauses lapsed and we recorded the \$98.0 million as a part of other income.

Gain from Continuation Advances from Illumina

As part of the Termination Agreement, Illumina paid us Continuation Advances of \$18.0 million during the fourth quarter of 2019 and \$34.0 million during the first quarter of 2020. We recorded the \$34.0 million and \$18.0 million as a part of other income for the year ended December 31, 2020 and 2019, respectively.

Up to the full \$52.0 million of Continuation Advances paid to us are repayable without interest to Illumina if, within two years of March 31, 2020, we enter into, or consummate a Change of Control Transaction or raise 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 our 1.50% Convertible Senior Notes due 2028, \$52.0 million of Continuation Advances were paid without interest to Illumina in February 2021. Refer to Note 11, "Subsequent Events" within the Consolidated Financial Statements on Item 8 of this report for additional details.

Interest Expense

Interest expense for the year ended December 31, 2020 decreased \$2.3 million compared to 2019, as the debt agreement with Deerfield entered into in February 2013 (the "Facility Agreement") matured in February 2020.

Other Income, Net

The increase in Other income, net was primarily driven by a \$1.0 million foreign exchange gain recognized for the year ended December 31, 2020 compared to a \$0.1 million foreign exchange loss recognized for the year ended December 31, 2019.

Liquidity and Capital Resources

Cash, cash equivalents and investments at December 31, 2020 totaled \$318.8 million, compared to \$49.1 million at December 31, 2019. The increase was attributable to the proceeds from our public offerings of common stock completed in August 2020 and November 2020, as well as the Reverse Termination Fee and Continuation Advances we received from Illumina, partially offset by cash used in operations and a \$16.0 million repayment of debt in the first quarter of 2020. We believe that our existing cash, cash equivalents and investments will be sufficient to fund our projected operating requirements for at least the next 12 months from the date of filing of this Annual Report on Form 10-K for the year ended December 31, 2020.

As part of the Termination Agreement with Illumina, up to \$52.0 million of the Continuation Advances that we received from Illumina are repayable without interest to Illumina if, within two years of March 31, 2020, we enter into, or consummate a Change of Control Transaction or raise at least \$100 million in a single equity or debt financing (may have multiple closings), with the amount payable dependent on the amount raised by us.

On February 9, 2021, we entered into an 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 the Company's 1.50% Convertible Senior Notes due 2028 (the "Notes"). As a result of the Notes, \$52.0 million of Continuation Advances were paid without interest to Illumina in February 2021. Refer to Note 11, "Subsequent Events" within the Consolidated Financial Statements on Item 8 of this report for additional details.

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; 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; and other factors. There can be no assurance that funds will be available on favorable terms, or at all.

Operating Activities

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

In 2020, cash provided by operating activities was \$19.5 million, reflecting a net income of \$29.4 million, which include a gain from the Reverse Termination Fee received from Illumina of \$98.0 million and a gain from the Continuation Advances from Illumina of \$34.0 million. However, the Continuation Advances are considered a financing activity and therefore an associated \$34.0 million adjustment has been reflected to cash provided by operating activities. The net income of \$29.4 million included non-cash expense items such as stock-based compensation of \$17.5 million and depreciation of \$6.4 million. The change in net operating assets and liabilities was primarily attributed to an increase of \$4.1 million in accrued expenses and an increase of \$5.0 million in other liabilities, partially offset by a decrease of \$5.1 million in accounts payable.

In 2019, cash used in operating activities was \$78.3 million, reflecting a net loss of \$84.1 million, adjusted for non-cash items such as stock-based compensation of \$16.4 million and depreciation of \$7.3 million. The change in net operating assets and liabilities was primarily attributed to a decrease of \$3.9 million in inventory, partially offset by an increase of \$6.7 million in accounts receivable.

Investing Activities

Our investing activities consist primarily of capital expenditures and investment purchases, sales and maturities.

In 2020, net cash used in investing activities was \$219.3 million, comprised of net purchases of investments of \$218.3 million and purchases of property and equipment of \$1.0 million.

In 2019, net cash provided by investing activities was \$62.0 million, comprised of net purchase of investments of \$64.8 million and net purchase of property and equipment of \$2.8 million.

Financing Activities

In 2020, cash provided by financing activities was \$251.8 million, comprised of total net proceeds of \$187.5 million from our August 2020 and November 2020 underwritten public equity offerings after deducting underwriter commissions and paid offering expenses, \$34.0 million of Continuation Advances from Illumina and proceeds of \$46.4 million from the issuance of common stock through our equity compensation plans, partially offset by \$16.0 million we repaid for the remaining outstanding principal to Deerfield upon the maturity of the Facility Agreement.

In 2019, cash provided by financing activities was \$26.5 million, comprised of \$18.0 million of Continuation Advances from Illumina and net proceeds of \$8.5 million from the issuance of common stock through our equity compensation plans.

Underwritten Public Equity Offering

In August 2020, we entered into an underwriting agreement, relating to the public offering of 19,430,000 shares of our common stock, \$0.001 par value per share, at a price to the public of \$4.47 per share. Under the terms of the underwriting agreement, we also granted the underwriters a 30-day option to purchase up to an additional 2,914,500 shares of our common stock, which was subsequently exercised in full, and the offering including the sale of shares of common stock subject to the underwriters' option, closed in August 2020. In total, we sold 22.3 million shares of our common stock. We paid a commission equal to 6% of the gross proceeds from the sale of shares of our common stock. The total net proceeds to us from the offering after deducting the underwriting discount were approximately \$93.9 million, excluding approximately \$0.3 million of offering expenses.

In November 2020, we entered into an underwriting agreement, relating to the public offering of 6,096,112 shares of our common stock, \$0.001 par value per share, at a price to the public of \$14.25 per share. Under the terms of the underwriting agreement, we also granted the underwriters a 30-day option to purchase up to an additional 914,416 shares of our common stock, which was subsequently exercised in full, and the offering including the sale of shares of common stock subject to the underwriters' option, closed in November 2020. In total, we sold 7.0 million shares of our common stock. We paid a commission equal to 6% of the gross proceeds from the sale of shares of our common stock. The total net proceeds to us from the offering after deducting the underwriting discount were approximately \$93.9 million, excluding approximately \$0.3 million of offering expenses, \$0.2 million of which was unpaid as of December 31, 2020.

In total, for the year ended December 31, 2020, we issued 29.4 million shares of our common stock through our two underwritten public offerings with an average offering price of \$6.40. The total net proceeds to us from the two offerings, after deducting the underwriting commission and offering expenses, were approximately \$187.2 million.

Debt Facility Agreement

In February 2013, we entered into a debt facility agreement with Deerfield, pursuant to which we received \$20.5 million in funding and issued promissory notes in the aggregate principal amount of \$20.5 million. The promissory notes bore simple interest at a rate of 8.75% per annum, payable quarterly in arrears commencing on April 1, 2013 and on the first business day of each January, April, July and October thereafter. The debt facility agreement had a maximum term of seven years. We received net proceeds of \$20.0 million, representing \$20.5 million of gross proceeds, less a \$500,000 facility fee, before deducting other expenses of the transaction. On June 23, 2017, pursuant to a partial exercise by the promissory notes holders of their right to elect to receive up to 25% of the net proceeds from any financing that includes an equity component, we paid \$4.5 million of outstanding principal, together with accrued and unpaid interest, to one of the promissory notes holders with proceeds from our underwritten public equity offering. As of December 31, 2019, a balance of \$16.0 million aggregate principal amount of debt remained outstanding under this facility and was presented as "Notes payable, current" on the consolidated balance sheet as of December 31, 2019.

In February 2020, upon the maturity of the debt, we repaid the remaining outstanding principal of \$16.0 million and interest to Deerfield.

Critical Accounting Policies and Estimates

Management's Discussion and Analysis of Financial Condition and Results of Operations is based upon our Consolidated Financial Statements, which we have prepared in accordance with U.S. GAAP. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, cost of revenue, and operating expenses, and related disclosure of contingent assets and liabilities. Management based its estimates on historical experience and on various other assumptions that it believes to be reasonable under the circumstances, the results of which form the basis for making judgements about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ materially from these estimates under different assumptions or conditions.

An accounting policy is deemed to be critical if it requires an accounting estimate to be made based on assumptions about matters that are highly uncertain at the time the estimate is made, if different estimates reasonably could have been used, or if changes in the estimate that are reasonably likely to occur could materially impact the financial statements.

Revenue Recognition

Our revenue is generated primarily from the sale of products and services. Product revenue primarily consists of sales of our instruments and related consumables; Service and other revenue consist primarily of revenue earned from product maintenance agreements.

We account for a contract with a customer when there is a legally enforceable contract between us and the customer, the rights of the parties are identified, the contract has commercial substance, and collectability of the contract consideration is probable. Revenues are recognized when control of the promised goods or services is transferred to our customers or services are performed, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. Taxes we collect concurrent with revenue-producing activities are excluded from revenue.

Our instrument sales are generally sold in a bundled arrangement and commonly include the instrument, instrument accessories, installation, training, and consumables. Additionally, our instrument sale arrangements generally include a one year period of service. For such bundled arrangements, we account for individual products and services separately if they are distinct, that is, if a product or service is separately identifiable from other items in the bundled package and if a customer can benefit from it on its own or with other resources that are readily available to the customer. Our customers cannot benefit from our instrument systems without installation, and installation

can only be performed by us or qualified distributors. As a result, the system and installation are considered to be a single performance obligation recognized after installation is completed except for sales to qualified distributors, in which case the system is distinct and recognized when control has transferred to the distributor which typically occurs upon shipment.

The consideration for bundled arrangements is allocated between separate performance obligations based on their individual standalone selling price ("SSP"). The SSP is determined based on observable prices at which we separately sell the products and services. If a SSP is not directly observable, then we will estimate the SSP by considering multiple factors including, but not limited to, overall market conditions, including geographic or regional specific factors, internal costs, profit objectives, pricing practices and other observable inputs.

We recognize revenues as performance obligations are satisfied by transferring control of the product or service to the customer or over the term of a product maintenance agreement with a customer. Our revenue arrangements generally do not provide a right of return.

Contract liabilities and contract assets - Contract liabilities consist of deferred revenue. We record deferred revenues when cash payments are received or due in advance of our performance for product maintenance agreements. Deferred revenue is recognized over the related performance period, generally one year to three years, on a straight-line basis as we are standing ready to provide services and a time-based measure of progress best reflects the satisfaction of the performance obligation.

Other practical expedients and exemptions - Customers generally are invoiced upon acceptance of the system, which is also the start of the one year service period. As such, there is typically not more than a one year difference between the receipt of cash and the provision of services. Therefore, we apply the practical expedient and do not account for any potential significant financing benefit. However, it is noted that some customers will pre-order extended service periods at the time of the initial system sale. These customers may choose to make quarterly or annual payments or prepay multiple years of service upfront but there is no pricing difference between these different payment options. As such, no significant financing component is believed to exist with any of our existing arrangements.

Inventories

Inventories are stated at the lower of cost or net realizable value on a first-in, first-out ("FIFO") basis. The cost basis of our inventory is reduced for any products that are considered excessive or obsolete based upon assumptions about future demand, market conditions and the release of new products that may supersede old ones. If actual future demand or market conditions are less favorable than those projected by management, additional inventory write-downs may be required, which could have a material adverse effect on the results of our operations.

Recent Accounting Pronouncements

Please see "Note 3. Summary of Significant Accounting Policies", subsection titled "Recent Accounting Pronouncements", in Part II, Item 8 of this Annual Report on Form 10-K for information regarding applicable recent accounting pronouncements.

Contractual Obligations, Commitments and Contingencies

The following table provides our future contractual obligations as of December 31, 2020:

	Payments due by period (in thousands)						
	Total	2021	2022	2023	2024	2025	After
Operating lease obligations (1)	\$ 54,054	\$ 7,330	\$ 7,502	\$ 7,704	\$ 7,920	\$ 8,136	\$ 15,462
Total contractual obligations	<u>\$ 54,054</u>	<u>\$ 7,330</u>	<u>\$ 7,502</u>	<u>\$ 7,704</u>	<u>\$ 7,920</u>	<u>\$ 8,136</u>	<u>\$ 15,462</u>

(1) Maintenance, insurance, taxes and contingent rent obligations are excluded.

Other Purchase Commitments

In addition, we had other purchase commitments of an estimated amount of approximately \$18.2 million as of December 31, 2020, consisting of open purchase orders and contractual obligations in the ordinary course of business, including commitments with contract manufacturers and suppliers for which we have not received the goods or services, and acquisition and licensing of intellectual property. A majority of these purchase obligations are due within a year. Although open purchase orders are considered enforceable and legally binding, the terms generally allow us the option to cancel, reschedule and adjust our requirements based on our business needs prior to the delivery of goods or performance of services.

License Agreements

Payments related to licensing and other arrangements not included in the contractual obligations table include amounts related to cancelable license agreements with third parties for certain patent rights and technology. Under the terms of these agreements, we may be obligated to pay royalties based on revenue from the sales of licensed products, or minimum royalties, whichever is greater, and license maintenance fees. The future license maintenance fees and minimum royalty payments under the license agreements are not deemed to be material.

The table above reflects only payment obligations that are fixed and determinable. Future royalties under our license agreements are not included in the table above because we cannot, at this time, determine when or if the events triggering any such payment obligations will occur or the amounts that will become potentially payable.

Legal Proceedings

Please see Item 3 "Legal Proceedings" of this Annual Report on Form 10-K for additional information.

Off-Balance Sheet Arrangements

As of December 31, 2020, 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 negligent 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 such third parties and us in connection with such fundraising efforts. To the extent that such indemnification obligations apply to the lawsuits described in "Note 6. Commitments and Contingencies" in Part II, Item 8 of this Annual Report on Form 10-K, any associated expenses incurred are included within the related accrued litigation expense amounts. No additional liability associated with such indemnification agreements has been recorded at December 31, 2020.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate and Market Risk

Our exposure to market risk is confined to our cash, cash equivalents and our investments. The goals of our investment policy are preservation of capital, fulfillment of liquidity needs and fiduciary control of cash and cash equivalents and investments. We also seek to maximize income from our investments without assuming significant risk. To achieve our goals, we maintain a portfolio of cash equivalents and investments in a variety of securities of high credit quality. The securities in our investment portfolio are not leveraged, are classified as available for sale and are, due to their short-term nature, subject to minimal interest rate risk. We currently do not hedge interest rate exposure. Because of the short-term maturities of our investments, we do not believe that an increase in market rates would have any material negative impact on the value of our investment portfolio.

Foreign Exchange Risk

The majority of our revenue, expense, and capital purchasing activities are transacted in U.S. dollars. However, a portion of our operations consists of development and sales activities outside of the United States therefore we have foreign exchange exposures relating to non-U.S. dollar revenue, operating expense, accounts receivable, accounts payable and currency balances. Our primary exposure is with the Euro. A 10% strengthening of the U.S. dollar exchange rate against all currencies with which we have exposure, after taking into account offsetting positions at December 31, 2020 would have resulted in a \$0.5 million decrease in the carrying amounts of those net assets. Actual gains and losses in the future may differ materially from the hypothetical gains and losses discussed above based on changes in the timing and amount of foreign currency exchange rate movements and our actual exposure.

Our international operations are subject to risks typical of international operations, including, but not limited to, differing economic conditions, changes in political climate, differing tax structures, other regulations and restrictions and foreign exchange rate volatility.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTAL DATA

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Pacific Biosciences of California, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Pacific Biosciences of California, Inc. (the Company) as of December 31, 2020 and 2019, the related consolidated statements of operations and comprehensive income (loss), stockholders' equity and cash flows for each of the three years in the period ended December 31, 2020, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

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

Critical Audit Matter

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

Revenue recognition – Non-standard revenue contracts

Description of the Matter

As described in Note 3 to the consolidated financial statements, the Company's instrument is generally sold in a bundled arrangement and commonly includes the instrument, instrument accessories, installation, one-year period of service, training, and consumables. The Company enters into non-standard sales arrangements for which significant discounts may be offered on the different components of the bundled arrangements and for which historical information for similar sales may not be available. As part of the Company's identification of performance obligations and the resulting determination of the allocation of contract consideration, the Company considers if these discounts represent a material right when compared to the estimated standalone selling prices, and therefore a performance obligation to be included in the allocation of the contract value. The Company also estimates the standalone selling price of each performance obligation to determine the allocation of consideration. To estimate the selling price of each performance obligation, the Company uses historical sales data, as well as management judgment.

Auditing the Company's estimated standalone selling price, their determination of whether there are material rights that represent performance obligations and the resulting allocation of the contract value for non-standard sales arrangements is complex and required a higher level of judgment due to the level of estimation and subjectivity in establishing the standard selling price of each performance obligation.

***How We Addressed the
Matter in Our Audit***

We tested the completeness of the identified performance obligations and tested the accuracy of the allocation of the total contract consideration among the identified performance obligations. In order to do this, our audit procedures included, among others, evaluating the accuracy and completeness of the underlying data used in management's calculation of the standard selling price for each performance obligation by agreeing the data to historical transactions and contract pricing for backlog orders. We tested the identification of performance obligations and the allocation of contract consideration using the standard selling price of each performance obligation for a sample of arrangements by reading the contracts with the customers and evaluating whether terms of the contracts (including future purchase options) resulted in material rights. We also performed sensitivity analyses of significant assumptions to evaluate the changes in revenue recognized for the period under audit that would result from changes in the Company's estimated standard selling price for the performance obligations.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2011.

Redwood City, California
February 26, 2021

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Consolidated Balance Sheets

	December 31,	December 31,
	2020	2019
(in thousands, except per share amounts)		
Assets		
Current assets		
Cash and cash equivalents	\$ 81,611	\$ 29,627
Investments	237,203	19,472
Accounts receivable	16,837	15,266
Inventory	14,230	13,312
Prepaid expenses and other current assets	4,870	3,069
Short-term restricted cash	836	300
Total current assets	355,587	81,046
Property and equipment, net	24,899	30,070
Operating lease right-of-use assets, net	29,951	32,827
Long-term restricted cash	3,500	4,000
Other long-term assets	43	42
Total assets	<u>\$ 413,980</u>	<u>\$ 147,985</u>
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	\$ 3,579	\$ 8,368
Accrued expenses	17,350	13,242
Deferred revenue, current	8,722	7,610
Operating lease liabilities, current	4,332	3,837
Notes payable, current	—	15,871
Other liabilities, current	4,519	225
Total current liabilities	38,502	49,153
Deferred revenue, non-current	1,568	1,951
Operating lease liabilities, non-current	37,667	41,964
Other liabilities, non-current	752	—
Total liabilities	<u>78,489</u>	<u>93,068</u>
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 192,294 and 153,119 shares at December 31, 2020 and December 31, 2019, respectively	192	153
Additional paid-in capital	1,372,083	1,120,999
Accumulated other comprehensive income	85	5
Accumulated deficit	(1,036,869)	(1,066,240)
Total stockholders' equity	<u>335,491</u>	<u>54,917</u>
Total liabilities and stockholders' equity	<u>\$ 413,980</u>	<u>\$ 147,985</u>

See accompanying notes to the consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Consolidated Statements of Operations and Comprehensive Income (Loss)

(in thousands, except per share amounts)	Years Ended December 31,		
	2020	2019	2018
Revenue:			
Product revenue	\$ 65,424	\$ 77,742	\$ 66,355
Service and other revenue	13,469	13,149	12,271
Total revenue	78,893	90,891	78,626
Cost of Revenue:			
Cost of product revenue	35,424	44,771	42,053
Cost of service and other revenue	10,903	11,544	11,477
Total cost of revenue	46,327	56,315	53,530
Gross profit	32,566	34,576	25,096
Operating Expense:			
Research and development	64,152	59,630	62,594
Sales, general and administrative	72,799	75,491	63,489
Total operating expense	136,951	135,121	126,083
Operating loss	(104,385)	(100,545)	(100,987)
Gain from Reverse Termination Fee from Illumina	98,000	—	—
Gain from Continuation Advances from Illumina	34,000	18,000	—
Interest expense	(267)	(2,611)	(2,423)
Other income, net	2,055	1,022	848
Net income (loss)	29,403	(84,134)	(102,562)
Other comprehensive income (loss):			
Unrealized gain (loss) on investments	80	41	(4)
Comprehensive income (loss)	\$ 29,483	\$ (84,093)	\$ (102,566)
Net income (loss) per share:			
Basic	\$ 0.18	\$ (0.55)	\$ (0.76)
Diluted	\$ 0.17	\$ (0.55)	\$ (0.76)
Weighted average shares outstanding used in calculating net income (loss) per share			
Basic	165,187	152,527	135,094
Diluted	174,970	152,527	135,094

See accompanying notes to the consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Consolidated Statements of Stockholders' Equity

(in thousands)	Common Stock		Additional Paid-in Capital	\$	(32)	\$	(879,733)	\$	Total Stockholders' Equity
	Shares	Amount							
Balance at December 31, 2017	116,277	\$ 116	\$ 965,752	\$ (32)	\$ (879,733)	\$ 86,103			
Net loss	—	—	—	—	(102,562)		(102,562)		
Other comprehensive income (loss)	—	—	—	(4)	—		(4)		
ASC606 adoption effect					189		189		
Issuance of common stock in conjunction with equity plans	3,357	4	9,648	—	—		9,652		
Issuance of common stock from Underwritten Public Equity Offerings, net of issuance costs	30,610	30	97,500	—	—		97,530		
Stock-based compensation expense	—	—	23,153	—	—		23,153		
Balance at December 31, 2018	150,244	150	1,096,053	(36)	(982,106)		114,061		
Net loss	—	—	—	—	(84,134)		(84,134)		
Other comprehensive income (loss)	—	—	—	41	—		41		
Issuance of common stock in conjunction with equity plans	2,875	3	8,545	—	—		8,548		
Stock-based compensation expense	—	—	16,401	—	—		16,401		
Balance at December 31, 2019	153,119	\$ 153	\$ 1,120,999	\$ 5	\$ (1,066,240)		\$ 54,917		
Net income	—	—	—	—	29,403		29,403		
Other comprehensive income (loss)	—	—	—	80	—		80		
ASC326 adoption effect					(32)		(32)		
Issuance of common stock in conjunction with equity plans	9,819	10	46,350	—	—		46,360		
Issuance of common stock from Underwritten Public Equity Offerings, net of issuance costs	29,356	29	187,201	—	—		187,230		
Stock-based compensation expense	—	—	17,533	—	—		17,533		
Balance at December 31, 2020	192,294	\$ 192	\$ 1,372,083	\$ 85	\$ (1,036,869)		\$ 335,491		

See accompanying notes to the consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
Consolidated Statements of Cash Flows

(in thousands)	Years Ended December 31,		
	2020	2019	2018
Cash flows from operating activities			
Net income (loss)	\$ 29,403	\$ (84,134)	\$ (102,562)
Adjustments to reconcile net loss to net cash used in operating activities			
Gain from Continuation Advances from Illumina	(34,000)	(18,000)	—
Depreciation	6,428	7,265	7,215
Amortization of right-of-use assets	2,876	2,683	—
Amortization of debt discount and financing costs	129	1,212	1,024
Stock-based compensation	17,533	16,401	23,153
(Gain) loss from derivative	—	(16)	(167)
Amortization and accretion for investment premium (discount)	(107)	(913)	(758)
Loss on disposition of equipment	—	194	—
Changes in assets and liabilities			
Accounts receivable	(1,603)	(6,671)	4,838
Inventory	(1,096)	3,915	3,623
Prepaid expenses and other assets	(1,063)	(523)	(290)
Accounts payable	(5,072)	1,713	(2,239)
Accrued expenses	4,102	2,333	183
Deferred revenue	729	2,134	33
Operating lease liabilities	(3,802)	(3,428)	—
Other liabilities	5,046	(2,477)	(483)
Net cash provided by (used in) operating activities	19,503	(78,312)	(66,430)
Cash flows from investing activities			
Purchase of property and equipment	(1,039)	(2,836)	(1,854)
Purchase of investments	(373,283)	(57,727)	(122,183)
Sales of investments	1,400	1,500	2,442
Maturities of investments	153,600	121,110	83,180
Net cash provided by (used in) in investing activities	(219,322)	62,047	(38,415)
Cash flows from financing activities			
Continuation Advances from Illumina	34,000	18,000	—
Proceeds from issuance of common stock from equity plans	46,360	8,548	9,652
Notes payable principal payoff	(16,000)	—	—
Proceeds from issuance of common stock from underwritten public equity offerings, net of issuance costs	187,479	—	97,530
Net cash provided by financing activities	251,839	26,548	107,182
Net increase in cash and cash equivalents and restricted cash	52,020	10,283	2,337
Cash and cash equivalents and restricted cash at beginning of period	33,927	23,644	21,307
Cash and cash equivalents and restricted cash at end of period	\$ 85,947	\$ 33,927	\$ 23,644
Cash and cash equivalents at end of period	81,611	29,627	18,844
Restricted cash at end of period	4,336	4,300	4,800
Cash and cash equivalents and restricted cash at end of period	\$ 85,947	\$ 33,927	\$ 23,644
Supplemental disclosure of cash flow information			
Interest paid	\$ 491	\$ 1,400	\$ 1,400
Supplemental disclosure of non-cash investing and financing activities			
Inventory transferred to property and equipment	1,097	2,062	1,871
Property and equipment transferred to inventory	(919)	(1,536)	(343)

See accompanying notes to the consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Notes to Consolidated Financial Statements

NOTE 1. OVERVIEW

We design, develop and manufacture sequencing systems to help scientists resolve genetically complex problems. Based on our novel Single Molecule, Real-Time (SMRT®) sequencing technology, our products enable: *de novo* genome assembly to finish genomes in order to more fully identify, annotate and decipher genomic structures; full-length transcript analysis to improve annotations in reference genomes, characterize alternatively spliced isoforms in important gene families, and find novel genes; targeted sequencing to more comprehensively characterize genetic variations; and real-time kinetic information for epigenome characterization. Our technology provides high accuracy, ultra-long reads, uniform coverage and the ability to simultaneously detect epigenetic changes. PacBio® sequencing systems, including associated consumables and software, provide a simple and fast end-to-end workflow for SMRT sequencing.

Our current products include the Sequel II and Sequel IIE instruments and SMRT Cell 8M, which when used together are capable of sequencing up to approximately eight million DNA molecules simultaneously, and the previous generation Sequel instrument and Sequel SMRT Cell 1M, which when used together are capable of sequencing up to approximately one million DNA molecules simultaneously. 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.

Our research and development efforts are focused on developing new products and further improving our existing products including continuing chemistry and sample preparation improvements to increase throughput and expand our supported applications. By providing access to genetic information that was previously inaccessible, we enable scientists to confidently increase their understanding of biological systems.

The names “Pacific Biosciences,” “PacBio,” “SMRT,” “SMRTbell,” “Sequel” and our logo are our trademarks.

NOTE 2. TERMINATION OF MERGER WITH ILLUMINA

On November 1, 2018, we entered into an Agreement and Plan of Merger (as amended, the “Merger Agreement”) with Illumina, Inc. (“Illumina”) and FC Ops Corp., a wholly owned subsidiary of Illumina (“Merger Subsidiary”). On January 2, 2020, we, Illumina and Merger Subsidiary, 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”), of \$18.0 million during the fourth quarter of 2019 and \$34.0 million during the first quarter of 2020. We recorded the \$34.0 million and \$18.0 million as a part of other income in the consolidated statements of operations and comprehensive income (loss) for the year ended December 31, 2020 and 2019, respectively. Please refer to “Note 4. Financial Instruments” for the accounting treatment of the Continuation Advances.

Up to the full \$52.0 million of Continuation Advances paid to us are repayable without interest to Illumina if, within two years of March 31, 2020, we enter into, or consummate a Change of Control Transaction or raise 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. Please see “Note 11. Subsequent Events” for additional information.

Reverse Termination Fee from Illumina

As part of the Termination Agreement, Illumina paid us a \$98.0 million termination fee (“Reverse Termination Fee”), from which we paid our financial advisor associated fees of \$6.0 million in April 2020. We recorded the \$6.0 million of associated fees we paid to our financial advisor in the “Sales, general and administrative” expense line in the consolidated statements of operations and comprehensive income (loss) for the year ended December 31, 2020.

Pursuant to the Termination Agreement, in the event that, on or prior to September 30, 2020, we entered into a definitive agreement providing for, or consummated, a Change of Control Transaction, then we may have been required to repay the Reverse Termination Fee (without interest) to Illumina in connection with the consummation of such Change of Control Transaction. If such Change of Control Transaction was not consummated by the two year anniversary of the execution of the definitive agreement for such Change of Control Transaction, then we would not have been required to repay the Reverse Termination Fee. As indicated in ASC 450, *Contingencies*, a gain contingency usually is not recognized in the financial statements until the period in which all contingencies are resolved and the gain is realizable. As such, we deferred the gain from the Reverse Termination Fee from Illumina until the date when the associated contingency lapsed. On October 1, 2020, the contingency clauses lapsed and we recorded the \$98.0 million as a part of other income in the consolidated statements of operations and comprehensive income (loss) for the year ended December 31, 2020.

NOTE 3. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation and Consolidation

Our 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 consolidated financial statements include the accounts of Pacific Biosciences and our wholly owned subsidiaries. All intercompany transactions and balances have been eliminated. Translation adjustments resulting from translating foreign subsidiaries' results of operations and assets and liabilities into U.S. dollars are immaterial for all periods presented.

COVID-19

We are subject to risks and uncertainties as a result of the novel coronavirus pandemic (COVID-19). The extent of the impact of the COVID-19 pandemic on our business is highly uncertain as responses to the pandemic can change quickly and information is rapidly evolving. We considered the impact of COVID-19 on the assumptions and estimates used to determine the results reported and asset valuations as of December 31, 2020.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires us to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes to the financial statements. Our estimates include, but are not limited to, the valuation of inventory, the determination of stand-alone selling prices for revenue recognition, the valuation of a financing derivative and long-term notes, the probability of repaying the Continuation Advances and Reverse Termination Fee to Illumina, the valuation and recognition of share-based compensation, the expected renewal period for service contracts to derive the amortization period for capitalized commissions, the useful lives assigned to long-lived assets, the recognition and measurement of current and deferred income tax assets, along with the assessment of recoverability and the determination of the internal borrowing rate used in calculating the operating lease right-of-use assets and operating lease liabilities. Actual results could differ materially from these estimates.

Reclassifications

Certain prior year amounts in the consolidated financial statements have been reclassified to conform to the current year presentation with no effect on previously reported net loss, comprehensive loss, cash flows or stockholders' equity.

Accounting Changes

In June 2016, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, 2016-13 *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("Topic 326"), which replaces existing incurred loss impairment guidance and establishes a single allowance framework for financial assets carried at amortized cost. We adopted Topic 326 on January 1, 2020, using a modified retrospective transition method, which requires a cumulative-effect adjustment to the opening balance of retained earnings/accumulated deficit to be recognized on the date of adoption with prior periods not restated. The adoption of Topic 326 did not have a material impact on our financial statements and our bad debt expense was immaterial as of December 31, 2020.

Cash, Cash Equivalents and Investments

We consider all highly liquid investments purchased with an original maturity of three months or less to be cash equivalents. We have designated all investments as available-for-sale and therefore, such investments are reported at fair value, with unrealized gains and losses recognized in accumulated other comprehensive income (loss) ("OCI") in stockholders' equity. The cost of marketable securities is adjusted for the amortization of premiums and discounts to expected maturity. Premium and discount amortization is included in other income, net. Realized gains and losses, as well as interest income, on available-for-sale securities are also included in other income, net. The cost of securities sold is based on the specific identification method. We include all of our available-for-sale securities in current assets.

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

Concentration and Credit Risks

Financial instruments that potentially subject us to credit risk consist principally of interest-bearing investments and trade receivables. We maintain cash, cash equivalents and investments with various major financial institutions. The counterparties to the agreements relating to our investment securities consist of various major corporations, financial institutions, municipalities and government agencies of high credit standing.

We perform periodic evaluations of the relative credit standing of these financial institutions. In addition, we perform periodic evaluations of the relative credit quality of its investments. All of our investments are subject to a periodic impairment review. We recognize an impairment charge when a decline in the fair value of our investments below the cost basis is judged to be other-than-temporary. Factors considered in determining whether a loss is temporary include the length of time and the extent to which an investment's fair value has been less than its cost basis, the financial condition and near-term prospects of the investee, the extent of the loss related to credit of the issuer, the expected cash flows from the security, our intent to sell the security and whether or not we will be required to sell the security before the recovery of its amortized cost. For the years ended December 31, 2020, 2019 and 2018, we did not have any impairment charges on our investments as it is more likely than not that we will recover their amortized cost basis upon sale or maturity.

Our trade receivables are derived from net revenue to customers and distributors located in the United States and other countries. We perform credit evaluations of our customers' financial condition and, generally, require no collateral from our customers. The allowance for doubtful accounts is based on our assessment of the collectability of customer accounts. We regularly review our trade receivable including consideration of factors such as historical experience, the age of the accounts receivable balances, customer creditworthiness, customer industry, and current and forecasted economic conditions that may affect a customer's ability to pay. We have not experienced any significant credit losses to date.

Although we have historically not experienced significant credit losses, our exposure to credit losses may increase if our customers are adversely affected by changes in economic pressures or uncertainty associated with local or global economic recessions, disruption associated with the current COVID-19 pandemic, or other customer-specific factors.

For the years ended December 31, 2020, 2019 and 2018, one customer, Gene Company Limited, accounted for approximately 14%, 17% and 26% our total revenue, respectively.

As of December 31, 2020 and 2019, 43% and 55% of our accounts receivable were from domestic customers, respectively. As of December 31, 2020, two customers, Berry Genomics Co., Ltd and Gene Company Limited, represented approximately 15% and 12% of our net accounts receivable, respectively. As of December 31, 2019, customer, Gene Company Limited, represented approximately 11% of our net accounts receivable.

We currently purchase several key parts and components used in the manufacture of our products from a limited number of suppliers. Generally, we have been able to obtain an adequate supply of such parts and components. However, an extended interruption in the supply of parts and components currently obtained from our suppliers could adversely affect our business and consolidated financial statements.

Inventory

Inventories are stated at the lower of average cost or net realizable value. Cost is determined using the first-in, first-out ("FIFO") method. Adjustments to reduce the cost of inventory to its net realizable value, if required, are made for estimated excess or obsolete balances. Cost includes depreciation, labor, material, and overhead costs, including product and process technology costs while determining net realizable value of inventories involves numerous judgements, including projecting future average selling prices, sales volumes, and costs to complete products in work in process inventories.

We enter into inventory purchases and commitments so that we can meet future shipment schedules based on forecasted demand for our products. The business environment in which we operate is subject to rapid changes in technology and customer demand. We perform a detailed assessment of inventory each period, which includes a review of, among other factors, demand requirements, product life cycle and development plans, component cost trends, product pricing, product expiration, and quality issues. Based on our analysis, we record adjustments to inventory for potentially excess, obsolete, or impaired goods, when appropriate, in order to report inventory at net realizable value. Inventory adjustments may be required if actual demand, component costs, supplier arrangements, or product life cycles differ from our estimates. Any such adjustments would result in a charge to our results of operations.

Property and Equipment, Net

Property and equipment are stated at cost, net of accumulated depreciation and any impairment charges. Depreciation is computed using the straight-line method over the estimated useful life of the asset, generally two years to three years for computer equipment, three years to five years for software, three years to seven years for furniture and fixtures and three years to five years for lab equipment. Leasehold improvements are depreciated over the shorter of the lease term or the estimated useful life of the related asset. Major improvements are capitalized, while maintenance and repairs are expensed as incurred.

Impairment of Long-Lived Assets

We periodically review property and equipment for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset is impaired or the estimated useful lives are no longer appropriate. Fair value is estimated based on discounted future cash flows. If indicators of impairment exist and the undiscounted projected cash flows associated with such assets are less than the carrying amount of the asset, an impairment loss is recorded to write the asset down to its estimated fair value. To date, we have not recorded any impairment charges.

Operating Leases

We lease administrative, manufacturing and laboratory facilities under operating leases. Lease agreements may include rent holidays, rent escalation clauses and tenant improvement allowances. We recognize scheduled rent increases on a straight-line basis over the lease term beginning with the date we take possession of the leased space. Leasehold improvements are capitalized at cost and depreciated over the shorter of their expected useful life or the life of the lease. On January 1, 2019, we adopted ASC 842, which requires the recognition of the right-of-use assets and related operating and finance lease liabilities on the consolidated balance sheet. Operating lease assets and liabilities are reflected within "Operating lease right-of-use assets, net", "Operating lease liabilities, current" and "Operating lease liabilities, non-current" on the consolidated balance sheets. These assets and liabilities are recognized at the commencement date based on the present value of remaining minimum lease payments over the lease term using our estimated secured incremental borrowing rates at the effective date of January 1, 2019.

Leases with terms of 12 months or less are expensed on a straight-line basis over the term and are not recorded in the consolidated balance sheets.

Short-term Restricted Cash

At December 31, 2020 the short-term restricted cash balance of \$0.8 million was comprised of \$0.5 million of a customer deposit and \$0.3 million of the security deposit for the credit cards for employees.

Long-term Restricted Cash

Under the lease agreement for our corporate offices, we were required to establish a letter of credit for the benefits 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, on May 1, 2019 the \$4.5 million in restricted cash was reduced to \$4.0 million and on May 1, 2020 the \$4.0 million in restricted cash was reduced to \$3.5 million.

Revenue Recognition

Our revenue is generated primarily from the sale of products and services. Product revenue primarily consists of sales of our instruments and related consumables; service and other revenue primarily consists of revenue earned from product maintenance agreements.

We account for a contract with a customer when there is a legally enforceable contract between us and the customer, the rights of the parties are identified, the contract has commercial substance, and collectability of the contract consideration is probable. Revenues are recognized when control of the promised goods or services is transferred to our customers or services are performed, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. Taxes we collect concurrent with revenue-producing activities are excluded from revenue.

Our instrument sales are generally sold in a bundled arrangement and commonly include the instrument, instrument accessories, installation, training, and consumables. Additionally, our instrument sale arrangements generally include a one year period of service. For such bundled arrangements, we account for individual products and services separately if they are distinct, that is, if a product or service is separately identifiable from other items in the bundled package and if a customer can benefit from it on its own or with other resources that are readily available to the customer. Our customers cannot benefit from our instrument systems without installation, and installation can only be performed by us or qualified distributors. As a result, the system and installation are considered to be a single performance obligation recognized after installation is completed except for sales to qualified distributors, in which case the system is distinct and recognized when control has transferred to the distributor which typically occurs upon shipment.

The consideration for bundled arrangements is allocated between separate performance obligations based on their individual standalone selling price ("SSP"). The SSP is determined based on observable prices at which we separately sell the products and services. If a SSP is not directly observable, then we will estimate the SSP by considering multiple factors including, but not limited to, overall market conditions, including geographic or regional specific factors, internal costs, profit objectives, pricing practices and other observable inputs.

We recognize revenues as performance obligations are satisfied by transferring control of the product or service to the customer or over the term of a product maintenance agreement with a customer. Our revenue arrangements generally do not provide a right of return.

Contract liabilities and contract assets - Contract liabilities consist of deferred revenue. We record deferred revenues when cash payments are received or due in advance of our performance for product maintenance agreements. Deferred revenue is recognized over the related performance period, generally one year to three years, on a straight-line basis as we are standing ready to provide services and a time-based measure of progress best reflects the satisfaction of the performance obligation.

Other practical expedients and exemptions - Customers generally are invoiced upon acceptance of the system, which is also the start of the one year service period. As such, there is typically not more than a one year difference between the receipt of cash and the provision of services. Therefore, we apply the practical expedient and do not account for any potential significant financing benefit. However, it is noted that some customers will pre-order extended service periods at the time of the initial system sale. These customers may choose to make quarterly or annual payments or prepay multiple years of service upfront but there is no pricing difference between these different payment options. As such, no significant financing component is believed to exist with any of our existing arrangements.

Cost of Revenue

Cost of revenue reflects the direct cost of product components, third-party manufacturing services and our internal manufacturing overhead and customer service infrastructure costs incurred to produce, deliver, maintain and support our instruments, consumables, and services. There are no incremental costs associated with our contractual revenue; all product development costs are reflected in research and development expense.

Manufacturing overhead is predominantly comprised of labor and facility costs. We determine and capitalize manufacturing overhead into inventory based on a standard cost model that approximates actual costs.

Service costs include the direct costs of components used in support, repair and maintenance of customer instruments as well as the cost of personnel, materials, shipping and support infrastructure necessary to support our installed customer base.

Research and Development

Research and development expense consists primarily of expenses for personnel engaged in the development of our SMRT Sequencing technology, the design and development of our future products and current product enhancements. These expenses also include prototype-related expenditures, development equipment and supplies, facilities costs and other related overhead. We expense research and development costs during the period in which the costs are incurred. However, we defer and capitalize non-refundable advance payments made for research and development activities until the related goods are received or the related services are rendered.

Credit Losses

We adopted Topic 326 on January 1, 2020. The adoption of Topic 326 did not have a material impact on our financial statements and our bad debt expense was immaterial as of December 31, 2020.

Trade accounts receivable - The allowance for doubtful accounts is based on our assessment of the collectability of customer accounts. We regularly review the allowance by considering factors such as the age of the accounts receivable balances, customer creditworthiness, customer industry, and current and forecasted economic conditions that may affect a customer's ability to pay.

Available-for-sale debt securities - Our investment portfolio at any point in time contains investments in cash deposits, money market funds, commercial paper, corporate debt securities and US government and agency securities. We regularly review the securities in an unrealized loss position and evaluate the current expected credit loss by considering factors such as significance of loss, historical experience, market data, issuer-specific factors, and current economic conditions and concluded that an allowance for credit losses was not required as of December 31, 2020.

Although we have historically not experienced significant credit losses, our exposure to credit losses may increase if our customers are adversely affected by changes in economic pressures or uncertainty associated with local or global economic recessions, disruption associated with the current COVID-19 pandemic, or other customer-specific factors.

Income Taxes

We account for income taxes under the asset and liability method, which requires, among other things, that deferred income taxes be provided for temporary differences between the tax bases of our assets and liabilities and the amounts reported in the financial statements. In addition, deferred tax assets are recorded for the future benefit of utilizing net operating losses and research and development credit carryforwards. A full valuation allowance is provided against our net deferred tax assets as it is more likely than not that the deferred tax assets will not be fully realized.

We review our positions taken relative to income taxes. To the extent our tax positions are more likely than not going to result in additional taxes, we would accrue the estimated amount of tax related to such uncertain positions.

Stock-based Compensation

We account for share-based payments using a fair-value based method for costs related to all share-based payments, including stock options, restricted stock units, and stock issued under our employee stock purchase plan ("ESPP"). We estimate the fair value of share-based payment awards on the date of grant using an option-pricing model. See Note 8 for further information regarding stock-based compensation.

Other Comprehensive Income (loss)

Other comprehensive income (loss) is comprised of unrealized gains (losses) on our investment securities.

Shipping and Handling

Costs related to shipping and handling are included in cost of revenues for all periods presented.

Recent Accounting Pronouncements

Recently Issued Accounting Standards

In August 2020, the FASB issued ASU No. 2020-06, *Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*. This guidance simplifies the accounting for convertible instruments primarily by eliminating the existing cash conversion and beneficial conversion models within Subtopic 470-20, which will result in fewer embedded conversion options being accounted for separately from the debt host. The guidance also amends and simplifies the calculation of earnings per share relating to convertible instruments. This guidance is effective for annual periods beginning after December 15, 2021, including interim periods within that reporting period, excluding smaller reporting companies. Early adoption is permitted, but no earlier than fiscal years beginning after December 15, 2020, including interim periods within that reporting period, using either a full or modified retrospective approach. We are currently evaluating the impact of the provisions of this guidance on our consolidated financial statements.

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes*. This ASU simplifies the accounting for income taxes by clarifying and amending existing guidance related to the recognition of franchise tax, the evaluation of a step up in the tax basis of goodwill, and the effects of enacted changes in tax laws or rates in the effective tax rate computation, among other clarifications. The standard will be effective for our annual reporting periods beginning after December 15, 2020, including interim reporting periods within those fiscal years. We have evaluated the effect that this guidance will have on our Consolidated Financial Statements and determined it will not have a material impact.

Recently Adopted Accounting Standards

In June 2016, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, 2016-13 *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("Topic 326"), which replaces existing incurred loss impairment guidance and establishes a single allowance framework for financial assets carried at amortized cost. We adopted Topic 326 on January 1, 2020, using a modified retrospective transition method, which requires a cumulative-effect adjustment to the opening balance of retained earnings/accumulated deficit to be recognized on the date of adoption with prior periods not restated. The adoption of Topic 326 did not have a material impact on our financial statements and our bad debt expense was immaterial as of December 31, 2020.

NOTE 4. FINANCIAL INSTRUMENTS

Fair Value of Financial Instruments

The fair value hierarchy established under U.S. 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 December 31, 2020 and 2019, respectively (in thousands):

(in thousands)	December 31, 2020				December 31, 2019			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Assets								
<u>Cash and cash equivalents:</u>								
Cash and money market funds	\$ 43,040	\$ —	\$ —	\$ 43,040	\$ 18,644	\$ —	\$ —	\$ 18,644
Commercial paper	—	32,537	—	32,537	—	10,983	—	10,983
U.S. government & agency securities	—	170	—	170	—	—	—	—
U.S. Treasury security	—	5,864	—	5,864	—	—	—	—
Total cash and cash equivalents	43,040	38,571	—	81,611	18,644	10,983	—	29,627
<u>Investments:</u>								
Commercial paper	—	112,644	—	112,644	—	16,971	—	16,971
Corporate debt securities	—	17,456	—	17,456	—	2,501	—	2,501
U.S. government & agency securities	—	107,103	—	107,103	—	—	—	—
Total investments	—	237,203	—	237,203	—	19,472	—	19,472
<u>Short-term restricted cash:</u>								
Cash	836	—	—	836	300	—	—	300
<u>Long-term restricted cash:</u>								
Cash	3,500	—	—	3,500	4,000	—	—	4,000
Total assets measured at fair value	\$ 47,376	\$ 275,774	\$ —	\$ 323,150	\$ 22,944	\$ 30,455	\$ —	\$ 53,399
Liabilities								
Financing Derivative	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Continuation Advances	—	—	—	—	—	—	—	—
Total liabilities measured at fair value	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —

Estimated fair value of the Financing Derivative liability

The estimated fair value of the Financing Derivative liability (as defined in the “Notes payable, current” section in “Note 5. Balance Sheet Components”) was determined using Level 3 inputs, or significant unobservable inputs. Changes to the estimated fair value of the Financing Derivative are recorded in “Other income, net” in the consolidated statements of operations and comprehensive loss.

The estimated fair value of the Financing Derivative was determined by comparing the difference between the fair value of the promissory notes from the debt facility that we entered into during the first quarter of 2013 with and without the Financing Derivative by calculating the respective present values from future cash flows using a 6.5% discount rate at December 31, 2019. The estimated fair value of the Financing Derivative as of December 31, 2019 was \$0.

In February 2020, upon maturity of the promissory notes, the Financing Derivative was extinguished. Refer to the “Notes payable, current” section in “Note 5. Balance Sheet Components” for a detailed description and valuation approach.

Estimated fair value of the Continuation Advances liability

In accordance with the terms of the Merger Agreement, we received Continuation Advances of \$34.0 million and \$18.0 million from Illumina during the year ended December 31, 2020 and 2019, respectively.

We determined that the Continuation Advances, which are subject to repayment under certain circumstances as discussed below, constitute a financial liability.

The fair value option was elected for the financial liability because management believes that among all measurement methods allowed by Accounting Standards Codification, or ASC, 825, *Financial Instruments*, the fair value option would most fairly represent the value of such a financial liability. Management applied the income approach to estimate the fair value of this financial liability. The estimated fair value of the liability related to the Continuation Advances was determined using Level 3 inputs, or significant unobservable inputs. Management estimated that there would be no future cash outflows associated with this financial instrument because the probabilities of either of the following events occurring and requiring repayment to Illumina were evaluated as being remote as of December 31, 2020 and December 31, 2019:

we enter into a Change of Control Transaction within two years following March 31, 2020; or

we raise \$100 million or more in a single equity or debt financing (that may have multiple closings) within two years following March 31, 2020.

As a result, the estimated fair value of the liability associated with the contingent repayment of the Continuation Advances received was assessed to be zero as of December 31, 2020 and 2019, respectively, with a resulting non-operating gain of \$34.0 million and \$18.0 million recorded as “Gain from Continuation Advances from Illumina” for the year ended December 31, 2020 and 2019, respectively.

For the year ended December 31, 2020, 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.

Cash, Cash Equivalents and Investments

The following table summarizes our cash, cash equivalents and investments as of December 31, 2020 and 2019 (in thousands):

	As of December 31, 2020			
	Amortized Cost	Gross unrealized gains	Gross unrealized losses	Fair Value
Cash and cash equivalents:				
Cash and money market funds	\$ 43,040	\$ —	\$ —	\$ 43,040
Commercial paper	32,538	—	(1)	32,537
U.S. government & agency securities	170	—	—	170
U.S. Treasury security	5,864	—	—	5,864
Total cash and cash equivalents	81,612	—	(1)	81,611
Investments:				
Commercial paper	112,648	4	(8)	112,644
Corporate debt securities	17,360	96	—	17,456
U.S. government & agency securities	107,109	6	(12)	107,103
Total investments	237,117	106	(20)	237,203
Total cash, cash equivalents and investments	\$ 318,729	\$ 106	\$ (21)	\$ 318,814
Short-term restricted cash:				
Cash	\$ 836	\$ —	\$ —	\$ 836
Long-term restricted cash:				
Cash	\$ 3,500	\$ —	\$ —	\$ 3,500

	As of December 31, 2019			
	Amortized Cost	Gross unrealized gains	Gross unrealized losses	Fair Value
Cash and cash equivalents:				
Cash and money market funds	\$ 18,644	\$ —	\$ —	\$ 18,644
Commercial paper	10,983	—	—	10,983
Total cash and cash equivalents	29,627	—	—	29,627
Investments:				
Commercial paper	16,971	1	(1)	16,971
Corporate debt securities	2,496	5	—	2,501
Total investments	19,467	6	(1)	19,472
Total cash, cash equivalents and investments	\$ 49,094	\$ 6	\$ (1)	\$ 49,099
Short-term restricted cash:				
Cash	\$ 300	\$ —	\$ —	\$ 300
Long-term restricted cash:				
Cash	\$ 4,000	\$ —	\$ —	\$ 4,000

The following table summarizes the contractual maturities of our cash equivalents and available-for-sale investments, excluding money market funds, as of December 31, 2020:

	Fair Value
Due in one year or less	\$ 255,207
Due after one year through 5 years	20,567
Total investments	\$ 275,774

Our marketable debt investments are classified as current based on the nature of the investments and their availability for use in current operations.

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

NOTE 5. BALANCE SHEET COMPONENTS

Inventory

As of December 31, 2020 and 2019, our inventory consisted of the following components:

(in thousands)	December 31, 2020	December 31, 2019
Purchased materials	\$ 3,531	\$ 3,966
Work in process	6,651	4,594
Finished goods	4,048	4,752
Inventory	\$ 14,230	\$ 13,312

Property and Equipment, Net

As of December 31, 2020 and 2019, our property and equipment, net, consisted of the following components:

(in thousands)	2020	2019
Laboratory equipment and machinery	\$ 24,948	\$ 25,173
Leasehold improvements	29,931	29,902
Computer equipment	12,400	11,851
Software	4,940	4,747
Furniture and fixtures	2,434	2,422
Construction in progress	137	193
	74,790	74,288
Less: Accumulated depreciation	(49,891)	(44,218)
Property and equipment, net	\$ 24,899	\$ 30,070

Depreciation expense during the years ended December 31, 2020, 2019 and 2018 was \$6.4 million, \$7.3 million and \$7.2 million, respectively.

Accrued Expenses

As of December 31, 2020 and 2019, our accrued expenses consisted of the following components:

(in thousands)	2020	2019
Salaries and benefits	\$ 15,261	\$ 9,748
Accrued product development costs	415	67
Accrued Tenant Improvements for Menlo Park building	—	998
Inventory accrual	218	229
Accrued professional services and legal fees	726	943
Other	730	1,257
Accrued expenses	\$ 17,350	\$ 13,242

Deferred Revenue

As of December 31, 2020, we had a total of \$10.3 million of deferred revenue from our service contracts, \$8.7 million of which was recorded as “Deferred revenue, current” to be recognized over the next year and the remaining \$1.6 million was recorded as “Deferred revenue, non-current” to be recognized in the next 3 years. Revenue recorded in the year ended December 31, 2020 includes \$7.6 million, respectively, of previously deferred revenue that was included in “Deferred revenue, current” as of December 31, 2019. Contract assets as of December 31, 2020 and December 31, 2019 were not material.

As of December 31, 2020, we had a total of \$0.7 million of deferred commissions included in “Prepaid expenses and other current assets” which is recognized as the related revenue is recognized. Additionally, as a practical expedient, we expense costs to obtain a contract as incurred if the amortization period would have been a year or less.

Notes payable, current

As of December 31, 2019, a balance of \$16.0 million aggregate principal amount of debt remained outstanding under the debt agreement with Deerfield entered into in February 2013 and was presented as “Notes payable, current” on the consolidated balance sheet as of December 31, 2019.

In February 2020, upon the maturity of the debt agreement, we repaid the remaining outstanding principal of \$16.0 million and interest.

Financing Derivative

A number of features embedded in the promissory notes required accounting for them as a derivative, including the indemnification of certain withholding taxes and the acceleration of debt upon (i) a qualified financing, (ii) an event of default, (iii) a Major Transaction (as such term is defined in the Facility Agreement), and (iv) the exercise of the warrant via offset to the debt principal. These features represent a single derivative (the “Financing Derivative”) that was bifurcated from the debt instrument and accounted for as a liability at fair value, with changes in fair value between reporting periods recorded in other income (expense), net.

The estimated fair value of the Financing Derivative was determined by comparing the difference between the fair value of the promissory notes with and without the Financing Derivative by calculating the respective present values from future cash flows using a 6.5% discount rate at December 31, 2019. The estimated fair value of the Financing Derivative as of December 31, 2019 was \$0.

In February 2020, after we repaid the remaining outstanding principal of \$16.0 million and interest to Deerfield, the related Financing Derivative expired.

Other liabilities, current

As of December 31, 2020 and 2019, our Other liabilities, current consisted of the following components:

(in thousands)	December 31,	
	2020	2019
Accrued ESPP	\$ 2,037	\$ —
Other	2,482	225
Other liabilities, current	\$ 4,519	\$ 225

Pursuant to the terms of the then-in-process Merger Agreement with Illumina, offerings under our 2010 ESPP were suspended after the completion of the purchase period ended March 1, 2019, resulting in the balance for “Accrued ESPP” being \$0 as of December 31, 2019. After the merger with Illumina was terminated in January 2020, we began offerings under the ESPP again starting with the offering period beginning March 1, 2020.

NOTE 6. COMMITMENTS AND CONTINGENCIES

Lease

In July 2015 we entered into a lease agreement with respect to our facility located at 1305 O’Brien Drive, Menlo Park, California. The term of the O’Brien Lease is one hundred thirty-two (132) months. In December 2016, we entered into an amendment to the O’Brien Lease which defined the commencement date of the lease to be October 25, 2016, notwithstanding that such substantial completion did not occur until the first quarter of 2017. Base monthly rent was abated for the first six (6) months of the lease term and thereafter was \$540,000 per month during the first year of the lease term, with specified annual increases thereafter until reaching \$711,000 per month during the last twelve (12) months of the lease term. If the rent is not received within five days of the due date, there will be an additional sum equal to 5% of the amount overdue as a late charge. Any amount not paid within 10 days after receipt of landlord’s written notice will bear interest from the date due until paid, at the lesser rate of (1) the prime rate of interest as published in the Wall Street Journal, plus 2% or (2) the maximum rate allowed by law, in addition to the late payment charge. We were required to establish a letter of credit for the benefits 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, on May 1, 2019 the \$4.5 million in restricted cash was reduced to \$4.0 million and on May 1, 2020 the \$4.0 million in restricted cash was reduced to \$3.5 million.

All of our leases are operating leases. Lease payments comprise the base rent per the term of the Lease. Lease expense for these leases is recognized on a straight-line basis over the lease term, with variable lease payments, such as common area maintenance fees, recognized in the period those payments are incurred.

We often have options to renew lease terms for buildings. For the O’Brien Lease, the renewal option is 5 years and the rent will be based on fair market value at the time of renewal and was not included in the lease term. In addition, certain lease arrangements may be terminated prior to their original expiration date at our discretion. We evaluate renewal and termination options at the lease commencement date to determine if we are reasonably certain to exercise the option on the basis of economic factors. The weighted average remaining lease term for our operating leases as of December 31, 2020 was 6.8 years.

The discount rate implicit within our leases is generally not determinable and therefore we determine the discount rate based on our incremental borrowing rate. The incremental borrowing rate for our leases is determined based on lease term and currency in which lease payments are made, adjusted for impacts of collateral. The weighted average discount rate used to measure our operating lease liabilities as of December 31, 2020 was 7.9%.

The following table presents information as to the amount and timing of cash flows arising from our operating leases as of December 31, 2020:

Maturity of Lease Liabilities	Amount
Years ending December 31,	(in thousands)
2021	\$ 7,330
2022	7,502
2023	7,704
2024	7,920
2025	8,136
Thereafter	15,462
Total undiscounted operating lease payments	54,054
Less: imputed interest	(12,055)
Present value of operating lease liabilities	41,999

Balance Sheet Classification

Operating lease liabilities, current	4,332
Operating lease liabilities, non-current	37,667
Total operating lease liabilities	41,999

Cash Flows

Cash paid for amounts included in the present value of operating lease liabilities was \$7.2 million and \$7.0 million for the year ended December 31, 2020 and 2019, respectively and were included in operating cash flow.

Operating Lease Costs

Operating lease costs were \$6.2 million and \$6.2 million for the year ended December 31, 2020 and 2019, respectively. For both 2020 and 2019 the operating lease costs primarily related to our operating leases, but also included immaterial amounts for variable leases.

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 March 15, 2017, we filed a complaint in the U.S. District Court for the District of Delaware against ONT Inc. for patent infringement (C.A. No. 17-cv-275 ("275 Action")). The complaint is based on our U.S. Patent No. 9,546,400 (the "400 Patent") which covers novel methods for nanopore sequencing of nucleic acid molecules using the signals from multiple monomeric units. We are seeking remedies including injunctive relief, damages and costs. On August 23, 2018, we filed an amended complaint, adding allegations of willful infringement and adding ONT Ltd. as a defendant in the 275 Action, which was granted on August 15, 2019.

On September 25, 2017, we filed a second complaint in the U.S. District Court for the District of Delaware against ONT Inc. for patent infringement (C.A. No. 17-cv-1353 ("1353 Action")). The complaint is based on our U.S. Patent No. 9,678,056 (the "056 Patent") and U.S. Patent No. 9,738,929. We are seeking remedies including injunctive relief, damages and costs. On March 28, 2018, we added a claim for infringement of our U.S. Patent No. 9,772,323 (the "323 Patent"). On August 23, 2018 we filed an amended complaint, adding allegations of willful infringement and adding ONT Ltd. as a defendant in the 1353 Action, which was granted on August 15, 2019.

A trial for the U.S. District Court matters was held from March 9 through March 18, 2020. The jury determined that ONT Inc. and ONT Ltd. infringed the '056 Patent, the '400 Patent, and the '323 Patent, but the jury declined to find these patents valid based on enablement and, in the case of claim one of the '056 Patent, written description and indefiniteness. The jury declined to find valid or infringed U.S. Patent No. 9,738,929. We are pursuing an appeal of the decision at the U.S. Court of Appeals for the Federal Circuit.

Unrelated to the preceding matters, 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 matter from this complaint (the “PGI District Court matter”) 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 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 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 August 19, 2020, the court ordered a stay of the PGI District Court matter based on a joint stipulation by the parties. With the institution of the PacBio IPR Petitions described above, pursuant to the joint stipulation, the matter is now stayed pending a final written decision on the IPRs.

Proceedings in China

On May 12, 2020, PGI filed a complaint in the Wuhan Intermediate People’s Court in China alleging infringement of one or more claims of China patent No. CN101743321B (the “CN321” Patent”), which is related to the ‘441 Patent. We were served on January 20, 2021 and plan to vigorously defend in this matter. On November 23, 2020 we filed an Invalidation Petition at the China National Intellectual Property Administration (CNIPA) demonstrating the invalidity of the claims in the CN321 Patent on grounds of insufficient disclosure, and the lack of support, essential technical features, clarity, novelty, and inventiveness.

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 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 December 31, 2020.

NOTE 7. INCOME TAXES

We are subject to income taxes in the United States and certain states in which we operate, and we use estimates in determining our provisions for income taxes. Significant management judgement is required in determining our provision for income taxes, deferred tax assets and liabilities and valuation allowances recorded against net deferred tax assets in accordance with U.S. GAAP. These estimates and judgements occur in the calculation of tax credits, benefits, and deductions, and in the calculation of certain tax assets and liabilities, which arise from differences in the timing of recognition of revenue and expense for tax and financial statement purposes, as well as the interest and penalties related to uncertain tax positions. Significant changes to these estimates may result in an increase or decrease to our tax provision in the current or subsequent period.

We assess all material positions taken in any income tax return, including all significant uncertain positions, in all tax years that are still subject to assessment or challenge by relevant taxing authorities. Assessing an uncertain tax position begins with the initial determination of the position's sustainability and is measured at the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement. As of each balance sheet date, unresolved uncertain tax positions must be reassessed, and we will determine whether the factors underlying the sustainability assertion have changed and the amount of the recognized tax benefit is still appropriate.

We account for Global Intangible Low-taxed Income as a period cost.

During the years ended December 31, 2020, 2019 and 2018 income (loss) before taxes from U.S. operations were \$28.9 million, (\$84.8) million and (\$103.1) million, respectively, and income before taxes from foreign operations was \$0.6 million, \$0.9 million and \$0.8 million, respectively.

Income tax provision (benefit) related to continuing operations differ from the amounts computed by applying the statutory income tax rate of 21% to pretax income or loss as follows:

	Years ended December 31,		
	2020	2019	2018
Statutory tax rate	21.0 %	21.0 %	21.0 %
State tax rate, net of federal benefit	(8.3)	4.9	3.5
Stock-based compensation	(15.2)	(0.8)	(1.6)
Tax credits	(3.6)	2.2	2.0
Other	(0.2)	0.2	(0.1)
Change in valuation allowance	6.3	(27.5)	(24.8)
Total	- %	- %	- %

Deferred income taxes reflect the net tax effects of loss and credit carry forwards and temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of our deferred tax assets for federal and state income taxes are as follows (in thousands):

	December 31,	
	2020	2019
Deferred tax assets:		
Net operating loss carryforwards	\$ 233,225	\$ 226,911
Research and development credits	49,179	45,853
Accruals and reserves	6,337	8,024
Stock-based compensation	9,717	16,219
ASC842 Operating lease liability	9,870	10,837
Total deferred tax assets	308,328	307,844
Less: Valuation allowance	(300,505)	(298,658)
Total deferred tax assets:	7,823	9,186
Fixed assets	(786)	(1,425)
ASC842 Operating lease right-of-use assets	(7,037)	(7,761)
Total deferred tax liabilities	(7,823)	(9,186)
Net deferred tax assets	\$ —	\$ —

At December 31, 2020, we maintained a full valuation allowance against all of our deferred tax assets which totaled \$300.5 million, including net operating loss carryforwards and research and development credits of \$233.2 million and \$49.2 million, respectively.

Due to uncertainties surrounding the realization of deferred tax assets through future taxable income, we have provided a full valuation allowance and, therefore, have not recognized any benefits from net operating losses and other deferred tax assets.

A valuation allowance is recorded when it is more likely than not that all or some portion of the deferred income tax assets will not be realized. We regularly assess the need for a valuation allowance against our deferred income tax assets by considering both positive and negative evidence related to whether it is more likely than not that our deferred income tax assets will be realized. In evaluating our ability to recover our deferred income tax assets within the jurisdiction from which they arise, we consider all available positive and negative evidence, including scheduled reversals of deferred income tax liabilities, projected future taxable income, tax-planning strategies, and results of recent operations. Accordingly, we have provided a full valuation allowance against our net deferred tax assets as of December 31, 2020 and 2019, respectively.

For the year ended December 31, 2020, our valuation allowance increased to \$300.5 million, primarily because of an increase in our net operating losses and tax credits offset by a decrease to our stock-based compensation deferred tax asset. For the year ended December 31, 2019, our valuation allowance increased to \$298.7 million, primarily because of an increase to our net operating losses, tax credits and changes in book to tax timing differences.

As of December 31, 2020, we had a net operating loss carryforward for federal income tax purposes of approximately \$913.9 million, \$755.9 million of which will begin to expire after 2024 and through 2037, and \$158.0 million of which do not expire. We had a total state net operating loss carryforward of approximately \$634.3 million, which have expiration dates of 2025 and beyond. Utilization of some of the federal and state net operating loss and credit carryforwards are subject to annual limitations due to the "change of ownership" provisions of the Internal Revenue Code of 1986 and similar state provisions. The annual limitations may result in the expiration of net operating losses and credits before utilization.

We have federal credits of approximately \$30.7 million, which will begin to expire in 2024 if not utilized and state research credits of approximately \$30.1 million which have no expiration date. These tax credits are subject to the same limitations discussed above.

As of December 31, 2020, our total unrecognized tax benefit was \$6.0 million.

A reconciliation of the beginning and ending unrecognized tax benefit balance is as follows (in thousands):

Balance as of December 31, 2017	\$ 18,786
Decrease in balance related to tax positions taken in prior year	—
Increase in balance related to tax positions taken during current year	1,661
Balance as of December 31, 2018	\$ 20,447
Decrease in balance related to tax positions taken in prior year	—
Increase in balance related to tax positions taken during current year	1,532
Balance as of December 31, 2019	\$ 21,979
Decrease in balance related to tax positions taken in prior year	(17,255)
Increase in balance related to tax positions taken during current year	1,230
Balance as of December 31, 2020	\$ 5,954

Decrease in balance related to tax positions taken in prior years of \$17.3 million in 2020 relates to the fact that we completed a research and development credit study in 2020 and adjusted our associated uncertain tax position accordingly for the 2004-2019 tax years.

Our practice is to recognize interest and/or penalties related to income tax matters in income tax expense. As of both December 31, 2020 and 2019, we had no accrued interest or penalties due to our net operating losses available to offset any tax adjustment. If total unrecognized tax benefits were realized in the future, it would not result in any tax benefit as we currently have a full valuation allowance. We file U.S. federal and various state income tax returns. For U.S. federal and state income tax purposes, the statute of limitations currently remains open for the years ending December 31, 2017 to present and December 31, 2016 to present, respectively. In addition, all of the net operating losses and research and development credit carryforwards that may be utilized in future years may be subject to examination. We are not currently under examination by income tax authorities in any jurisdiction.

In response to the COVID-19 pandemic, the Coronavirus Aid, Relief and Economic Securities Act (CARES Act) was signed into law in the US in March 2020. The CARES Act adjusted a number of provisions in the tax code, including the calculation and eligibility of certain deductions and the treatment of net operating losses and tax credits. The enactment of the CARES Act did not result in any material adjustments to our income tax provision for the year ended December 31, 2020, or to our net deferred tax assets as of December 31, 2020.

California Assembly Bill 85 (AB 85) was signed into law in June 2020. The legislation suspends the use of California Net Operating Loss deductions for 2020, 2021, and 2022 for certain taxpayers and imposes a limitation on the use of certain California Tax Credits for 2020, 2021, and 2022. The carryover periods for Net Operating Loss deductions disallowed by this provision will be extended. Given the Company's net operating loss position in the current year, the new legislation will not impact the current year provision. The Company will continue to monitor possible California net operating loss and credit limitations in future periods.

NOTE 8. STOCKHOLDERS' EQUITY

Preferred Stock

Our Certificate of Incorporation, as amended and restated in October 2010 in connection with the closing of our initial public offering, authorizes us to issue 1,000,000,000 shares of \$0.001 par value common stock and 50,000,000 shares of \$0.001 par value preferred stock. As of December 31, 2020 and 2019, there were no shares of preferred stock issued or outstanding.

Common Stock

Common stockholders are entitled to dividends when and if declared by our board of directors. There have been no dividends declared to date. The holder of each share of common stock is entitled to one vote.

Underwritten Public Equity Offerings

In August 2020, we entered into an underwriting agreement, relating to the public offering of 19,430,000 shares of our common stock, \$0.001 par value per share, at a price to the public of \$4.47 per share. Under the terms of the underwriting agreement, we also granted the underwriters a 30-day option to purchase up to an additional 2,914,500 shares of our common stock, which was subsequently exercised in full, and the offering including the sale of shares of common stock subject to the underwriters' option, closed in August 2020. In total, we sold 22.3 million shares of our common stock. We paid a commission equal to 6% of the gross proceeds from the sale of shares of our common stock. The total net proceeds to us from the offering after deducting the underwriting discount were approximately \$93.9 million, excluding approximately \$0.3 million of offering expenses.

In November 2020, we entered into an underwriting agreement, relating to the public offering of 6,096,112 shares of our common stock, \$0.001 par value per share, at a price to the public of \$14.25 per share. Under the terms of the underwriting agreement, we also granted the underwriters a 30-day option to purchase up to an additional 914,416 shares of our common stock, which was subsequently exercised in full, and the offering including the sale of shares of common stock subject to the underwriters' option, closed in November 2020. In total, we sold 7.0 million shares of our common stock. We paid a commission equal to 6% of the gross proceeds from the sale of shares of our common stock. The total net proceeds to us from the offering after deducting the underwriting discount were approximately \$93.9 million, excluding approximately \$0.3 million of offering expenses.

In total, for the year ended December 31, 2020, we issued 29.4 million shares of our common stock through our two underwritten public offerings with an average offering price of \$6.40. The total net proceeds to us from the two offerings, after deducting the underwriting commission and offering expenses, were approximately \$187.2 million.

For the year ended December 31, 2018, we issued 30.6 million shares of our common stock through our two underwritten public offerings with an average offering price of \$3.38 per share. The total net proceeds to us from the two offerings, after deducting the underwriting commissions and offering expenses, were approximately \$97.5 million.

Equity Plans

As of December 31, 2019, we had two active equity plans: 1) the 2010 Equity Incentive Plan (the "2010 Plan") and 2) the 2010 Outside Director Equity Incentive Plan (the "2010 Director Plan"), both of which we adopted upon the effectiveness of our initial public offering in October 2010. Pursuant to the terms of the then-in-process Merger Agreement with Illumina, offerings under our 2010 ESPP were suspended after the completion of the purchase period ended March 1, 2019. After the merger with Illumina was terminated in January 2020, we began offerings under the ESPP again starting with the offering period beginning March 1, 2020.

As of June 30, 2020, in total, we had three active equity compensation plans: the 2010 Plan, the 2010 Director Plan and the 2010 ESPP. On July 29, 2020 our 2010 Plan and 2010 Director Plan expired.

On August 4, 2020, stockholders approved our new 2020 Equity Incentive Plan (the "2020 plan") and reserved 11,000,000 shares of the Company's 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 2020 Inducement Equity Incentive Plan (the "Inducement Plan") and reserved 2,500,000 shares of the Company's common stock for issuance pursuant to equity awards granted under the Inducement Plan.

2020 Equity Incentive Plan

Under the 2020 Plan, with the approval of the Compensation Committee of the Board of Directors, we may grant equity-based awards, including non-statutory stock options, restricted stock units ("RSUs"), restricted stock, stock appreciation rights, performance shares and performance units. Stock options granted under the 2020 Plan may be either incentive stock options ("ISOs") within the meaning of Internal Revenue code Section 422 or non-qualified stock options ("NSOs"). Stock options under the 2020 Plan may be granted with a term of up to ten years and at prices no less than the fair market value of our common stock on the date of grant. To date, stock options granted to existing employees generally vest over four years on a monthly basis and stock options granted to new employee vest at a rate of 25% upon the first anniversary of the vesting commencement date and 1/48th per month thereafter, in each case, subject to continued service with us through the applicable vesting dates.

Inducement Plan

Under the Inducement Plan, with the approval of the Compensation Committee of the Board of Directors, we may grant equity-based awards, including non-statutory stock options, restricted stock units, restricted stock, stock appreciation rights, performance shares and performance units, and its terms are substantially similar to the 2020 Plan, including with respect to treatment of equity awards in the event of a "merger" or "change in control" as defined under the Inducement Plan, but with such other terms and conditions intended to comply with the NASDAQ Inducement Award exception. In accordance with Rule 5635(c)(4) of the NASDAQ Listing Rules, awards under the Inducement Plan may only be made to individuals not previously employees or non-employee directors of the Company (or following such individuals' bona fide period of non-employment with the Company), as an inducement material to the individuals' entry into employment with the Company or in connection with a merger or acquisition, to the extent permitted by Rule 5635(c)(3) of the NASDAQ Listing Rules.

As of December 31, 2020, we had an aggregate of 10.3 million shares remained available for future issuance under the 2020 Plan and Inducement Plan.

Stock Options

The following table summarizes stock option activity for all of our stock option plans for the year ended December 31, 2020 (in thousands, except per share amounts):

	Stock Options Outstanding				Weighted average	
	Number		Exercise price	exercise price		
	of shares					
Balances, December 31, 2019	22,697	\$	1.16 – 16.00	\$	5.57	
Options granted	2,852		2.45 – 20.9		7.20	
Options exercised	(8,078)		1.16 – 15.98		5.44	
Options canceled	(2,833)		1.16 – 16		7.82	
Balances, December 31, 2020	<u>14,638</u>	<u>\$</u>	<u>1.16 – 20.90</u>	<u>\$</u>	<u>5.53</u>	

The expired options during the year ended December 31, 2020 totaled 2.4 million with exercise prices ranging from \$1.16 to \$16.00 and a weighted average exercise price per share of \$8.49.

The following table summarizes information with respect to stock options outstanding and exercisable under the plans at December 31, 2020:

Exercise price	Options Outstanding			Options Exercisable		
	Number outstanding	Weighted average remaining contractual life (Years)	Weighted average exercise price	Number vested	Weighted average	
					exercise price	
\$ 0.00 – 3.67	4,254,183	5.45	\$ 2.53	3,253,267	\$	2.51
\$ 3.67 – 7.34	7,560,966	6.18	\$ 5.68	5,396,883	\$	5.42
\$ 7.34 – 11.01	2,591,433	5.78	\$ 9.05	2,191,433	\$	8.95
\$ 11.01 – 14.68	131,375	2.99	\$ 12.49	96,375	\$	11.82
\$ 14.68 – 18.35	500	0.13	\$ 15.98	500	\$	15.98
\$ 18.35 – 22.02	100,000	9.95	\$ 20.90	—	\$	—
\$ 22.02 – 25.69	—	—	\$ —	—	\$	—
\$ 25.69 – 29.36	—	—	\$ —	—	\$	—
\$ 29.36 – 33.03	—	—	\$ —	—	\$	—
\$ 33.03 – 36.70	—	—	\$ —	—	\$	—
	14,638,457	5.90	\$ 5.53	10,938,458	\$	5.32

The aggregate intrinsic value of the outstanding and exercisable options presented in the table above totaled \$298.8 million and \$225.6 million, respectively. The aggregate intrinsic value represents the total pretax intrinsic value (i.e., the difference between \$25.94, our closing stock price on the last trading day of our fourth quarter of 2020 and the exercise price, multiplied by the number of in-the-money options) that would have been received by the option holders had all option holders exercised their options on December 31, 2020. The aggregate intrinsic value changes at each reporting date based on the fair market value of our common stock. The weighted average remaining contractual life for exercisable options is 4.89 years.

The vested and expected to vest options as of December 31, 2020 totaled 13,677,000, with aggregate intrinsic value of \$279.0 million, weighted average exercise price per share of \$5.54 and weighted average remaining contractual life of 5.73 years.

The total intrinsic value of stock options exercised during the years ended December 31, 2020, 2019 and 2018 was \$63.1 million, \$2.6 million and \$5.3 million, respectively.

The weighted-average grant-date fair value of all options granted with exercise prices equal to fair market value was \$4.14 in 2020, \$0 in 2019, \$1.50 in 2018 determined by the Black-Scholes option valuation method. There were no options granted with exercise prices lower than fair market value in 2020, 2019 and 2018.

Time-based RSUs

Each RSU represents one equivalent share of our common stock to be awarded after satisfying the applicable continued service-based vesting criteria over a specified period. These RSUs vest over four years at a rate of 25% annually. The fair value for these RSUs is based on the closing price of our common stock on the date of grant. We measure compensation expense for these RSUs at fair value on the date of grant and recognize the expense over the expected vesting period on a straight-line basis. The RSUs do not entitle participants to the rights of holders of common stock, such as voting rights, until the shares are issued. RSUs that are expected to vest are net of estimated future forfeitures.

The following table summarizes the time-based RSUs activity for the year ended December 31, 2020 (in thousands, except per share amounts):

	Number of shares	Weighted average	
		grant date	fair value
RSUs outstanding at December 31, 2019	1,086	\$	6.12
RSUs granted	6,556		5.18
RSUs released	(1,000)		6.33
RSUs forfeited	(723)		4.40
Unvested RSUs outstanding at December 31, 2020	5,919	\$	5.25

For the years ended December 31, 2020, 2019 and 2018, we recognized compensation expense of \$7.7 million, \$4.9 and \$0.2 million, respectively, related to time-based RSUs.

Performance-based RSUs

Starting 2018 the Compensation Committee of the Board of Directors approved awards of RSUs with performance-based vesting under the 2010 Plan to certain employees. Each RSU represents one equivalent share of our common stock to be awarded upon vesting at the end of the performance periods, if specific performance goals set by the Compensation Committee of the Board of Directors are achieved. No RSUs with performance-based vesting will vest if the performance goals are not met. The fair value of these RSUs is based on the closing price of our common stock on the date of grant. We make a quarterly probability assessment as to whether the performance goals will be achieved. Changes in our assessment of the probability of vesting results in adjustments to stock-based compensation, which may include either a cumulative catch-up of expense or a reduction of expense depending on whether the likelihood of vesting has increased or decreased, that is recognized in the period such determination is made. The RSUs do not entitle participants to the rights of holders of common stock, such as voting rights, until the shares are issued. RSUs that are expected to vest are net of estimated future forfeitures.

The following table summarizes the performance-based RSUs activity for the year ended December 31, 2020 (in thousands, except per share amounts):

	Number of shares	Weighted average grant date fair value
PSUs outstanding at December 31, 2019	138	\$ 2.63
PSUs granted	—	—
PSUs released	—	—
PSUs forfeited	(44)	2.63
Unvested PSUs outstanding at December 31, 2020	<u>94</u>	\$ 2.63

2010 Employee Stock Purchase Plan

We adopted the ESPP in October 2010. Our ESPP permits eligible employees to purchase common stock at a discount through payroll deductions during defined offering periods. Each offering period will generally consist of four purchase periods, each purchase period being approximately six months. The price at which the stock is purchased is equal to the lower of 85% of the fair market value of the common stock at the beginning of an offering period or at the end of a purchase period. Each offering period will generally end and the shares will be purchased twice yearly on March 1 and September 1. If the stock price at the end of the purchase period is lower than the stock price at the beginning of the offering period, that offering period will then be terminated and new offering period comes to place. The ESPP provides for an annual increase to the shares available for issuance at the beginning of each calendar year equal to 2% of the common shares then outstanding.

Pursuant to the terms of the then-in-process Merger Agreement with Illumina, offerings under our 2010 ESPP were suspended after the completion of the purchase period ended March 1, 2019. After the merger with Illumina was terminated in January 2020, we began offerings under the ESPP again starting with the offering period beginning March 1, 2020.

For the years ended December 31, 2020, 2019 and 2018, 834,677 shares, 1,306,329 shares and 1,674,960 shares of common stock were purchased under the ESPP, respectively. As of December 31, 2020, 5,878,770 shares of our common stock remain available for issuance under our ESPP.

Stock-based Compensation

Total stock-based compensation expense consists of the following (in thousands):

	Years Ended December 31,		
	2020	2019	2018
Cost of revenue	\$ 2,236	\$ 1,857	\$ 3,124
Research and development	7,061	7,699	10,076
Sales, general and administrative	8,236	6,845	9,953
Total stock-based compensation expense	<u>\$ 17,533</u>	<u>\$ 16,401</u>	<u>\$ 23,153</u>

As of both December 31, 2020 and 2019, \$0.3 million of stock-based compensation cost was capitalized in inventory on our consolidated balance sheets, respectively.

The tax benefit of stock-based compensation expense was immaterial for the years ended December 31, 2020, 2019 and 2018.

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. For the year ended December 31, 2019, we did not grant any stock option.

For the years ended December 31, 2020, 2019 and 2018, the fair value of employee stock options was estimated using the following weighted average assumptions:

	Years Ended December 31,		
	2020	2019	2018
Expected term (years)	5.0 years	—	5.2 years
Expected volatility	70.7%	—	66.8%
Risk-free interest rate	0.3%	—	2.6%
Dividend yield	—	—	—

We recorded stock-based compensation expense for stock options of \$6.2 million, \$11.0 million and \$15.5 million for the years ended December 31, 2020, 2019 and 2018, respectively.

As of December 31, 2020, \$9.9 million of total unrecognized compensation expense related to stock options was expected to be recognized over a weighted-average period of 3 years.

Cash received from option exercises for the years ended December 31, 2020, 2019 and 2018 was \$43.9 million, \$5.9 million and \$6.3 million, respectively.

ESPP

We estimated the fair value of shares to be issued under the ESPP using the Black-Scholes option pricing model. For the years ended December 31, 2020, 2019 and 2018, weighted average fair value at grant date for shares to be issued under the ESPP was \$1.68, \$0 and \$1.47, respectively.

For the years ended December 31, 2020, 2019 and 2018, the fair value of shares to be issued under the ESPP was estimated using the following assumptions:

	Years Ended December 31,		
	2020	2019	2018
Expected term (years)	0.5 - 2.0	—	0.5 - 2.0
Expected volatility	57% - 71%	—	65% - 67%
Risk-free interest rate	0.1%-1.0%	—	1.3%-2.7%
Dividend yield	—	—	—

We recorded stock-based compensation expense for ESPP of \$3.4 million, \$0.5 million and \$6.8 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Cash received through the ESPP for the years ended December 31, 2020, 2019 and 2018 was \$2.4 million, \$2.7 million and \$3.4 million, respectively.

NOTE 9. NET INCOME (LOSS) PER SHARE

Basic net income (loss) per share and diluted net income (loss) per share are presented for the three years presented. Basic net income (loss) per share is computed by dividing net income (loss) by the weighted average number of shares of common stock outstanding during the period. Diluted net income (loss) per share is computed using the weighted average number of shares of common stock outstanding and potential shares assuming the dilutive effect of outstanding stock options, restricted stock units and common stock issuable pursuant to our ESPP, using the treasury stock method.

The following table presents the calculation of weighted average shares of common stock used in the computations of basic and diluted net income (loss) per share amounts presented in the accompanying consolidated statements of operations and comprehensive income (loss) (in thousands, except per share amounts):

	Years Ended December 31,		
	2020	2019	2018
Numerator:			
Net income (Loss)	\$ 29,403	\$ (84,134)	\$ (102,562)
Denominator:			
Basic			
Weighted average shares used in computing basic net income (loss) per share	165,187	152,527	135,094
Basic net income (loss) per share	\$ 0.18	\$ (0.55)	\$ (0.76)
Diluted			
Weighted average shares used in computing diluted net income (loss) per share	165,187	152,527	135,094
Add: weighted average stock options	6,092	—	—
Add: weighted average restricted stock units	2,324	—	—
Add: weighted average common stock issuable pursuant to our ESPP	1,367	—	—
Weighted average shares used in computing diluted net income (loss) per share	174,970	152,527	135,094
Diluted net income (loss) per share	\$ 0.17	\$ (0.55)	\$ (0.76)

The following options outstanding, time-based RSUs, performance-based RSUs and ESPP shares to purchase common stock were excluded from the computation of diluted net loss per share for the periods presented because the effect of including such shares would have been antidilutive:

(in thousands)	Years Ended December 31,		
	2020	2019	2018
Options to purchase common stock	4,908	22,697	25,176
RSUs with time-based vesting	100	1,086	371
RSUs with performance-based vesting	94	138	586
Common stock issuable pursuant to our ESPP	2,890	—	—

NOTE 10. SEGMENT AND GEOGRAPHIC INFORMATION

We are organized as, and operate in, one reportable segment: the development, manufacturing and marketing of an integrated platform for genetic analysis. Our chief operating decision-maker is our Chief Executive Officer. The Chief Executive Officer reviews financial information presented on a consolidated basis for purposes of evaluating financial performance and allocating resources, accompanied by information about revenue by geographic regions. Our assets are primarily located in the United States of America and not allocated to any specific region and we do not measure the performance of geographic regions based upon asset-based metrics. Therefore, geographic information is presented only for revenue. Revenue by geographic region is based on the ship to address on the customer order.

A summary of our revenue by geographic location for the years ended December 31, 2020, 2019 and 2018 is as follows:

(in thousands)	Years Ended December 31,		
	2020	2019	2018
North America	\$ 37,277	\$ 44,681	\$ 35,598
Europe (including the Middle East and Africa)	19,065	19,600	13,958
Asia Pacific	22,551	26,610	29,070
Total	\$ 78,893	\$ 90,891	\$ 78,626

A summary of our revenue by category for the years ended December 31, 2020, 2019 and 2018 is as follows:

(in thousands)	Year Ended December 31,		
	2020	2019	2018
Instrument revenue	\$ 34,282	\$ 45,126	\$ 28,492
Consumable revenue	31,142	32,616	37,863
Product revenue	65,424	77,742	66,355
Service and other revenue	13,469	13,149	12,271
Total revenue	\$ 78,893	\$ 90,891	\$ 78,626

NOTE 11. SUBSEQUENT EVENTS

Invitae Collaboration

On January 12, 2021 we entered into a multi-year Development and Commercialization Agreement (the “Development Agreement”) with Invitae Corporation (“Invitae”), to begin development of a production-scale high-throughput sequencing platform, leveraging the power of PacBio’s highly accurate HiFi sequencing to expand Invitae’s whole genome testing capabilities.

In connection with the development of the Program Products, Invitae will provide to the Company amounts equal to certain development costs incurred by the Company. Under the Development Agreement, we will be primarily responsible for conducting a development program to develop the Program Products pursuant to a schedule and budget. We will make decisions regarding the development program jointly with Invitae. The development program is expected to last approximately sixty months, but may be shorter or longer. The Program Products will be sold to Invitae as they are developed and we have the right to broadly commercialize Program Products with other customers.

As a benefit of its contribution, Invitae will be entitled to preferred pricing on the Program Products if and when they are available for commercial sale. Each Program Product will have a preferential pricing period. During the initial period of preferred pricing for each Program Product, Invitae may purchase the Program Product at a substantially reduced margin until it has recouped a mutually agreed multiple of its contribution. Subsequently, for up to three years after the initial period of preferred pricing, Invitae has the right to purchase the Program Product at a higher price within a specified price range.

We and Invitae may terminate the Development Agreement if the other party remains in material breach of the Development Agreement following a cure period to remedy the material breach. In addition, the Development Agreement includes certain other circumstances for termination by each party, including circumstances where Invitae may terminate for delays, IP concerns, change in control, or without cause.

In certain termination circumstances, (i) we will be obligated to refund all or a portion of the development costs advanced by Invitae and/or (ii) we will owe Invitae a share of the revenue generated from the sale of the Program Products if and when they are commercialized until such time as Invitae has recouped the amounts reimbursed to us, and in certain circumstances, a mutually agreed return.

We expect to incur significant development costs over the duration of the collaboration agreement in 2021. We are still evaluating the accounting impact of the agreement, including whether the funding received by the Company from Invitae represents discounts toward future supplies, funding of development efforts, or a combination of both. There can be no assurances that the development program will be successful or that the Program Platform will become ready for commercial sale.

Issuance and Sale of 1.50% Convertible Senior Notes due February 15, 2028

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 the Company’s 1.50% Convertible Senior Notes due February 15, 2028 (the “Notes”). The Notes were issued on February 16, 2021.

Issuance of Convertible Notes

The Notes are expected to be governed by an indenture (the “Indenture”) between the Company and U.S. Bank National Association, as trustee (the “Trustee”). The Notes will 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 commencing 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 will be convertible into shares of the Company’s 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.

On or after February 20, 2026, the Notes will be redeemable by the Company in the event that the closing sale price of the Company’s 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 the Company provides the redemption notice at a redemption price of 100% of the principal amount of such Notes, plus accrued and unpaid interest to, but excluding, the redemption date.

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

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

Standstill Obligations

Pursuant to the Investment Agreement, the Purchaser has agreed, subject to certain exceptions, that from the Closing and until the earliest of (i) the three year anniversary of the Closing, (ii) the effective date of a change of control of the Company and (iii) 90 days after the date on which none of the members of the Purchaser or its affiliates beneficially own any Notes or shares of the Company's common stock received upon conversion of the Notes (the "Standstill Period"), the Purchaser will not, among other things: (i) make, or in any way participate in any "proxy contest" or other solicitation of proxies, (ii) form, join, influence or in any way participate in a voting trust or similar arrangement, (iii) acquire any securities of the Company if, immediately after such acquisition, the Purchaser or its affiliates would collectively own in the aggregate more than 19.99% of the then outstanding voting securities of the Company, (iv) sell, transfer or otherwise dispose of any voting securities of the Company to any person who is (or will become upon consummation of such sale, transfer or other disposition) a beneficial owner of 10% or more of the outstanding voting securities of the Company, (v) propose or seek to effect any tender or exchange offer, merger or other business combination involving the Company, or make any public statement with respect to such transaction, (vi) call or seek to call any meeting of stockholders or other referendum or consent solicitation, or (vii) take action to control or influence the Board of Directors or management of the Company.

Transfer Restrictions; Registration Rights

The Investment Agreement restricts the Purchaser's ability to transfer the Notes and the Company's common stock issuable or issued upon conversion of the Notes and enter into any hedging or other agreement that transfers the economic consequences of ownership of the Notes or the Company's common stock issuable or issued upon conversion of the Notes, subject to certain exceptions specified in the Investment Agreement and summarized below.

Except as described below, prior to the earlier of (i) the one year anniversary of the Closing or (ii) immediately prior to the consummation of a change of control of the Company, the Purchaser will be restricted from transferring or entering into any hedging or other agreement that transfers the economic consequences of ownership of the Notes or the Company's common stock issuable or issued upon conversion of the Notes. Exceptions include: (A) transfers to affiliates, (B) transfers to the Company or any of its subsidiaries, (C) transfers to a third party where the net proceeds of such sale are solely used to satisfy a margin call or repay a permitted loan or (D) transfers in connection with certain merger and acquisition events.

Subject to certain limitations, the Investment Agreement provides the Purchaser and any lender of a permitted loan to the Purchaser or its affiliates with certain registration rights for the shares of the Company's common stock issuable or issued upon conversion of the Notes.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None

ITEM 9A. CONTROLS AND PROCEDURES.*Evaluation of Disclosure Controls and Procedures*

Our management, with the participation of our chief executive officer, and our chief financial 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 Annual Report on Form 10-K. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to our management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgement in evaluating the cost-benefit relationship of possible controls and procedures. Based on this evaluation, our chief executive officer, chief financial officer and our principal accounting officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f). Under the supervision and with the participation of our management, including our Chief Executive Officer, Chief Financial Officer and Principal Accounting Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control — Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (COSO). Based on our evaluation under this framework our management concluded that our internal control over financial reporting was effective as of December 31, 2020.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation required by paragraph (d) of Exchange Act Rules 13a-15 or 15d-15 that occurred during our fourth fiscal quarter that have materially affected or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III**ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE.**

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2021 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 11. EXECUTIVE COMPENSATION.

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2021 Annual Meeting of Stockholder to be filed with the SEC within 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS.

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2021 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE.

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2021 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES.

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2021 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

PART IV**ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES.**

- (a) The following documents are filed as part of, or incorporated by reference into, this Annual Report on Form 10-K:
 - 1. *Financial Statements:* See Index to Consolidated Financial Statements under Item 8 of this Annual Report on Form 10-K.
 - 2. *Financial Statement Schedules:* All schedules are omitted because they are not required, are not applicable or the information is included in the consolidated financial statements or notes thereto.
 - 3. *Exhibits:* We have filed or incorporated by reference into this Annual Report on Form 10-K, the exhibits listed on the accompanying Exhibit Index immediately below.
- (b) Financial Statement Schedules: See Item 15(a)(2), above.
- (c) Exhibits: Refer to the Exhibit Index that follows.

Exhibit Index

Exhibit Number	Description	Incorporated by reference herein		
		Form	Exhibit No.	Filing Date
3.1	Amended and Restated Certificate of Incorporation	10-K	3.1	March 23, 2011
3.2	Second Amended and Restated Bylaws of Pacific Biosciences of California, Inc.	8-K	3.1	November 5, 2018
4.1	Specimen Common Stock Certificate	S-1/A	4.1	October 1, 2010
4.2	Description of Registrant's securities registered under Section 12 of the Exchange Act	10-K	4.2	February 28, 2020
4.3	Indenture, dated February 16, 2021, between Pacific Biosciences of California, Inc. and U.S. Bank National Association, as Trustee	8-K	4.1	February 16, 2021
4.4	Form of 1.50% Convertible Senior Notes due 2028 (included in Exhibit 4.1)	8-K	4.1	February 16, 2021
10.1+	Form of Director and Executive Officer Indemnification Agreement	S-1	10.1	August 16, 2010
10.2+	2010 Equity Incentive Plan	S-1	10.4	August 16, 2010
10.3+	2010 Equity Incentive Plan forms of agreement	10-Q	10.1	May 2, 2018
10.4+	2010 Employee Stock Purchase Plan and forms of agreement thereunder	S-1	10.5	August 16, 2010
10.5+	2010 Outside Director Equity Incentive Plan	S-1	10.6	August 16, 2010
10.6+	2010 Outside Director Equity Incentive Plan forms of agreement	10-Q	10.2	May 2, 2018
10.7+	2020 Equity Incentive Plan and related forms of agreement	8-K	10.1	August 5, 2020
10.8+	2020 Inducement Equity Incentive Plan and related forms of agreement	8-K	10.1	December 4, 2020
10.9+	Change in Control Severance Agreement by and between the Registrant and Susan K. Barnes effective September 9, 2010	S-1/A	10.20	September 20, 2010
10.10+	Change in Control Severance Agreement by and between the Registrant and James Michael Phillips effective September 9, 2010	S-1/A	10.24	September 20, 2010
10.11+	Change in Control Severance Agreement by and between the Registrant and Michael Hunkapiller dated January 5, 2012	10-K	10.33	March 1, 2012
10.12+	Letter Relating to Employment Terms by and between the Registrant and Susan G. Kim effective September 28, 2020	10-Q	10.2	November 2, 2020
10.13+	Change in Control and Severance Agreement by and between the Registrant and Susan G. Kim effective September 28, 2020	10-Q	10.3	November 2, 2020
10.14+	Form of Change in Control and Severance Agreement for executive officers			Filed herewith
10.15+	Letter Relating to Employment Terms by and between the Registrant and Christian O. Henry effective September 14, 2020			Filed herewith
10.16+	Change in Control and Severance Agreement by and between the Registrant and Christian O. Henry effective September 14, 2020			Filed herewith
10.17+	Amended Change in Control and Severance Agreement by and between the Registrant and Christian O. Henry dated February 3, 2021			Filed herewith
10.18+	Letter Relating to Employment Terms by and between the Registrant and Mark Van Oene effective January 8, 2021			Filed herewith
10.19+	Letter Relating to Employment Terms by and between the Registrant and Peter Fromen effective January 8, 2021			Filed herewith
10.20†	Lease Agreement by and between the Registrant and Menlo Park Portfolio II, LLC, dated July 22, 2015.	10-Q	10.2	August 5, 2015
10.21†	First Amendment to Lease Agreement by and between the Registrant and Menlo Park Portfolio II, LLC, dated December 23, 2016.	10-K	10.50	March 6, 2017
10.22	Agreement by and among Pacific Biosciences of California, Inc., Illumina, Inc. and FC Ops Corp. dated January 2, 2020	8-K	10.1	January 2, 2020
10.23††	Development and Commercialization Agreement by and between the Registrant and Invitae Corporation dated January 12, 2021			Filed herewith
10.24	Investment Agreement, dated as of February 9, 2021, between Pacific Biosciences of California, Inc. and SB Northstar L.P.	8-K	10.1	February 9, 2021
10.25††	Exclusive License Agreement by and between the Registrant and Cornell Research Foundation, Inc., dated as of February 1, 2004			Filed herewith

	List of Subsidiaries of the Registrant	
21.1	Consent of Independent Registered Public Accounting Firm	Filed herewith
23.1	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
31.1	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
31.2	Certification of Chief Financial Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	Filed herewith
32.1*	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	Furnished herewith
32.2*	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	Furnished herewith
101.INS	XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)	Filed herewith
101.SCH	XBRL Taxonomy Extension Schema Document	Filed herewith
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	Filed herewith
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	Filed herewith
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document	Filed herewith
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	Filed herewith
104	Cover Page Interactive File (formatted as inline XBRL and contained in Exhibit 101)	Filed herewith

+ Indicates management contract or compensatory plan

† Confidential treatment has been requested for portions of this exhibit. These portions have been omitted and have been filed separately with the Securities and Exchange Commission.

†† Certain confidential information contained in this Exhibit was omitted by means of marking such portions with brackets because the identified confidential information (i) is not material and (ii) would be competitively harmful if publicly disclosed.

* The certifications attached as Exhibits 32.1 and 32.2 that accompany this Annual Report on Form 10-K 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 Annual Report on Form 10-K, irrespective of any general incorporation language contained in such filing

ITEM 16. FORM 10-K SUMMARY

None

Signatures

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

Date: February 26, 2021

By: /s/ SUSAN G. Kim

Susan G. Kim
Chief Financial Officer

Date: February 26, 2021

By: /s/ Eric E. Schaefer

Eric E. Schaefer
Vice President and Chief Accounting Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Christian O. Henry, Susan G. Kim, Brett Atkins and Eric E. Schaefer, jointly and severally, as his or her true and lawful attorney-in-fact and agent, with full power of substitution, each with power to act alone, to sign and execute on behalf of the undersigned any and all amendments to this Annual Report on Form 10-K, and to perform any acts necessary in order to file the same, with all exhibits thereto and other documents in connection therewith with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requested and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or their or his or her substitutes, shall do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed by the following persons on behalf of the Registrant in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Christian O. Henry Christian O. Henry	Director, Chief Executive Officer and President (Principal Executive Officer)	February 26, 2021
/s/ Susan G. Kim Susan G. Kim	Chief Financial Officer (Principal Financial Officer)	February 26, 2021
/s/ Eric E. Schaefer Eric E. Schaefer	Vice President and Chief Accounting Officer (Principal Accounting Officer)	February 26, 2021
/s/ John F. Milligan John F. Milligan	Chairman of the Board of Directors	February 26, 2021
/s/ David Botstein David Botstein	Director	February 26, 2021
/s/ William W. Ericson William W. Ericson	Director	February 26, 2021
/s/ Michael Hunkapiller Michael Hunkapiller	Director	February 26, 2021
/s/ Randall S. Livingston Randall S. Livingston	Director	February 26, 2021
/s/ Marshall L. Mohr Marshall L. Mohr	Director	February 26, 2021
/s/ Kathy Ordoñez Kathy Ordoñez	Director	February 26, 2021
/s/ Lucy Shapiro Lucy Shapiro	Director	February 26, 2021