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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, 2021

OR

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

Commission File Number 001-38613

Bionano Genomics, Inc.

(Exact name of Registrant as specified in its Charter)

Delaware	**26-1756290**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
9540 Towne Centre Drive, Suite 100, San Diego, CA	**92121**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: (858) 888-7600

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

Title of Each Class	**Trading Symbol(s)**	**Name of Each Exchange on which Registered**
Common Stock, $0.0001 par value	BNGO	The Nasdaq Stock Market, LLC
Warrants to purchase Common Stock	BNGOW	The Nasdaq Stock Market, LLC

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 x No ☐

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

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 x No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes x 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.

Large accelerated filer	☒	Accelerated filer	☐
Non-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 ☒

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 30, 2021 (the last business day of the registrant's most recently completed second fiscal quarter) was approximately $2,045,466,000 based on the closing price of the registrant's common stock on June 30, 2021 of $7.33 per share, as reported by the Nasdaq Capital Market.

As of February 24, 2022, the Registrant had 289,612,949 shares of common stock, $0.0001 par value per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement, or the Proxy Statement, for the Registrant's 2022 Annual Meeting of Stockholders are incorporated by reference into Part III of this Annual Report on Form 10-K. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the Registrant's fiscal year ended December 31, 2021.

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As used in this Form 10-K, "Bionano," the "Company," "we," "our," and "us" refer to Bionano Genomics, Inc. and its subsidiaries or, as the context may require, Bionano Genomics, Inc. only. "Lineagen" and "BioDiscovery" refer to our wholly owned subsidiaries, Lineagen, Inc. and BioDiscovery, LLC.

Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K, or this Annual Report, contains forward-looking statements and information within the meaning of the safe harbor provisions for the U.S. Private Securities Litigation Reform Act of 1955. All statements other than statements of historical facts contained in this Annual Report, including statements regarding our future results of operations or financial condition, business strategy and plans, and objectives of management for future operations, are forward-looking statements. In some cases, you can identify forward-looking statements because they contain words such as "anticipate," "believe," "contemplate," "continue," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "target," "will" or "would" or the negative of these words or other similar terms or expressions.

We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy and financial needs. These forward-looking statements are subject to known and unknown risks, uncertainties and assumptions, including risks described in the section entitled "Risk Factors" and elsewhere in this Annual Report, regarding, among other things:

- the size and growth potential of the markets for our products, and our ability to serve those markets;
- the rate and degree of market acceptance of our products;
- our ability to manage the growth of our business and integrate acquired businesses;
- our ability to expand our commercial organization to address effectively existing and new markets that we intend to target;
- the impact from future regulatory, judicial, and legislative changes or developments in the U.S. and foreign countries;
- our ability to successfully execute our strategy and meet anticipated goals and milestones
- our ability to compete effectively in a competitive industry;
- the introduction of competitive technologies or improvements in existing technologies and the success of any such technologies;
- the performance of our third-party contract sales organizations, suppliers and manufacturers;
- our ability to attract and retain key scientific or management personnel;
- the accuracy of our estimates regarding expenses, future revenues, reimbursement rates, capital requirements and needs for additional financing;
- the impact of the COVID-19 pandemic on our business and operations, as well as the business or operations of our suppliers, customers, manufacturers, research partners and other third parties with whom we conduct business and our expectations with respect to the duration of such impacts and the resulting effects on our business;
- we may not realize the anticipated benefits and synergies of our recent and any future acquisitions or other strategic transactions;
- our ability to obtain funding for our operations; and
- our ability to attract collaborators and strategic partnerships;

You should not rely on forward-looking statements as predictions of future events. The outcome of the events described in these forward-looking statements is subject to risks, uncertainties and other factors described in Part I, Item 1A Risk Factors and elsewhere in this Annual Report. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties may emerge from time to time, and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this Annual Report.

The results, events and circumstances reflected in the forward-looking statements may not be achieved or occur, and actual results, events or circumstances could differ materially from those described in the forward-looking statements.

In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based on information available to us as of the date of this Annual Report. And while we believe that information provides a reasonable basis for these statements, that information may be limited or incomplete. Our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all relevant information. These statements are inherently uncertain, and investors are cautioned not to unduly rely on these statements.

The forward-looking statements made in this Annual Report relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statements made in this Annual Report to reflect events or circumstances after the date of this Annual Report or to reflect new information or the occurrence of unanticipated events, except as required by law. We may not actually achieve the plans, intentions, or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments.

RISK FACTOR SUMMARY

Below is a summary of the principal factors that make an investment in our securities speculative or risky. This summary does not address *all of the risks that we face. Additional discussion of the risks and uncertainties summarized in this risk factor summary, and other risks and uncertainties that we face, are set forth below under the heading "Risk Factors" and should be carefully considered, together with other information in this Annual Report and our other filings with the SEC before making investment decisions regarding our securities.*

- We are an early-commercial-stage company and have a limited commercial history, which may make it difficult to evaluate our current business and predict our future performance;
- We have incurred recurring net losses since we were formed and expect to incur losses in the future. We cannot be certain that we will achieve or sustain profitability;
- Our quarterly and annual operating results and cash flows have fluctuated in the past and might continue to fluctuate, which makes our future operating results difficult to predict and could cause the market price of our securities to decline substantially;
- Our business, and that of our customers, has been adversely affected by the effects of public health crises, including the COVID-19 pandemic. In particular, the COVID-19 pandemic has materially affected our operations globally, including at our headquarters in San Diego, California, as well as the business or operations of our research partners, customers and other third parties with whom we conduct business. As a result, in some cases we have had to delay instrument installations or service-related visits.
- Our future capital needs are uncertain and we may require additional funding in the future to advance the commercialization of Saphyr, NxClinical and our other products, technologies, and services, as well as continue our research and development efforts. If we fail to obtain additional funding, we will be forced to delay, reduce or eliminate our commercialization and development efforts;
- Acquisitions, joint ventures and other strategic transactions could disrupt or otherwise harm our business and may cause dilution to our stockholders;
- If our products or technologies fail to achieve and sustain sufficient market acceptance, our revenue will be adversely affected;
- Our future success is dependent upon our ability to further penetrate our existing customer base and attract new customers;
- We are currently limited to "research use only" with respect to many of the materials and components used in our consumable products including our assays;
- In the near term, sales of our Saphyr system, the NxClinical software, our consumables and genome analysis services will depend on levels of research and development spending by clinical research laboratories, academic and governmental research institutions and biopharmaceutical companies, a reduction in which could limit demand for our technologies, products and adversely affect our business and operating results;
- If we do not successfully manage the development and launch of new products and technologies, our financial results could be adversely affected;
- If the FDA determines that our RUO products are medical devices or if we seek to market our RUO products for clinical diagnostic or health screening use, we will be required to obtain regulatory clearance(s) or approval(s), and may be required to cease or limit sales of our then marketed products, which could materially and adversely affect our business, financial condition and results of operations. Any such regulatory process would be expensive, time-consuming and uncertain both in timing and in outcome;
- If we are unable to protect our intellectual property, it may reduce our ability to maintain any technological or competitive advantage over our competitors and potential competitors, and our business may be harmed; and
- The price of our securities may be volatile or may decline regardless of our operating performance, and you could lose all or part of your investment.

PART I

ITEM 1. BUSINESS

Overview

We are a global genomics company focused on elevating the health and wellness of all people. We are pioneers of optical genome mapping, or OGM, for genome analysis and provide a suite of genome analysis solutions designed to enable researchers and clinicians to reveal answers to challenging questions in biology and medicine. Our mission is to transform the way the world sees the genome through OGM solutions, clinical testing and laboratory services and software. We offer OGM and software solutions for applications across applied, translational and clinical research and we offer diagnostic services to physicians specializing in medical management for individuals with genetic conditions such as pediatric neurodevelopmental disorders, or NDDs, including autism spectrum disorders, or ASDs.

We market and sell the Saphyr® system, which delivers OGM data to enable ultra-sensitive and ultra-specific detection of all classes of structural variation. The Saphyr system is used in clinical and discovery research to streamline the identification of structural changes in chromosomes, known as cytogenetics, and to accelerate the search for answers in genetic disease and cancer applications. The Saphyr system is comprised of an instrument, chip consumables, reagents and software containing a suite of data analysis and visualization tools. In addition to our Saphyr system and software products, we offer laboratory services to provide data generated by the Saphyr system to researchers seeking access to OGM data. The Saphyr system has been shown to outperform the current gold standard methods for cytogenetics and molecular genetics including karyotyping, fluorescence in-situ hybridization (FISH), Southern blot and chromosomal microarray. The Saphyr system has also been shown to identify structural changes in chromosomes that cannot be identified using current commercially available solutions for gene sequencing.

We provide proprietary molecular genetic clinical testing services for individuals demonstrating clinical presentations consistent with NDDs, including ASDs and other disorders of childhood development. Our comprehensive genetic testing services include reporting for known NDD-causing genome variations, including testing for proprietary variations, and combines testing with our Proprietary Variant Index (PRISM) which uses a proprietary database of over 35,000 individuals with NDDs tested with over 60,000 tests that provides additional evidence for candidate genes associated with NDDs. This testing is a CLIA-certified diagnostic testing service, and we have expertise in selling cytogenetic assays to physicians, providing genetic counseling services to individuals undergoing testing and their families, and contracting with third-party payors for reimbursement.

We also provide laboratory services to clinicians, scientists, pharmaceutical companies, and others who are seeking to incorporate OGM into their genomics research without the need to bring our Saphyr system in house. Laboratory services for OGM are performed in our laboratory facilities in San Diego and at partner laboratories in the United States and Europe, and serve as solutions for researchers and clinicians who would like to use OGM for various applications in genomics but have yet to acquire the Saphyr.

Our software solutions deliver genomic data interpretation solutions tailored for research use in cytogenomics and molecular pathology labs in genetic disease and cancer research markets, with an emphasis on structural variation. We offer an industry-leading, platform-agnostic software solution that can integrate OGM with next-generation sequencing, or NGS, and microarray data. This software solution is designed to provide analysis, visualization, interpretation and reporting of structural variants, single-nucleotide variants and absence of heterozygosity across the genome in one consolidated view. Our software currently enables analysis of NGS and microarray data, and we are developing a version that we expect to be able to incorporate OGM data to make our software a more comprehensive offering for analysis of genomic data. We believe the integration of OGM with data types common in the industry, such as Variant Call Format (VCF), and Binary Alignment Map (BAM), should accelerate and broaden our position in digital cytogenetics and comprehensive genome analysis by enabling us to simplify the assessment of clinically relevant variants in cytogenomics applications, potentially reducing interpretation time per sample and expanding our reach into the discovery and translational research markets through the combination of OGM and NGS data.

Over the past year, we believe we have transformed our business from an instrument company to a provider of a full suite of genomics solutions. We expanded into molecular genetic clinical testing services through our August 2020 acquisition of Lineagen Inc. Our recent expansion into software solutions was made possible by our October 2021 acquisition of BioDiscovery, LLC. We believe that these acquisitions, along with internal investments in research and development and the build out of our commercial teams, have positioned us well to make OGM standard of care for many constitutional genetic disorders and cancers.

Recent Highlights

Commercial Adoption of Offerings for Saphyr

Bionano executed on its commercialization strategy, expanded the utilization of its Saphyr system and increased the amount of Bionano data generated across the globe, driving scientific momentum.

- Grew our installed base to 164 as of December 31, 2021, an increase of approximately 69% from a total installed base of 97 as of December 31, 2020. Installed base represents the global number of Saphyr instruments installed at end-customer locations and therefore ready to process optical genome mapping.
- Sold 3,204 flowcells in the fourth quarter of 2021, an increase of approximately 29% over the 2,484 flowcells sold during the fourth quarter of 2020. For the year ended December 31, 2021, total flowcells sold reached 12,518, an increase of approximately 98% over the 6,311 flowcells sold during the year ended December 31, 2020. The Saphyr chip is the consumable that packages nanochannel arrays for DNA linearization. In its current form, each Saphyr chip has three flowcells. Flowcells sold refers to the units of genome mapping consumables used for analyzing one genome, purchased by customers to process optical genome mapping.

Validated the Utility of OGM for Applications in Clinical Research with Benchmarking, Scientific Publication and Adoption

Rigorous and extensive benchmarking of Saphyr was conducted against traditional cytogenetic methods and long read sequencing and these results were published and validated in several key publications, presentations and announcements including:

- OGM demonstrated 100% concordance with karyotyping, FISH, and chromosomal microarray in constitutional disorders in two studies appearing in the August 2021 issue of the American Journal of Human Genetics;
- The authors in these back-to-back AJHG publications describe OGM as a better alternative to traditional cytogenetics assays for both inherited genetic disease and hematologic malignancy applications since it consolidates multiple antiquated methods requiring manual integration for interpretation into a single workflow with higher resolution for detection of all classes of structural variants.
- University Hospitals Leuven in Belgium, received its accreditation from the Belgian Accreditation Body (BELAC) for using OGM in analysis of acute lymphoblastic leukemia (ALL) and showed significant improvements in cost and turnaround time relative to traditional techniques of FISH and MLPA.
- Published study by Johns Hopkins University in the Journal of Clinical & Anatomic Pathology outlining a stepwise approach to adoption of OGM for cancer analysis in their cytogenetics lab.
- A team from the University of Iowa published the largest clinical research study to date evaluating OGM for facioscapulohumeral muscular dystrophy (FSHD). The study, published in the Journal of Molecular Diagnostics, concluded that OGM can be performed quicker, more accurately, and more reproducibly than the current gold standard method of Southern blot analysis.
- Publication of a study and of 76 subjects by authors at The University of Texas MD Anderson Cancer Center, which evaluated the utility of OGM as an alternative to traditional cytogenomic methods for the characterization of structural variation (SV) in myelodysplastic syndrome (MDS). The study was published in Blood, the journal of the American Society of Hematology (ASH) and presented at the 2021 ASH annual conference.
- Publication of a study from the International COVID-19 Host Genome Structural Variation Consortium, which is a global open host genome structural variation consortium for COVID-19 response. The consortium is comprised of over 30 researchers from leading institutions who are using OGM to assess structural variations in the human genome that could be contributing to COVID-19 susceptibility or progression. In this study, OGM was conducted on samples from 52 severely ill COVID-19 subjects to investigate structural variations as decisive predisposition factors associated with COVID-19. The researchers identified 7 structural variations in 9 subjects (17% of subjects analyzed) involving genes implicated in two key host-viral interaction pathways: innate immunity and inflammatory response, and viral replication and spread.
- Researchers from leading institutions in the US published in medRxiv the first readout from the ongoing multi-site clinical research study designed to support OGM as an alternative to traditional workflows in cytogenetics for postnatal inherited genetic disease. The IRB-approved clinical study evaluated 331 individual sample runs from 202 unique samples across five sites for interim measures of key endpoints:
    - Concordance with traditional techniques – 97.7% (214 out of 219 samples)
    - Partially concordant with traditional techniques – 2.3% (5 out of 219 samples)
    - Concordance with traditional techniques for pathogenic variant calls – 100% (219 out of 219 samples)
    - Concordance with chromosomal microarray (CMA) – 100% (103 out of 103 samples)
    - First-pass success rate for OGM – 94% (311 out of 331 samples)
    - Reproducibility of analytical QC from site-to-site – 98.8% (171 out of 173 replicates)

  - Reproducibility of pathogenic variant calls from site-to-site – 100% (173 out of 173 replicates)

- Researchers from the Medical College of Georgia/Augusta University published a study that evaluated the performance and utility of combining OGM and a 523-gene NGS panel for comprehensive evaluation of myeloid tumors and compared it to standard cytogenetic methods (karyotyping and fluorescence in situ hybridization (FISH) and a 54-gene NGS panel. The combination of OGM and a 523-gene NGS panel is superior to standard methods and more cost effective than whole genome sequencing.

COVID-19 Overview

The COVID-19 pandemic, and the measures imposed to contain this pandemic in areas where we operate our business and elsewhere have disrupted and are expected to continue to impact our business. COVID-19 related disruptions to the global supply chain created and may continue to create challenges in our getting sufficient components and raw materials for production of our OGM systems and consumables. At various times throughout the pandemic, we have been unable to visit certain customer sites to support installation or service our OGM systems. In addition, study enrollment for clinical studies generally has been affected by COVID-19. While we have not experienced adverse effects on study enrollment, we may begin to as we continue to pursue clinical studies.

For a more detailed discussion of the impacts of the COVID-19 pandemic on our business, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations - COVID-19.”

Industry Background

Genome analysis is the process of extracting and interpreting biological information from DNA and RNA. DNA is the code that is found in all living cells and determines the characteristics and health of all living organisms. Although each organism’s DNA order is unique, all DNA is composed of the same four nucleotides that come in pairs, which are referred to as base pairs. The human genome is composed of six billion of these base pairs (three billion of which are the maternal copy and three billion of which are the paternal copy of the genome), distributed across 23 pairs of chromosomes ranging in size from approximately 50 million to approximately 250 million base pairs. Genome variation is defined as at least one base pair differing in a comparison of sequence against a reference standard and can be as large as tens of millions of base pairs.

Genome structure refers to the way in which the various functional elements of the genome such as genes, reading frames, promoters and others are ordered, oriented and organized across the 23 pairs of chromosomes. Structural variations represent differences in the amount or location of genomic DNA from one individual compared to a reference genome. Structural variation is one of the most biologically important aspects of the human genome and is a major factor for the cause of genetic disorders and cancer. Each structural variation involves the rearrangement or repetition of as few as several hundred base pairs to as many as tens of millions of base pairs. Structural variations may be inherited or arise spontaneously. Structural variations are well-known to cause diseases such as constitutional genetic disorders and cancer. Many researchers and clinicians now agree that despite major advances in the speed and cost-effectiveness of DNA sequencing, it fails to reliably detect structural variations. OGM enables the detection of all classes of structural variants, and we believe no methodology exists that can detect structural variations more comprehensively or cost efficiently than OGM with the Saphyr system.

We believe the traditional cytogenomic methods of detecting structural variations for research and clinical applications, karyotyping, CMA, and fluorescent in situ hybridization, or FISH, are antiquated and cumbersome and can only detect a small proportion of the structural variations across an entire genome. OGM is designed to offer cytogeneticists the ability to fully digitize and replace these traditional methods with one simplified, cost effective and scalable workflow using the Saphyr system.

We believe that software is necessary for genome analysis and should be the primary interface for how cytogeneticists interact with the data and report their findings. We believe the software’s ease of use, core analysis functionality and the time necessary to obtain a reportable result are the most important factors to customers when considering a platform adoption decision and that data interpretation is typically a critical bottleneck in methods of genome analysis and therefore software is a key component in the entire workflow. The majority of software solutions on the market today have been developed with NGS as the primary application with the focus on the interpretation and reporting of single nucleotide variants (SNVs) instead of SVs. Our software solution, NxClinical, was developed with copy number variation as the core focus and has become established as an industry leading solution for interpretation and reporting of CNVs for CMA and NGS. To the extent we are successful in integrating OGM into NxClinical, we anticipate that our software will be the first software solution delivering a fully integrated interpretation capability for SVs from OGM as well as seamless integration with NGS, with the potential to enable complementary OGM and NGS workflows through one software solution.

Our Solutions

OGM Systems

OGM is our proprietary approach to measuring genome structure and structural variation. The OGM workflow is novel, comprehensive, scalable, cost effective and highly differentiated. OGM data are currently generated using the Saphyr system, which directly measures sequence specific patterns (SSPs) along extremely long DNA molecules in an unbiased approach without any amplification. Using the SSPs, software constructs detailed physical map of the genome that accurately assigns the chromosomal location, order, orientation and quantity of sequence and in-turn, all the genome's functional elements. We believe OGM is capable of comprehensive, cost effective and efficient detection of all classes of SVs and CNVs. Today, these structural variations cannot be reliably detected by genome sequencing. High throughput sequencers, of which there are approximately 16,000 currently installed worldwide, are reliable for detecting genomic differences involving a few base pairs or SNVs, which Saphyr does not identify. Sequencing, including NGS, cannot reliably detect the larger structural variations that our Saphyr system is designed to detect. Therefore, Saphyr may be adopted alongside this installed base of sequencers as a complement that is designed to give users the ability to see a much wider scope of genome variation from single bases of DNA to full chromosomes.

OGM was built upon four key elements:

- **Extremely long molecules for analysis.** The Saphyr system is capable of analyzing single molecules that are on average approximately 250,000 base pairs in length and can be as long as millions of base pairs. These lengths are over 1,000 times longer than the average read length with Illumina sequencing systems and approximately 10-20 times longer than the average read lengths with Pacific Biosciences of California, or PacBio, and Oxford Nanopore systems. We believe these long read lengths overcome the inherent challenges of genome complexity and are the key to Saphyr's unprecedented sensitivity and specificity.
- **Proprietary nanotechnology for massively parallel linearization and analysis of long molecules with single molecule imaging.** Analyzing these extremely long chromosomal fragments required invention. We invented, patented, developed and commercialized nanochannel arrays to capture long single molecules of DNA from solution and unwind and linearize them for structural variation analysis. Each molecule is imaged separately, making it possible to deconvolute complex mixtures including haplotypes and heterogeneous tumors.
- **DNA labeling chemistry specifically for physical mapping.** The detailed analysis of SSPs we use is also highly unique and novel. Instead of identifying the sequence of every base pair in these long fragments, we label and detect SSPs or motifs that occur universally across every genome with an average frequency of approximately one site for every few thousand base pairs. The key to our method entails introducing fluorescent tags at the sequence-specific site using highly specific and robust enzymatic chemistry along the extremely long fragments. These fragments, stretched out in nanochannels, are then directly imaged allowing us to measure the distance between labels with high accuracy. The pattern of labels detected on all these fragments can then be related to the pattern of sequence motif sites in a reference genome for comparison. Changes in the pattern indicate structural variation.
- **Bioinformatic tools for structural variation analysis.** Finally, our approach includes a novel bioinformatics platform that we developed from the ground-up to take advantage of the unique benefits of our solution. It comprises proprietary algorithms for the construction of a structurally accurate physical map of the genome to assign structure. Physical maps of a test subject are then compared to a reference or other subjects in cross-mapping analysis that allows our system to detect genome wide structural variation, including the most complex balanced events.

The Saphyr system provides a solution for comprehensive structural variation analysis at a higher resolution than traditional techniques allowing for more answers that matter to be obtained in genetic disease and cancer applications. We believe that Saphyr is the only product capable of detecting structural variations at high sensitivity and specificity with a workflow that is cost-effective and time efficient.

Our customers include researchers and clinicians who seek to identify and understand the biological implications of genome variation. We believe that Saphyr can replace more traditional cytogenetic tools which are expensive, slow and labor-intense, with an advanced solution designed to simplify workflow, reduce cost, and increase assay success rates. We believe Saphyr has the potential to significantly increase success rates and provide more answers across a wide range of applications in genomics.

Testing and Laboratory Services

We offer tests that use CMA for evaluation of patients suspected of having certain genetic diseases, which is recommended by the American College of Medical Genetics and Genomics (ACMG), the American Academy of Pediatrics (AAP), and the American Academy of Neurology (AAN), among other renowned societies. We are actively performing research to determine whether OGM with the Saphyr system can replace CMA as the front-line test for children with developmental disorders. As the scientific, peer-reviewed literature supports this claim, the coding entities such as CMS and the AMA would need to adopt the proper procedural codes to allow for insurance reimbursement of new testing methodologies before they become mainstream clinical diagnostic instruments. Importantly, OGM is expected to be able to detect full mutations consistent with fragile X syndrome, which is another front-line test for children, especially males, with autism spectrum disorder and intellectual disability. Studies are ongoing to determine the sensitivity and specificity for OGM as it relates to fragile X syndrome. We also

employ Whole Exome Sequencing (WES), which aims to detect genome SNVs that are different from genome structural variations and are not detectable by OGM.

We believe we are uniquely positioned to develop LDT's that can improve upon the existing standards of care for diagnostic testing for NDDs. We have an established channel to work with payers to secure reimbursement alternatives for Saphyr-based testing. If reimbursements can be established, we intend to share our strategies with our customers to drive demand for the Saphyr system. We plan to expand our testing menu with inclusion of OGM to demonstrate workflow implementation in a clinical setting in order to drive adoption as well as serve as a conduit for enabling access for those customers unable to make a capital equipment expenditure. Our goal is to enable access, demonstrate excellence of the OGM workflow as a model within a CLIA setting for educational purposes, drive advancements in product development for clinical grade testing of OGM at scale.

Software Solutions

We offer industry leading genome analysis software that enables genomics labs to analyze and interpret data across a wide range of platforms to generate highly informative data visualizations for streamlined and simple reporting of causal variants. Today, NxClinical software is among the most comprehensive solutions for analysis and interpretation of any microarray or NGS generated data integrating copy number variants (CNVs), absence of heterozygosity (AOH) and loss of heterozygosity (LOH), as well as SNVs from sequencing data into a single well integrated interface that is used across the globe by renowned academic and commercial clinical laboratories.

Our acquisition of BioDiscovery has expanded our portfolio into providing data analysis and interpretation solutions across NGS, CMA and OGM. These software solutions are expected to allow us to leverage and expand our network of Bionano customers and to potentially enable future adoption of OGM. We believe integrating OGM data into NxClinical should substantially improve the analysis and reporting capabilities of our current Saphyr system, making OGM easier to adopt and use by our customers. Through BioDiscovery, we can now serve the NGS and array markets directly though software with an industry leading data interpretation solution for revealing more answers with delivery of copy number variants across the genome. Our software monetization strategy is predicated on a pay-per-sample model where customers running NGS and/or array today can adopt, which sets the stage for future OGM adoptions. Software is a way for us to participate directly in the NGS market while also enabling OGM data to be seamlessly integrated with NGS in one view for a comprehensive analysis, which is unique to Bionano.

Our Commercial Offerings

The Saphyr System and Consumables

We develop and market the Saphyr system, a complete sample-to-result solution for structural variation analysis by OGM that empowers comprehensive genome analysis and facilitates a deeper understanding of genetic variation and function. We believe the Saphyr system is capable of addressing the needs for structural variation analysis because it is:

- **Highly sensitive.** We believe Saphyr is the most sensitive detector of structural variations larger than 500 base pairs currently on the market.
- **Cost effective.** The consumables cost per genome, at an average of approximately $500, can be less than the combination of standard techniques and well below both short-read and long-read WGS at a depth of 160x coverage.
- **Scalable and fast.** Relative to traditional techniques, Saphyr has demonstrated up to a 75% reduction in turnaround time for analysis of acute lymphoblastic leukemia (ALL) subjects when used instead of karyotyping, FISH and MLPA.

The Saphyr Instrument

The Saphyr instrument is a single-molecule imager that includes high performance optics, automated sample loading based on machine learning algorithms and computational hardware and control software. The instrument's high-performance optics simultaneously image DNA linearized in hundreds of thousands of nanochannels. The instrument's control interface is the user's primary control center to design and monitor experiments as they occur in real time. The computational hardware is responsible for the secondary processing of the image data being produced on the Saphyr. The Saphyr instrument is currently capable of analyzing up to 5,000 human genomes per year at 30x coverage. At the end of 2021 we announced the completion of a prototype currently in development that is expected to significantly increase the throughput.

The Saphyr Chip

The Saphyr Chip® is the consumable that packages the nanochannel arrays for DNA linearization. In its current form, each Saphyr chip has three flow cells containing approximately 120,000 nanochannels that are roughly 30 nanometers wide, and each flowcell can hold one unique sample. To manufacture the arrays, we use photolithography in a semiconductor fabrication facility to print hundreds of thousands of tiny grooves on silicon wafers and then dice the wafers into individual chips. Our chips are inexpensive to manufacture and highly scalable. The fluidic environment in each channel allows individual molecules to move swiftly utilizing only the charge of DNA. Hundreds of thousands of molecules can move through hundreds of thousands of parallel nanochannels simultaneously, enabling extremely high-throughput processing on a single-molecule basis.

Saphyr Sample Prep and Labeling Kits

Our Bionano Prep Kits™ and DNA labeling kits provide the reagents and protocols needed to extract and label ultra-high molecular weight, or UHMW, DNA for use with the Saphyr system. These kits are optimized for performing our genome mapping applications on a variety of sample types.

Our workflow begins with the isolation of ultra-high molecular weight DNA. Our sample prep kits are optimized for isolating and purifying ultra-high molecular weight DNA in a process that is gentler than existing DNA extraction methods. The resulting purified DNA is millions of base pairs long and optimal for use with our systems. Each Bionano Prep Kit allows customers to perform five to 10 HMW DNA preps. Our kits and protocols enable the extraction of HMW DNA from a variety of sample types including human or animal tissue and tumors, plant tissue, cell lines, bone marrow aspirates and human blood.

Our labeling reagents are optimized for applications on our genome mapping systems. Starting with HMW DNA purified using the appropriate Bionano Prep Kit, fluorescent labels are attached to specific sequence motifs. The result is uniquely identifiable genome-specific label patterns that enable de novo map assembly, anchoring sequencing contigs and discovery of structural variations as small as 500 base pairs to up to chromosome arm lengths.

Our kit for DNA labeling, the Direct Label and Stain (DLS) kit, is a proprietary, nondestructive chemistry for sequence motif labeling of genomic DNA that improves every aspect of our genome mapping. DLS uses a single direct-labeling enzymatic reaction to attach a fluorophore to the DNA at a specific 6-base pair sequence motif, yielding approximately 16 labels per 100,000 base pairs in the human genome. After labeling, the molecules are linearized in the Saphyr chip on the Saphyr instrument and imaged. Through the isolation, labeling and linearization steps, the molecules maintain an average length of around 250,000 base pairs. The label patterns on each molecule allow them to be uniquely identified and aligned in a pair-wise comparison against all other molecules imaged from the same sample.

Software Solutions

Our data solutions offering includes a complete suite of hardware and software for end-to-end experiment management, algorithms for assembling genome maps and algorithms and databases for bioinformatics processing, all of which is driven through convenient web-based management and monitoring tools.

We have a suite of proprietary algorithms and databases that fully enable our proprietary bioinformatic and structural variation analysis pipelines. Using pairwise alignment of the single molecule images, consensus genome maps are constructed, refined, extended and merged. Molecules are then clustered into two alleles, and a diploid assembly is created to allow for heterozygous

structural variation detection. Genome maps typically span entire chromosome arms in single, contiguous maps. Comparative analysis of maps reveals structural variation. Our customers use our variant annotation workflow to specifically uncover rare and sample-specific mutations.

Our hardware solution includes the Saphyr Compute Server, which provides cluster-like performance in an affordable, compact solution and the Bionano Compute Server, which expands the analytical capacity of the suite of tools. With these solutions, our customers are capable of performing multiple simultaneous analyses and sustaining continuous throughput, which allows them to spend less time waiting for data, so they can focus on investigating results. We also offer a cloud-based solution for data analysis.

NxClinical is among the most comprehensive and up-to-date solutions for cytogenetics and molecular genetics, providing one system for analysis and interpretation of all genomic variants from microarray and NGS data. We are developing a version of NxClinical to incorporate OGM data, which is expected to become our software solution once completed.

Testing and Laboratory Services

Through Bionano Labs, we offer OGM data to researchers seeking access to OGM data. We intend to build a menu of LDT's on Saphyr to demonstrate the capabilities of OGM.

FirstStepDx PLUS is a CMA designed to identify an underlying genetic cause in individuals with autism spectrum disorder, developmental delay, and intellectual disability.

Fragile X syndrome (FXS) testing is designed to detect individuals (both males and females) with FXS, as well as carriers of the condition.

NextStepDx PLUS is a whole exome sequencing test designed to identify genetic variants that are associated with disorders of childhood development.

EpiPanelDx PLUS is a genetic testing panel designed for patients who have experienced seizures, infantile spasms, encephalopathy, or febrile seizures.

PGx test identifies over 60 alleles in 11 genes. PGx testing is one aspect of personalized medicine and is used to aid health care providers with medications and dosage.

Market Opportunity

According to Markets and Markets, the worldwide market for genomics products and services is expected to reach approximately $54.4 billion by 2025, up from approximately $22.7 billion in 2020, representing a compound annual growth rate of 19%.

We believe the two areas of the genomics market that are driving demand for the Saphyr System are:

- ***Consolidation of traditional cytogenetics techniques in constitutional and cancer applications.*** To provide a robust clinical analysis, cytogenetic assays detect known structural variations that are linked to specific diseases or therapeutic responses. The technologies used for detecting structural variations are expensive and involve cumbersome workflows with relatively limited ability to scale to higher volumes or more complex testing panels. Sequencers tend not to be used for cytogenetics due to their inability to reliably detect structural variations. Cytogenetics laboratories are beginning to adopt Saphyr as a more effective, scalable and efficient approach to finding the structural variations causative to genetic diseases and cancer. For this segment, Saphyr is used alone tool for providing comprehensive and accurate detection of all classes of structural variations and enable clinically relevant calls without the need for any sequencing or legacy cytogenetic technology. We estimate that approximately 2,500 cytogenetics labs exist worldwide.
- ***Combining OGM with sequencing for molecular genetics and discovery research applications.*** In discovery research across patient cohorts, sequencing is primarily used to find SNVs responsible for disease or therapeutic response. Sequencing alone, however, is significantly limited due to its inability to reveal structural variations. Our Saphyr system has been expanding this market segment by complementing sequencing to expand the scope of genome variation that can be analyzed in studies to achieve a more comprehensive view of the genome.

We estimate that the current worldwide discovery research and cytogenetics segments together comprise an addressable opportunity for us to sell up to an aggregate of approximately 10,000 OGM-based instruments, representing a total instrument market opportunity of approximately $2.1 billion.

In addition to the instrument sales opportunity, our OGM-based instruments generate recurring revenue from chip consumables and reagents that are used on a per-sample basis. We believe estimate that each of our OGM-based instruments has the potential to create recurring revenue from chip consumable sales in a range of between $70,000 to approximately $175,000 per year, suggesting a potential annual recurring revenue from chip consumable sales opportunity between approximately $0.7 billion to

approximately $1.7 billion. We have based this estimated annual recurring revenue opportunity for chip consumable sales on anticipated customer and an assumed price of $500 per chip consumable and sample prep and labeling kit.

We believe that if our OGM-based instruments can successfully penetrate these addressable market opportunities, this should spur additional basic and translational research creating new areas where Saphyr (or successor instruments) and OGM data can be used to improve the standard of care and patient management. These may include preconception, products of conception and prenatal genetic applications, uses to advance gene editing techniques and precision medicine. In the long term, we anticipate potential opportunities in population screening, newborn screening, biopharma applications in cell quality control and oncology.

Our current market opportunity estimates for total OGM-based instrument sales and annual recurring revenue from chip consumable sales are forward-looking statements and are subject to significant risks and uncertainties. While these were prepared in good faith, we cannot provide assurances as to future results or events. These estimates are based on third-party market research data and our future outlook, which is dependent in principal part on anticipated demand for OGM instruments, complementary capabilities of OGM and NGS, expected consumption of chips and sample prep and labeling kits. In particular, these estimates are based on current and projected selling prices for instruments and consumables, each of which is subject to change over time. These estimates and assumptions underlying our addressable market opportunities involve significant judgments with respect to, among other things, future economic, competitive, regulatory, market and financial conditions, as well as future customer demand, business decisions and corporate opportunities that may not be realized, and that are inherently subject to significant business, economic, competitive and regulatory risks and uncertainties, all of which are difficult to predict and many of which are outside of our control. Our underlying assumptions and estimates may prove to be inaccurate and our financial objectives may not be realized, and therefore our actual results may differ materially from these estimated addressable market opportunities. In addition, these addressable opportunities should not be construed as financial guidance and should not otherwise be relied upon as being necessarily indicative of future results, and you are cautioned not to place undue reliance on these estimated addressable opportunities. In preparing these estimated addressable opportunities, we have relied upon and assumed, without independent verification, the accuracy and completeness of certain industry and market information provided to us by third parties or through publicly available sources, which information involves assumptions and limitations, and you should not give undue weight to such information.

We have established relationships with key opinion leaders in genomics research and clinical applications, including rare diseases and oncology, including some of the world's most prominent clinical, translational research, basic research, academic and government institutions as well as leading pharmaceutical and diagnostic companies. Examples include Quest Diagnostics, Brigham and Women's Hospital, Harvard Medical School, MD Anderson Cancer Center, Children's Hospital Los Angeles, Columbia University Medical Center, Children's Hospital of Philadelphia, Medical College of Georgia at Augusta University, Children's National Health System, Boston Children's Hospital, PerkinElmer, Praxis Genomics, Garvan Institute of Medical Research, McDonnell Genome Institute at Washington University, National Institutes of Health, Pennsylvania State University, Radboud University Medical Center and Salk Institute for Biological Studies.

Our Strategy

We are primarily focused on driving adoption of OGM through the Saphyr system. Our goal is to streamline structural variant identification and enable new research in genomics to allow greater insight into their role in human health in ways that have not been possible with any other current research and diagnostic technologies.

Our strategy to achieve this includes:

- ***Demonstrate that Saphyr is a superior alternative to traditional techniques in constitutional genetic disorders and hematologic malignancy applications.*** Optical genome mapping has demonstrated superior detection sensitivity for all classes of structural variants relative to karyotyping, FISH and CMA in numerous peer-reviewed publications over the last year and offers benefits of improved assay success rates, faster time to result and a lower total cost. The value proposition and competitive differentiation for OGM in cytogenetics market is exceptionally strong with an immediate opportunity to digitize legacy microscope techniques (karyotyping) with a superior approach using Saphyr. Since the cytogenetics market understands the importance of structural variants and these genomic variants are the basis of this medical discipline, we believe the cytogenetics market is well poised as the entry point for global expansion.
- ***Complement NGS with OGM in translational, applied and discovery research markets.*** We believe the combination of NGS and OGM can provide the most comprehensive and cost-effective analysis of genome variants from SNVs to whole chromosomes. NGS is an accurate technique for measuring genome variants below 500 bp while OGM bridges the gap by enabling detection of all structural variants above 500 bp to reveal more answers and resolve previously unresolved cases from using NGS alone. There are over 15,000 NGS instruments installed globally and for each of these sequencers our vision is to complement with a mapper in Saphyr to provide a more comprehensive picture of the genome for more discoveries, publications and translation into molecular genetics.

- ***Accelerate broad reimbursement for OGM and establish it as the standard of care in guidelines by professional medical societies.*** We are investing in four multi-center clinical studies for postnatal, prenatal, hematologic malignancies and solid tumor analyses relative to standard of care. Each study is designed with an expectation for recruitment of 1,000 subjects and will assess sensitivity, specificity, reproducibility, concordance and incremental clinically relevant findings relative to standard of care. We are investing in these programs to build the necessary evidence to establish reimbursement and to pave the way for inclusion in professional society guidelines to advance standard of care. The first preliminary readout from the multicenter postnatal study was published in December 2021.
- ***Support the publication of findings with OGM by our customers beyond the more than 340 papers published to date.*** The annual number of publications featuring data generated by Saphyr and its predecessor system has steadily increased since 2010 when the first publication appeared. Recently, the overall number of these publications has grown significantly. For example, of the 340 peer-reviewed and pre-print papers published since 2019, 161 were published in 2021 alone. We intend to continue to support and foster our customer base to help grow the number of publications featuring our systems' data. We believe that these publications are impactful as our customers' studies cover structural variations in areas of high unmet medical need, such as rare and undiagnosed pediatric diseases, neurological and muscular diseases, developmental delays and disorders, prostate cancer and leukemia.
- ***Continue to innovate our products and technologies.*** We designed Saphyr to accommodate performance enhancements without the need for replacement of the entire instrument. For example, hardware upgrades and new consumables are made available to purchase by customers. We intend for these performance enhancements to be delivered on a regular basis. In addition, we periodically make available software upgrades to customers through download at no charge. We expect to continue developing and refining our technologies to improve the ease of use of our Saphyr system and enable our existing installed systems to meaningfully increase sample throughput and sensitivity and specificity of structural variation detection. A high throughput version is currently in development that is expected to significantly increase the throughput and lower the cost per sample. Compared to the Saphyr system, which images DNA at a rate of approximately 205 Gbp per hour, the new system is expected to image nearly 820 Gbp per hour and we announced the completion of this protype at the end of 2021.
- ***Partner with industry-leading companies and laboratories to expand adoption in clinical markets.*** Establish additional collaborations with customers to help drive validating studies. Expand partnership efforts with clinical diagnostic companies to commercialize LDTs in the U.S. as well as LDTs and approved tests outside the U.S.

Sales and Marketing

As of December 31, 2021, our commercial team consisted of 152 individuals in sales, sales support and marketing. Our sales support personnel include individuals in customer solutions, field service engineers and field application specialists. This commercial staff is primarily located in North America, Europe, and China. Most of our sales support team is located at our headquarters in San Diego and some work remotely throughout the U.S., Europe, and China.

We sell our products through a direct sales force based in North America and Europe. Our sales strategy involves the use of a combination of sales managers and sales representatives. We expect to increase our sales force as we expand our business.

We sell our products through a network of distributors in the Asia-Pacific region and select other markets outside of North America and Europe. Specifically, we distribute our instruments and reagents via third-party distributors in markets such as China, Japan, South Korea, Singapore, Australia, India and South Africa. Three of our distributors are in China, one in Australia, one in Italy, one in Sweden, one in Japan and one in South Korea.

The role of our sales managers and sales representatives is to educate customers on the advantages of Saphyr and the applications that our system makes possible. The role of our field application specialists is to provide on-site training and scientific technical support to prospective and existing customers. Our field application specialists are technical experts with advanced degrees, including seven with PhDs., and generally have extensive experience in academic research and core sequencing lab experience.

In addition, we maintain an applications lab team in San Diego, California composed of scientific experts who can transfer knowledge from the research and development team to the field application specialists. 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. This team also provides commercial services by running samples on Saphyr for researchers who do not have a Saphyr system of their own.

We intend to expand our sales, support, and marketing efforts in the future by expanding our direct footprint in North America and Europe as well as developing a more comprehensive support network in China where significant market opportunities exist. Additionally, we believe that there is significant opportunity in other European, South American, Asia-Pacific and Middle Eastern regions. We plan to expand into these regions via initial penetration with distributors.

Our systems are relatively new to the life science marketplace and require a capital investment by our customers. The sales process typically involves numerous interactions and demonstrations with multiple people within an organization. Some potential customers conduct in-depth evaluations of the system including having us run experiments on in-house Saphyr systems. In addition, in most countries, sales to academic or governmental institutions require participation in a tender process involving preparation of extensive documentation and a lengthy review process. Because of these factors and the budget cycles of our customers, our sales cycle, the time from initial contact with a customer to our receipt of a purchase order, can often be nine to 12 months.

We primarily sell our suite of LDTs to pediatric physicians through a physician-directed “in-person” sales model. This commercial staff is located in North America, and the sales personnel primarily work remotely in U.S. states where we have obtained insurance reimbursement. Our sales and marketing efforts are targeted primarily on specialty pediatricians, including pediatric neurologists, medical geneticists, and developmental and behavioral pediatricians. We also target general pediatricians with large numbers of patients. Our managed care efforts are directed to establishing contracts and/or credentialing with private and governmental insurance carriers that provide coverage for patients with ASD and other forms of NDDs.

Instruments

Our instruments are manufactured by a third-party medical device manufacturer. Nearly complete instruments are shipped by the manufacturer to us for final assembly and quality control testing. Upon completion, we ship directly to our customers’ locations globally, or distributors’ locations in the case of certain systems sold in the Asia-Pacific region. Installation of, and training on, our products is provided by our employees in the markets where we conduct direct sales, and by distributors in those markets where we operate with distributors.

We believe this manufacturing strategy is efficient and conserves capital. However, in the event it becomes necessary to utilize a different contract manufacturer, we would experience additional costs, delays and difficulties in doing so, and our business could be harmed. This manufacturer actively manages obsolescence of all components in our system. This is done through their supply management process where we get notified of any parts that will become obsolete with enough lead time to identify alternatives.

Consumables

All our chip consumables are produced by a third-party manufacturer at its facility; however, we have established procedures for a replacement manufacturer if required. We complete final assembly and quality control assessments of our chips at our headquarters in San Diego.

Our reagents are sourced from a limited number of suppliers, including certain single source suppliers. Reagents include all components required to run a sample on OGM, such as capture and detector reagents, enzyme reagents and enzyme substrate. Although we believe that alternatives would be available, it would take time to identify and validate replacement reagents for our assay kits, which could negatively affect our ability to supply assay kits on a timely basis. Reagents are supplied through a single source supplier. This supplier requires a sufficient notification period to allow for supply continuity and the identification and technology transfer to a new supplier in the event either party wishes to terminate the relationship.

We actively manage component obsolescence by subscribing to our vendors’ end-of-life notifications. If a vendor is unable to provide sufficient notification, we keep safety stock of the component to minimize disruption to operations.

Manufacturing and Supply

Our manufacturing strategy is to outsource instrument and chip manufacturing and internally develop and assemble reagent kits in our own facility.

Software

Our fundamental long-term software strategy is based on our goal of making OGM ubiquitous with increased utilization through simplified data interpretation and a seamless integration with NGS and array data to provide the most compressive genome analysis. In addition, we can participate directly in the NGS and array markets for genetic disease and cancer applications independent of OGM using a monetization model with a pay-per-sample NxClinical software offering. In this manner we can expand our network of Bionano customers into our software ecosystem with among the most comprehensive platform-agnostic genome interpretation solution where our proprietary original content in OGM can be adopted when needed to obtain a more comprehensive view of the genome by revealing all classes of structural variants. We plan on continuing to enable OGM users with the full solution with software at no additional charge while we monetize the per sample utilization for NGS.

Testing and Laboratory Services

Bionano Labs OGM testing is performed at our lab in San Diego, or at our partner labs in the United States and Europe. We intend to increase our testing capacity, expand our menu of testing, and pursue CLIA certification for the San Diego lab.

For diagnostic testing currently through our Lineagen subsidiary, we maintain contracts with a network of laboratories to perform the wet work on our various LDT tests in order to conserve capital and maintain flexibility of adjusting contract lab based on the best-in-class/most updated technology and customer service. As of December 31, 2021, we have established contracts with two primary laboratories to perform wet lab services. All third-party laboratories have met stringent criteria, including passing a site visit from our management, and being CAP and CLIA-certified. We obtain raw data from laboratories for interpretation and reporting. Our short-term strategy is to augment our existing test menu with OGM based LDT's. Eventually, we intend to convert these tests to OGM.

Key Agreements

License Agreement with Princeton University

In January 2004, we entered into a license agreement, or the License Agreement, with Princeton University, or Princeton. Pursuant to the License Agreement, we received a worldwide, exclusive right and license to, among other things, manufacture and market products or services utilizing patents and inventions related to our sample preparation, DNA imaging and genomic data analysis platform and other key technology.

We are obligated to pay Princeton an annual license maintenance fee in the mid-four digits, which can be reduced by royalties paid to Princeton during the preceding 12 month period. We are also obligated to make royalty payments to Princeton equal to (i) a percentage in the mid-single digits of our and any of our sub-licensees' net sales of products covered by the License Agreement and (ii) a percentage in the low-single digits of our and any of our sub-licensees' revenue from services covered by the License Agreement. Our royalty obligations continue on a licensed product-by-licensed product and licensed service-by-licensed service basis, in every country of the world, until the later of the last sale of a licensed product or service or the expiration of all Princeton patent rights.

The term of the License Agreement will continue until all of our royalty payment obligations have expired, unless terminated earlier. Princeton may terminate the License Agreement upon written notice in the event of our material breach of the License Agreement if such breach remains uncured for 60 days. We may terminate the License Agreement without cause upon 60 days' advance written notice to Princeton.

Agreement for the Manufacture of Our Instruments

We have engaged a single third-party manufacturer to produce and test our instruments on an as-ordered basis. The manufacturer of our instruments has no obligation to manufacture our instruments without a purchase order. In addition, this manufacturer has no obligation to maintain inventory in excess of any open purchase orders or materials in excess of the amount it reasonably determines will be consumed within 90 days. We are obligated to purchase any material deemed in excess pursuant to the agreement. The price we pay is determined according to a mutually agreed-upon pricing formula. We may terminate a purchase order by giving the manufacturer at least 30 days' written notice.

Agreement for the Manufacture of Our Chip Consumables

We have engaged a single third-party manufacturer to manufacture our chip consumables used in our Saphyr system and provide engineering services to us. This third-party has no obligation to manufacture our chip consumables without a purchase order. The prices and fees we pay are established in our agreement with this manufacturer or determined by the manufacturer pursuant if supported by appropriate information. Our agreement with this manufacturer automatically renews for successive one year terms unless a party notifies the other party in writing at least 30 days prior to the expiration of the then-current term. We may terminate an order of the agreement at any time upon 30 days' written notice.

Intellectual Property

Genome Analysis

Our core technology for nucleic acid research is related to methods and devices for non-sequencing based analysis of macromolecules such as nucleic acids. Using this technology, long (high-molecular weight) nucleic acids can be suitably labeled and elongated in order to ascertain structural information such as scaffold organization, copy number, and genomic repeats that is not readily obtained with current sequencing-based approaches. We have secured and continue to pursue intellectual property rights globally, including rights related to analysis of nucleic acid molecules, as well as innovations in the molecular biology and bioinformatics spaces.

We have developed a global patent portfolio that includes 101 issued patents or allowed applications across 26 patent families and an exclusively licensed portfolio of patents and applications from Princeton University, which includes 35 patents across two families. The global patent portfolio owned and licensed by us has effective filing dates ranging from 2001 to 2018. The owned and licensed patent families contain issued patents and pending applications that relate to devices, systems, and methods for macromolecular analysis, genetic testing, computer software systems and reflect our active and ongoing research programs.

In addition to pursuing patents, we have taken steps to protect our intellectual property and proprietary technology by entering into confidentiality agreements and intellectual property assignment agreements with our employees, consultants, corporate partners and, as applicable, advisors.

Diagnostic Services

Lineagen, Inc. has registered trademarks to certain of its genetic testing services and a patent portfolio of patent applications that relate to diagnostic tests and methods to diagnose or predict disease by detecting one or more of ASD-associated CNVs, methods for assessing the presence or absence of a chromosomal deletion or duplication syndrome and methods of selecting patients for treatment based on such assessments, probe compositions, and related PCR-based methods of diagnosis by detecting ASD-associated SNPs and / or CNVs, methods for treating Wolf-Hirschhorn syndrome (4P-syndrome) seizures with cannabidiol or with vitamin B6 combination in patients with deletion of particular seizure susceptibility region, and has exclusively licensed a method of identifying a genome sequence mutation that is linked to causality of a disease using computer program product from The Hospital for Sick Children (SickKids) in in Toronto, Canada.

Software

BioDiscovery has over 25 years of experience in development of software and algorithms for analysis, visualization, and interpretation of genomic data. It has amassed a large base of commercial grade code along with expertise in multi-modal data integration with specific methods for copy number analysis. In addition to patents for microarray array data and image analysis, it has developed CNV segmentation algorithms called SNP-Rank and Fast Adaptive State Segmentation Technology (FASST). Additionally, the company BioDiscovery invented the Multi-Scale Reference (MSR) algorithm for CNV detection from NGS data.

Government Regulation

Our business is subject to and impacted by extensive and frequently changing laws and regulations in the United States (at both the federal and state levels) and internationally. These include laws and regulations particular to our business and laws and regulations relating to conducting business generally (e.g., export controls laws, U.S. Foreign Corrupt Practices Act and similar laws of other jurisdictions). We also are subject to inspections and audits by governmental agencies. Set forth below are highlights of certain key regulatory schemes applicable to our business. Below are discussions concerning government regulation of our Optical Genome Mapping, or OGM, products and services and, separately, our Diagnostic Services.

Optical Genome Mapping

Our OGM products are currently intended for research use only, or RUO, applications, although our customers may use our products to develop their own products that are subject to regulation by the FDA. Although most products intended for RUO are not currently subject to clearance or approval by the FDA, RUO products fall under the FDA's jurisdiction if they are used for clinical rather than research purposes. Consequently, our products are labeled "For Research Use Only."

The FDA's 2013 Guidance for Industry and Food and Drug Administration Staff on "Distribution of In Vitro Diagnostic Products Labeled for Research Use Only or Investigational Use Only," or, the RUO/IUO Guidance, provides the FDA's thinking on when IVD products are properly labeled for RUO or for IUO. The RUO/IUO Guidance explains that the FDA will review the totality of the circumstances when evaluating whether equipment and testing components are properly labeled as RUO. Merely including a labeling statement that a product is intended for research use only will not necessarily exempt the device from the FDA's 510(k) clearance, premarket approval, or other requirements, if the circumstances surrounding the distribution of the product indicate that the manufacturer intends its product to be used for clinical diagnostic use. These circumstances may include written or verbal marketing claims or links to articles regarding a product's performance in clinical applications, a manufacturer's provision of technical support for clinical validation or clinical applications, or solicitation of business from clinical laboratories, all of which could be considered evidence of intended uses that conflict with RUO labeling.

When marketed for clinical diagnostic use, our products will be regulated by the FDA as medical devices. The FDA defines a medical device in part as an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar or related article which is intended for the diagnosis of disease or other conditions or in the cure, mitigation, treatment, or prevention of disease in man. FDA regulates the development, testing, manufacturing, marketing, post-market surveillance, distribution, advertising and labeling of medical devices. The FDA also requires the device to be registered by the medical device manufacturer and listed as a marketed product.

The FDA classifies medical devices into one of three classes on the basis of the intended use of the device, the risk associated with the use of the device for that indication, as determined by the FDA, and on the controls deemed by the FDA to be necessary to reasonably ensure their safety and effectiveness. Class I devices, which have the lowest level of risk associated with them, are subject to general controls. Class II devices are subject to general controls and special controls, including performance standards. Class III devices, which have the highest level of risk associated with them, are subject to general controls and premarket approval. Most Class I devices and some Class II devices are exempt from a requirement that the manufacturer submit a premarket notification, or 510(k), and receive clearance from the FDA which is otherwise a

premarketing requirement for a Class II device. Class III devices may not be commercialized until a premarket approval application, or PMA, is submitted to and approved by the FDA.

510(k) Clearance Pathway

To obtain 510(k) clearance, a sponsor must submit to the FDA a premarket notification demonstrating that the device is substantially equivalent, or SE, to a device legally marketed in the U.S. for which a PMA was not required. The FDA is supposed to make a SE determination within 90 days of FDA's receipt of the 510(k), but it often takes longer if the FDA requests additional information. Most 510(k)s do not require supporting data from clinical trials, but the FDA may request such data.

Premarket Approval Pathway

A PMA must be submitted if a new device cannot be cleared through the 510(k) process. The PMA process is generally more complex, costly and time consuming than the 510(k) process. A PMA must be supported by extensive data including, but not limited to, technical, preclinical, clinical trials, manufacturing and labeling to demonstrate to the FDA's satisfaction the safety and effectiveness of the device for its intended use. After a PMA is sufficiently complete, the FDA will accept the application for filing and begin an in-depth review of the submitted information. By statute, the FDA has 180 days to review the accepted application, although, review of the application generally can take between one and three years. During this review period, the FDA may request additional information or clarification of information already provided. Also during the review period, an advisory panel of experts from outside the FDA may be convened to review and evaluate the application and provide recommendations to the FDA as to the approvability of the device. In addition, the FDA will conduct a preapproval inspection of the manufacturing facility to ensure compliance with its quality system regulations, or QSRs. New premarket approval applications or premarket approval application supplements are also required for product modifications that affect the safety and efficacy of the device.

Clinical Trials

Clinical trials are usually required to support a PMA and are sometimes required for a 510(k). In the U.S., if the device is determined to present a "significant risk," the manufacturer may not begin a clinical trial until it submits an investigational device exemption application, or IDE, and obtains approval of the IDE from the FDA. These clinical trials are also subject to the review, approval and oversight of an institutional review board, or IRB, at each clinical trial site. The clinical trials must be conducted in accordance with the FDA's IDE regulations and good clinical practices. A clinical trial may be suspended by the FDA, the sponsor or an IRB at its institution at any time for various reasons, including a belief that the risks to the study participants outweigh the benefits of participation in the trial. Even if a clinical trial is completed, the results may not demonstrate the safety and efficacy of a device to the satisfaction of the FDA, or may be equivocal or otherwise not be sufficient to obtain approval of a device.

After a medical device is placed on the market, numerous regulatory requirements apply. These include among other things:

- Compliance with QSRs, which require manufacturers to follow stringent design, testing, control, documentation, record maintenance, including maintenance of complaint and related investigation files, and other quality assurance controls during the manufacturing process;
- Reporting of device malfunctions, serious injuries or deaths;
- Registration of the establishments where the devices are produced;
- Labeling regulations, which prohibit the promotion of products for uncleared or unapproved uses; and
- Medical device reporting obligations, which require that manufacturers investigate and report to the FDA adverse events, including deaths, or serious injuries that may have been or were caused by a medical device and malfunctions in the device that would likely cause or contribute to a death or serious injury if it were to recur.

Failure to comply with applicable regulatory requirements can result in enforcement action by the FDA, which may include sanctions, including but not limited to, warning letters; fines, injunctions, and civil penalties; recall or seizure of the device; operating restrictions, partial suspension or total shutdown of production; refusal to grant 510(k) clearance or PMA approvals of new devices; withdrawal of 510(k) clearance or PMA approvals; and civil or criminal prosecution. To ensure compliance with regulatory requirements, medical device manufacturers are subject to market surveillance and periodic, pre-scheduled and unannounced inspections by the FDA.

Laboratory Developed Tests (LDTs)

Federal agencies involved in the regulation of LDTs include CMS and the FDA. CMS regulates the quality of clinical laboratories and the clinical testing process pursuant to the Clinical Laboratory Improvement Amendments of 1988 (CLIA) and the FDA regulates the safety and effectiveness of the diagnostic test pursuant to authorities in the Federal, Food, Drug, and Cosmetic Act (FDCA). Although the FDA has statutory authority to regulate medical devices, the FDA has historically exercised its enforcement discretion and not enforced applicable provisions of the

FDCA and FDA regulations with respect to LDTs, which are a subset of in vitro diagnostic tests that are intended for clinical use and designed, manufactured and used entirely within a single laboratory. The FDA does not consider devices to be LDTs if they are designed or manufactured completely, or partly, outside of the laboratory that offers and uses them. We sell our Saphyr system on an RUO basis to CLIA certified cytogenetic laboratories, which may use the system to develop LDTs.

At various times since 2006, the FDA has issued documents outlining its intent to require varying levels of FDA oversight of many types of LDTs. Congress has also considered legislation that would change how LDTs are regulated. It is unclear at this time if or when the FDA will finalize its plans to end enforcement discretion for LDTs, and even then, whether the new regulatory requirements are expected to be phased-in over time. However, the FDA may decide to regulate certain LDTs on a case-by-case basis at any time. A significant change in the way that the FDA regulates any LDTs that we, our collaborators, or our customers develop using our technology could affect our business. If the FDA requires laboratories to undergo premarket review and comply with other applicable FDA requirements in the future, the cost and time required to commercialize an LDT will increase substantially and may reduce the financial incentive for laboratories to develop LDTs, which could reduce demand for our instruments and our other products. In addition, if the FDA were to change the way that it regulates LDTs to require that we undergo pre-market review or comply with other applicable FDA requirements before we can sell our instruments or our other products to clinical cytogenetics laboratories, our ability to sell our instruments and other products to this addressable market would be delayed, thereby impeding our ability to penetrate this market and generate revenue from sales of our instruments and our other products.

Europe/Rest of World Government Regulation

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in non-U.S. countries prior to the commencement of clinical trials or marketing of our product for clinical diagnostic use in those countries. The regulations in other jurisdictions vary from those in the U.S. and may be easier or more difficult to satisfy and are subject to change. For example, the European Union recently published new regulations that will result in greater regulation of medical devices and IVDs. The IVD Regulation is significantly different from the IVD Directive that it replaces in that it will ensure that the new requirements apply uniformly and on the same schedule across the member states, including a risk-based classification system and increasing the requirements for conformity assessment. The conformity assessment process results in the receipt of a CE designation which has been sufficient to begin marketing many types of IVDs. That process will become more difficult and costly to complete.

Other Governmental Regulation

We are subject to laws and regulations related to the protection of the environment, the health and safety of employees and the handling, transportation and disposal of medical specimens, infectious and hazardous waste and radioactive materials. For example, the U.S. Occupational Safety and Health Administration has established extensive requirements relating specifically to workplace safety for healthcare employers in the U.S. This includes requirements to develop and implement multi-faceted programs to protect workers from exposure to blood-borne pathogens, including preventing or minimizing any exposure through needle stick injuries. For purposes of transportation, some biological materials and laboratory supplies are classified as hazardous materials and are subject to regulation by one or more of the following agencies: the U.S. Department of Transportation, the U.S. Public Health Service, the U.S. Postal Service and the International Air Transport Association. We generally use third-party vendors to dispose of regulated medical waste, hazardous waste and radioactive materials that we may use during our research.

Laboratories that purchase certain of our OGM products and perform clinical diagnostic testing are also subject to extensive regulation under the Clinical Laboratory Improvement Amendments of 1988, or CLIA, requiring clinical laboratories to meet specified standards in areas such as personnel qualifications, administration, participation in proficiency testing, patient test management, quality control, quality assurance and inspections. Adverse interpretations of current CLIA regulations or future changes in CLIA regulations could have an adverse effect on sales of any affected products. Moreover, if we decide to operate our own clinical testing laboratory with respect to our OGM products, such clinical testing would require compliance with CLIA. If, in the future, we operate our own clinical laboratory to perform clinical diagnostic testing with respect to our OGM products, such activities would become subject to the Health Insurance Portability and Accountability Act of 1996, or HIPAA, and its corresponding regulations, as well as additional federal and state laws that impose a variety of fraud and abuse prohibitions on healthcare providers, including clinical laboratories.

Coverage and Reimbursement

Currently, our OGM product, Saphyr, is for research use only, but clinical laboratories may acquire our instrumentation through a capital purchase or capital lease and use the Saphyr and direct label stain chemistry to create their own potentially reimbursable products, such as laboratory developed tests for in vitro diagnostics. Our customers may generate revenue for these testing services by seeking the necessary approval of their product from the FDA or CMS, along with coverage and reimbursement from third-party payors, including government health programs and private health plans. The ability of our customers to commercialize diagnostic tests based on our technology will depend in part on the extent to which coverage and reimbursement for these tests will be available from such third-party payors.

In the U.S., molecular testing laboratories have multiple options for reimbursement coding, but we expect that the primary codes used will be the genomic sequencing procedure codes, or GSPs. The American Medical Association, or AMA, added GSPs to its clinical laboratory fee schedule in 2015. In addition, CMS recently issued a coverage determination providing for the reimbursement of next-generation sequencing for certain cancer diagnostics using an FDA-approved in vitro diagnostic test. Private health plans often follow CMS coverage and reimbursement guidelines to a substantial degree, and it is difficult to predict what CMS will decide with respect to the coverage and reimbursement of any products or services our customers try to commercialize.

In Europe, coverage for molecular diagnostic testing is varied. Countries with statutory health insurance (e.g., Germany, France, The Netherlands) tend to be more progressive in technology adoption with favorable reimbursement for molecular diagnostic testing. In countries such as the United Kingdom with tax-based insurance, adoption and reimbursement for molecular diagnostic testing is not uniform and is influenced by local budgets.

Ultimately, coverage and reimbursement of new products and services is uncertain, and whether laboratories that use our instruments to develop their own products or services will attain coverage and adequate reimbursement is unknown. In the U.S., there is no uniform policy for determining coverage and reimbursement. Coverage can differ from payor to payor, and the process for determining whether a payor will provide coverage may be separate from the process for setting the reimbursement rate. In addition, the U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid healthcare costs, including price controls and restrictions on reimbursement.

Diagnostic Services

Clinical Laboratory Improvement Amendments of 1988 and State Regulation

As a clinical laboratory, we are required to hold certain federal and state licenses, certifications and permits to conduct our business. As to federal certifications, in 1988, Congress passed the CLIA, establishing more rigorous quality standards for all commercial laboratories that perform testing on human specimens for the purpose of providing information for the diagnosis, prevention, or treatment of disease or the assessment of the health or impairment of human beings. CLIA requires such laboratories to be certified by the federal government and mandates compliance with various operational, personnel, facilities administration, quality and proficiency testing requirements intended to ensure the accuracy, reliability and timeliness of patient test results. CLIA certification is also a prerequisite to be eligible to bill state and federal healthcare programs, as well as many commercial third-party payers, for laboratory testing services. Our laboratory located in Salt Lake City, Utah is CLIA certified. This laboratory must comply with all applicable CLIA requirements. If a clinical laboratory is found to be out of compliance with CLIA standards, CMS may impose sanctions, limit or revoke the laboratory's CLIA certificate (and prohibit the owner, operator or laboratory director from owning, operating, or directing a laboratory for two years following license revocation), a directed plan of correction, on-site monitoring, civil monetary penalties, civil actions for injunctive relief, criminal penalties, or suspension or exclusion from the Medicare and Medicaid programs.

CLIA provides that a state may adopt laboratory licensure requirements and regulations that are more stringent than those under federal law and requires compliance with such laws and regulations. The State of Utah follows all CLIA regulations for laboratory facility and personnel requirements. Utah does not have any additional licensure and regulations.

Our laboratory in Salt Lake City, Utah has also been accredited by the College of American Pathologists, or CAP, which means that our laboratory has been certified as following CAP standards and guidelines in operating the laboratory facility and in performing tests that ensure the quality of our test results. Further, certain states require clinical laboratories to obtain licenses to test specimens from patients, or to receive orders from physicians, within those states. We hold such out-of-state laboratory licenses in California, Pennsylvania, and Maryland

HIPAA and other Privacy Laws

The Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), established comprehensive federal standards for the privacy and security of health information. The HIPAA standards apply to three types of organizations: health plans, healthcare clearing houses, and healthcare providers that conduct certain healthcare transactions electronically (“Covered Entities”). Title II of HIPAA, the Administrative Simplification Act, contains provisions that address the privacy of health data, the security of health data, the standardization of identifying numbers used in the healthcare system and the standardization of certain healthcare transactions. The privacy regulations protect medical records and other protected health information by, among other things, limiting their use and release, giving patients the right to access their medical records and limiting most disclosures of health information to the minimum amount necessary to accomplish an intended purpose. The HIPAA security standards require the adoption of administrative, physical, and technical safeguards and the adoption of written security policies and procedures.

On February 17, 2009, Congress enacted Subtitle D of the Health Information Technology for Economic and Clinical Health Act, or HITECH, provisions of the American Recovery and Reinvestment Act of 2009. HITECH expanded and strengthened HIPAA, created new targets for enforcement, imposed new penalties for noncompliance and established new breach notification requirements for Covered Entities. Regulations implementing major provisions of HITECH were finalized on January 25, 2013 through publication of the HIPAA Omnibus Rule (the “Omnibus Rule”).

Under HITECH's breach notification requirements, Covered Entities must report breaches of protected health information that has not been encrypted or otherwise secured in accordance with guidance from the Secretary of the U.S. Department of Health and Human Services (the “Secretary”). Required breach notices must be made as soon as is reasonably practicable, but no later than 60 days following discovery of the breach. Reports must be made to affected individuals and to the Secretary and, in some cases depending on the size of the breach, they must be reported through local and national media. Breach reports can lead to investigation, enforcement and civil litigation, including class action lawsuits.

As a result of our clinical diagnostic services, we are currently subject to HIPAA and maintain an active compliance program that is designed to identify security incidents and other issues in a timely fashion and enable us to remediate, mitigate harm or report if required by law. We are subject to prosecution and/or administrative enforcement and increased civil and criminal penalties for non-compliance, including a new, four-tiered system of monetary penalties adopted under HITECH. We are also subject to enforcement by state attorneys general who were given authority to enforce HIPAA under HITECH. To mitigate penalties under the HITECH breach notification provisions, we must ensure that breaches of protected health information are promptly detected and reported within the company, so that we can make all required notifications on a timely basis. However, even if we make required reports on a timely basis, we may still be subject to penalties for the underlying breach.

In addition to the federal privacy and security regulations, there are a number of state laws regarding the privacy and security of health information and personal data that are applicable to our clinical laboratories. Many states have also implemented genetic testing and privacy laws imposing specific patient consent requirements and protecting test results by strictly limiting the disclosure of those results. State requirements are particularly stringent regarding predictive genetic tests, due to the risk of genetic discrimination against healthy patients identified through testing as being at a high risk for disease. We believe that we have taken the steps required of us to comply with health information privacy and security statutes and regulations, including genetic testing and genetic information privacy laws in all jurisdictions, both state and federal. However, these laws constantly change, and we may not be able to maintain compliance in all jurisdictions where we do business. Failure to maintain compliance, or changes in state or federal laws regarding privacy or security could result in civil and/or criminal penalties, significant reputational damage and could have a material adverse effect on our business.

The General Data Protection Regulation (“GDPR”), which applies to all EU member states from May 25, 2018, also applies to some of our operations. The GDPR is discussed in more detail elsewhere in this report. The GDPR applies not only to organizations within the EU, but also applies to organizations outside of the EU that offer goods or services to EU data subjects or that process or hold personal data of EU data subjects. The regulation specifies higher potential liabilities for certain data protection violations, and we anticipate that it will result in a greater compliance burden for us as we conduct our business in the European Union. Fines for non-compliance can range from the greater of 2% of annual global revenues or €10 million, up to the greater of 4% of annual global revenues or €20 million. The GDPR is discussed in more detail under the heading “International Regulations” below.

Transparency Laws and Regulations

A federal law known as the Physician Payments Sunshine Act (the "Sunshine Act") requires certain medical device manufacturers to track and report to the federal government certain payments and other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), other healthcare professionals (such as physician assistants and nurse practitioners), and teaching hospitals and ownership or investment interests held by physicians and their immediate family members. Manufacturers must report data for the previous calendar year by the 90th day of the then-current calendar year. CMS then publishes the data on a publicly available website no later than June 30th. There are also state "sunshine" laws that require manufacturers to provide reports to state governments on pricing and marketing information. Several states have enacted legislation requiring medical device manufacturers to, among other things, establish marketing compliance programs, file periodic reports with the state, make periodic public disclosures on sales and marketing activities, and such laws may also prohibit or limit certain other sales and marketing practices. These laws may adversely affect our sales, marketing, and other activities by imposing administrative and compliance burdens on us. If we fail to track and report as required by these laws or to otherwise comply with these laws, we could be subject to the penalty provisions of the pertinent state and federal authorities.

Reimbursement and Billing

Reimbursement and billing for diagnostic services is highly complex. Laboratories must bill various payors, such as private third-party payors, including managed care organizations ("MCO"), and state and federal health care programs, such as Medicare and Medicaid, and each may have different billing requirements. Additionally, the audit requirements we must meet to ensure compliance with applicable laws and regulations, as well as our internal compliance policies and procedures, add further complexity to the billing process. Other factors that complicate billing include:

- variability in coverage and information requirements among various payors;
- patient financial assistance programs;
- missing, incomplete or inaccurate billing information provided by ordering physicians;
- billings to payors with whom we do not have contracts;
- disputes with payors as to which party is responsible for payment; and
- disputes with payors as to the appropriate level of reimbursement.

Depending on the reimbursement arrangement and applicable law, the party that reimburses us for our services may be:

- a third-party who provides coverage to the patient, such as an insurance company or MCO;
- a state or federal healthcare program; or
- the patient.
- Presently, approximately 90% of our diagnostic service revenue is paid by private third-party payors.

Federal and State Fraud and Abuse Laws

A variety of state and federal laws prohibit fraud and abuse involving state and federal health care programs, such as Medicare and Medicaid. These laws are interpreted broadly and enforced aggressively by various state and federal agencies, including CMS, the Department of Justice, the Office of Inspector General for the Department of Health and Human Services ("OIG"), and various state agencies. In addition, the Medicare and Medicaid programs increasingly use a variety of contractors to review claims data and to identify improper payments as well as fraud and abuse. Any overpayments must be repaid within 60 days of identification unless a favorable decision is obtained on appeal. In some cases, these overpayments can be used as the basis for an extrapolation, by which the error rate is applied to a larger set of claims, and which can result in even higher repayments.

Anti-Kickback Laws

The Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting, receiving or providing remuneration, directly or indirectly, in exchange for or to induce either the referral of an individual, or the furnishing, arranging for or recommending of an item or service that is reimbursable, in whole or in part, by a federal health care program. "Remuneration" is broadly defined to include anything of monetary value, such as, for example, cash payments, gifts or gift certificates, discounts, or the furnishing of services, supplies or equipment. The Anti-Kickback Statute can be interpreted broadly to prohibit many arrangements and practices that are lawful in businesses outside of the health care industry.

Recognizing the potential breadth of interpretation of the Anti-Kickback Statute and the fact that it may technically prohibit many otherwise innocuous or beneficial arrangements within the health care industry, the OIG has issued a series of regulations, or safe harbors intended to protect such arrangements. Compliance with all requirements of a safe harbor immunizes the parties to the business arrangement from prosecution under the Anti-Kickback Statute. The failure of a business arrangement to fit within a safe harbor does not necessarily mean that the arrangement is illegal or that the OIG will pursue prosecution but would be evaluated on a case-by-case basis. Still, in the absence of an applicable safe harbor, a violation of the Anti-Kickback Statute may occur even if only one purpose of an arrangement is to induce referrals. The penalties for violating the Anti-Kickback Statute can be severe. These sanctions include criminal, civil and administrative penalties, imprisonment and possible exclusion from the federal health care programs. Many states have adopted laws similar to the Anti-Kickback Statute, and some apply to items and services reimbursable by any payor, including private third-party payors.

Further, the Eliminating Kickbacks in Recovery Act of 2018, or EKRA, prohibits payments for referrals to recovery homes, clinical treatment facilities, and laboratories. EKRA's reach extends beyond federal health care programs to include private insurance (i.e., it is an "all payor" statute). For purposes of EKRA, the term "laboratory" is defined broadly and without reference to any connection to substance use disorder treatment. The law includes a limited number of exceptions, some of which closely align with corresponding federal Anti-Kickback Statute exceptions and safe harbors, and others that materially differ.

Physician Self-Referral Bans

The federal ban on physician self-referrals, commonly known as the Stark Law, prohibits, subject to certain exceptions, physician referrals of Medicare patients to an entity providing certain designated health services, which include laboratory services, if the physician or an immediate family member of the physician has any financial relationship with the entity. Several Stark Law exceptions are relevant to arrangements involving clinical laboratories, including but not limited to: (1) fair market value compensation for the provision of items or services; (2) payments by physicians to a laboratory for clinical laboratory services; (3) certain space and equipment rental arrangements that satisfy certain requirements; and (4) personal services arrangements. Penalties for violating the Stark Law include the return of funds received for all prohibited referrals, fines, civil monetary penalties and possible exclusion from federal health care programs. In addition to the Stark Law, many states have their own self-referral bans, which may extend to all self-referrals, regardless of the payor.

State and Federal Prohibitions on False Claims

The federal False Claims Act imposes liability on any person or entity that, among other things, knowingly presents, or causes to be presented, a false or fraudulent claim for payment to the federal government. Under the False Claims Act, a person acts knowingly if he or she has actual knowledge of the information or acts in deliberate ignorance or in reckless disregard of the truth or falsity of the information. Specific intent to defraud is not required. The qui tam provisions of the False Claims Act allow a private individual to bring an action on behalf of the federal government and to share in any amounts paid by the defendant to the government in connection with the action. Penalties include payment of up to three times the actual damages sustained by the government, plus significant civil penalties, as well as possible exclusion from federal health care programs. In addition, various states have enacted similar laws modeled after the False Claims Act that apply to items and services reimbursed under Medicaid and other state health care programs, and, in several states, such laws apply to claims submitted to any payor.

Civil Monetary Penalties Law

The federal Civil Monetary Penalties Law, or the CMP Law, prohibits, among other things, (1) the offering or transfer of remuneration to a Medicare or state health care program beneficiary if the person knows or should know it is likely to influence the beneficiary's selection of a particular provider, practitioner, or supplier of services reimbursable by Medicare or a state health care program, unless an exception applies; (2) employing or contracting with an individual or entity that the provider knows or should know is excluded from participation in a federal health care program; (3) billing for services requested by an unlicensed physician or an excluded provider; and (4) billing for medically unnecessary services. The penalties for violating the CMP Law include exclusion, substantial fines, and payment of up to three times the amount billed, depending on the nature of the offense.

Penalties

Failure to comply with the aforementioned fraud and abuse laws could result in significant penalties, including civil, criminal, and administrative penalties, damages, fines, disgorgement, the curtailment or restructuring of our operations, exclusion from participation in federal and state healthcare programs, additional integrity oversight and reporting obligations, imprisonment, contractual damages, and reputational harm. If any of the physicians or other healthcare providers or entities with whom we do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

International Regulations

We market some of our tests outside of the United States and are subject to foreign regulatory requirements governing laboratory licensure, human clinical testing, use of tissue, privacy and data security, and marketing approval for our tests. These requirements vary by jurisdiction, differ from those in the United States and may require us to implement additional compliance measures or perform additional pre-clinical or clinical testing. For example, the In Vitro Diagnostic Medical Devices (2017/746/EU) ("IVDR") will replace the existing In Vitro Diagnostic Medical Devices Directive (98/79/EC) ("IVDD") in the European Union ("EU"). The IVDR was published in May 2017, marking the start of a five-year period of transition from the IVDD. During the transitional period the IVDR will come into force gradually, starting with the provisions related to the designation of Notified Bodies and the ability of manufacturers to apply for new certificates under the IVDR. The transitional period will end on 26 May 2022, the "Date of Application" ("DoA") of the Regulation. From that point the IVDR will apply fully. The EU has also implemented the General Data Protection Regulation, or GDPR, which requires us to meet new and more stringent requirements regarding the handling of personal data about European Union residents. In many countries outside of the United States, coverage, pricing and reimbursement approvals are also required. We are also required to maintain accurate information on and control over sales and distributors' activities that may fall within the purview of the Foreign Corrupt Practices Act, its books and records provisions and its anti-bribery provisions.

Other Regulatory Requirements

Our laboratory is subject to federal, state and local regulations relating to the handling and disposal of regulated medical waste, hazardous waste and biohazardous waste, including chemical, biological agents and compounds, blood and bone marrow samples and other human tissue. Typically, we use outside vendors who are contractually obligated to comply with applicable laws and regulations to dispose of such waste. These vendors are licensed or otherwise qualified to handle and dispose of such waste.

We are subject to laws and regulations related to the protection of the environment, the health and safety of employees and the handling, transportation and disposal of medical specimens, infectious and hazardous waste and radioactive materials. For example, the U.S. Occupational Safety and Health Administration ("OSHA") has established extensive requirements relating specifically to workplace safety for healthcare employers in the U.S. This includes requirements to develop and implement multi-faceted programs to protect workers from exposure to blood-borne pathogens, including preventing or minimizing any exposure through needle stick injuries. For purposes of transportation, some biological materials and laboratory supplies are classified as hazardous materials and are subject to regulation by one or more of the following agencies: the U.S. Department of Transportation, the U.S. Public Health Service, the United States Postal Service, the Office of Foreign Assets Control, and the International Air Transport Association. We generally use third-party vendors to dispose of regulated medical waste, hazardous waste and radioactive materials and contractually require them to comply with applicable laws and regulations.

Healthcare Reform

In the U.S. and abroad, there have been and continue to be a number of legislative initiatives to contain healthcare costs and change the way healthcare is financed. By way of example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively, the ACA, became law. The ACA is a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms.

There have been executive, judicial and Congressional challenges to certain aspects of the ACA. For example, President Trump signed several Executive Orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. Concurrently, Congress considered legislation to repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA, such as removing penalties, effective January 1, 2019, for not complying with the ACA's individual mandate to carry health insurance. On June 17, 2021, the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Thus, the ACA will remain in effect in its current form. Prior to the U.S. Supreme Court ruling, on January 28, 2021, President Biden issued an executive order to initiate a special enrollment period from February 15, 2021 through August 15, 2021 for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is possible that the ACA will be subject to judicial or Congressional challenges in the future. It is unclear how such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business.

Further, other legislative changes have been proposed and adopted since the ACA was enacted. For example, on April 1, 2014, the Protecting Access to Medicare Act of 2014, or PAMA, was signed into law, which, among other things, significantly altered the payment methodology under the Medicare Clinical Laboratory Fee Schedule, or CLFS. PAMA requires certain laboratories performing clinical diagnostic laboratory tests to report to CMS the amounts paid by private payors for laboratory tests. Beginning on January 1, 2018, CMS has begun using reported private payor pricing to periodically revise payment rates under the CLFS. Based on current law, between January 1, 2023 and March 31, 2023, applicable laboratories will be required to report on data collected during January 1, 2019 and June 30, 2019. This data will be utilized to determine 2024 to 2026 CLFS rates.

We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services. For example, Congress is considering additional health reform measures. In addition, sales of our tests outside of the U.S. will subject us to foreign regulatory requirements, which may also change over time. Further, it is possible that additional governmental action is taken in response to the COVID-19 pandemic.

Other Healthcare Laws

Our operations are directly or indirectly, through our customers, subject to various federal and state fraud and abuse laws, including, without limitation, the federal and state anti-kickback statutes and false claims laws. These laws may impact, among other things, our sales and marketing and education programs, and our financial and business relationships with researchers who use our instruments to develop marketed products or services. By way of example: the federal Anti-Kickback Statute prohibits, among other things, any person or entity from, among other things, knowingly and willfully soliciting, receiving, offering or paying any remuneration, directly or indirectly, to induce, or in return for, purchasing, leasing, ordering, or arranging for or recommending the purchase, lease, or order of any good, facility, item, or service reimbursable, in whole or in part, under a federal healthcare program; and the federal false claims laws, including, without limitation the federal civil False Claims Act, prohibit, among other things, anyone from knowingly and willingly presenting, or causing to be presented for payment, to the federal government (including Medicare and Medicaid) claims for reimbursement for, among other things, drugs or services that are false or fraudulent, claims for items or services not provided as claimed, or claims for medically unnecessary items or services. The ACA, among other things, amended the intent requirement of the federal Anti-Kickback Statute to clarify that a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a crime. In addition, the ACA clarifies that the government may assert that a claim that includes items or service resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act.

Further, the Eliminating Kickbacks in Recovery Act of 2018, or EKRA, prohibits payments for referrals to recovery homes, clinical treatment facilities, and laboratories. EKRA's reach extends beyond federal health care programs to include private insurance (i.e., it is an "all payor" statute). For purposes of EKRA, the term "laboratory" is defined broadly and without reference to any connection to substance use disorder treatment. The law includes a limited number of exceptions, some of which closely align with corresponding federal Anti-Kickback Statute exceptions and safe harbors, and others that materially differ. Additionally, the Stark Law, which prohibits a physician from making a referral for certain designated health services covered by the Medicare or Medicaid program, including laboratory and pathology services, if the physician or an immediate family member of the physician has a financial relationship with the entity providing the designated health services and prohibits that entity from billing, presenting or causing to be presented a claim for the designated health services furnished pursuant to the prohibited referral, unless an exception applies.

There are also state and foreign law equivalents of each of the above federal laws, such as anti-kickback and false claims laws, that may impose similar or more prohibitive restrictions, and may apply to items or services reimbursed by any non-governmental third-party payors, including private insurers. In addition, we may be subject to HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act and their implementing regulations, which imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization by entities subject to the rule, such as health plans, healthcare clearinghouses and certain healthcare providers and their business associates who create, use or disclose individually identifiable health information on their behalf. We may also be subject to state and foreign laws that govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

If our operations are found to be in violation of any of these laws, we may be subject to significant penalties, including, without limitation, civil, criminal, and administrative penalties, damages, fines, disgorgement, the curtailment or restructuring of our operations, exclusion from participation in federal and state healthcare programs, additional integrity oversight and reporting obligations, imprisonment, contractual damages, and reputational harm.

Human Capital Management

As of December 31, 2021, we had 299 employees, of which 152 work in sales, sales support and marketing, 80 work in research and development, 34 work in operations and 33 work in general and administrative. As of December 31, 2021, of our 299 employees, 251 were located in the U.S. and 48 were employed outside the U.S. None of our employees are represented by a labor union or are subject to a collective bargaining agreement.

Our human capital resources objectives include, as applicable, identifying, recruiting, retaining, incentivizing and integrating our existing and new employees, advisors and consultants. The principal purposes of our equity incentive plans are to attract, retain and reward personnel through the granting of stock-based compensation awards, in order to increase stockholder value and the success of our company by motivating such individuals to perform to the best of their abilities and achieve our objectives.

Corporate Information

We were formed in January 2003 as BioNanomatrix LLC, a Delaware limited liability company. In August 2007, we became BioNanomatrix Inc., a Delaware corporation. In October 2011, we changed our name to BioNano Genomics, Inc., and in July 2018, we changed our name to Bionano Genomics, Inc.

Our principal executive offices are located at 9540 Towne Centre Drive, Suite 100, San Diego, California 92121, and our telephone number is (858) 888-7600. Our website address is www.bionanogenomics.com. Information contained in, or that can be accessed through, our website is not incorporated by reference into this Annual Report, and you should not consider information on our website to be part of this Annual Report. Our design logo, “Bionano,” and our other registered and common law trade names, trademarks and service marks are the property of Bionano Genomics, Inc.

Available Information

Access to our Annual Report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to these reports filed with or furnished to the SEC, may be obtained through the investor section of our website at http://www.bionanogenomics.com. We do not charge for access to and viewing of these reports. Information in the investor section and on our website is not part of this Annual Report on Form 10-K or any of our other securities filings. Our filings with the SEC may be accessed through the SEC’s website at www.sec.gov. All statements made in any of our securities filings, including all forward-looking statements or information, are made as of the date of the document in which the statement is included unless otherwise specified, and we do not assume or undertake any obligation to update any of those statements or documents unless we are required to do so by law.

ITEM 1A. RISK FACTORS

RISK FACTORS

You should consider and read carefully all of the risks and uncertainties described below, as well as other information included in this Annual Report, including our financial statements and related notes appearing below. The risks described below are not the only ones facing us. The occurrence of any of the following risks or additional risks and uncertainties not presently known to us or that we currently believe to be immaterial could materially and adversely affect our business, financial condition or results of operations. In such case, the trading price of our securities could decline. This Annual Report also contains forward-looking statements and estimates that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of specific factors, including the risks and uncertainties described below.

Risks related to our financial condition and need for additional capital

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

We are an early commercial-stage company and have a limited commercial history. Our limited commercial history may make it difficult to evaluate our current business and, especially when combined with the other risk factors listed in this section, makes predictions about our future success or viability subject to significant uncertainty. In particular, we have significantly increased our headcount through recent acquisitions of other businesses and the expansion of our sales, marketing and research and development teams, which has increased our operating costs in a manner not historically reflected in our consolidated financial statements, and plan to further increase headcount as we expand our operations. Our business model has evolved over time, and combined with our recent acquisitions, this has impacted the composition and concentration of our revenues, which we expect to continue to change with any future acquisitions and further expansion of our operations. These changes, among others, may make it difficult to evaluate our current business, assess our future performance relative to prior performance and accurately predict our future performance. We have encountered in the past, and will continue to encounter in the future, risks and difficulties frequently experienced by early commercial-stage companies, including those associated with scaling up our infrastructure, increasing the size of our organization and integrating acquired businesses. If we do not address these risks

successfully, or if our assumptions regarding these risks and uncertainties are incorrect or change over time, our results of operations could differ materially from our expectations and our business, financial condition and results of operations could be materially and adversely affected.

We have incurred recurring net losses since we were formed and expect to incur losses in the future. We cannot be certain that we will achieve or sustain profitability.

Since our inception, we have incurred recurring net losses. We incurred net losses of $72.4 million and $41.1 million, and used cash in operations of $71.9 million and $38.3 million for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021, we had an accumulated deficit of $216.1 million. We cannot predict if we will be profitable in the near future or at all. We expect that our losses will continue for the foreseeable future as we plan to invest significant additional funds toward the expansion of our commercial organization, research and development efforts and capital expenditures, among other things. Our recent acquisitions have increased our expenses and we expect that any future acquisitions of businesses, assets, products or technologies will further increase our expenses, which may result in additional losses. We also expect significant increases in our stock-based compensation expense in future periods, reflecting higher stock option valuations as a public company and the issuance of additional equity awards due to increased headcount. In addition, we incur significant legal, accounting and other expenses as a result of being a public company, especially as we no longer qualify as an emerging growth company or a smaller reporting company and are therefore required to comply with additional disclosure and compliance requirements, subject to a transition period. These factors, among others, will make it hard for us to achieve and sustain profitability. We may also incur significant losses in the future for a number of other reasons, many of which are beyond our control, including the level of market acceptance of our products, the introduction of competitive products and technologies, our future product development efforts, our market penetration and our margins, as well as the other risks described below.

Our quarterly and annual operating results and cash flows have fluctuated in the past and might continue to fluctuate, which makes our future operating results difficult to predict and could cause the market price of our securities to decline substantially.

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

Our operating results have varied in the past. In addition to other risk factors listed in this section, some of the important factors that, alone or together, may cause fluctuations in our quarterly and annual operating results include:

- adoption of our optical genome mapping solutions on our Saphyr system or successor systems;
- the successful integration of our Lineagen and BioDiscovery businesses;
- execution on our commercial and reimbursement strategy involving Lineagen;
- customer demand for current BioDiscovery software solutions, including NxClinical, and future software solutions developed through BioDiscovery’s platform;
- the timing of customer orders and payments and our ability to recognize revenue;
- the rate of utilization of consumables by our customers;
- reductions in or other difficulties relating to staffing, capacity, shutdowns or slowdowns of laboratories and other institutions in our customer base, as well as other impacts stemming from the COVID-19 pandemic or other similar factors, such as reduced or delayed investment in new technologies or spending on products, technologies or consumables;
- differences in purchasing patterns across our customer base, including potential differences in consumables spending between earlier adopters of our technologies and more recent customers and variances in rates of increase of consumables spending following new technology purchases, some of which may be compounded by impacts of the COVID-19 pandemic;
- our ability to successfully integrate new personnel, technology and other assets that we may acquire into our company;
- the timing of the introduction of new systems, products, technologies, system and product enhancements and services;

- changes in governmental funding of life sciences research and development or other changes that impact budgets, budget cycles or seasonal or other spending patterns of our customers;
- future accounting pronouncements or changes in our accounting policies; and
- the outcome of any current or future litigation or governmental investigations involving us or other third parties with whom we do business.

In addition, a significant portion of our operating expenses are relatively fixed in nature, and planned expenditures are based in part on expectations regarding future revenue. Accordingly, unexpected revenue shortfalls could decrease our gross margins and cause significant changes in our operating results from quarter to quarter. If this occurs, the trading price of our securities could fall substantially. This variability and unpredictability caused by factors such as those described above and elsewhere in this section could also result in our failing to meet the expectations of industry or financial analysts or investors for any period. If our revenue or operating results fall below the expectations of analysts or investors or below any guidance we may provide, or if the guidance we provide is below the expectations of analysts or investors, the price of our securities could decline substantially. Such a stock price decline could occur even when we have met or exceeded any previously publicly stated guidance.

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

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

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

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

Our future capital needs are uncertain and we will require additional funding in the future to advance the commercialization of Saphyr, NxClinical and our other products, technologies and services, as well as continue our research and development efforts. If we fail to obtain additional funding, we will be forced to delay, reduce or eliminate our commercialization and development efforts.

Our operations have consumed substantial amounts of cash since our inception. We expect to continue to spend substantial amounts of cash in order to continue the commercialization of our products and technologies, fund our research and development programs, expand headcount and execute potential strategic transactions. Although we raised $384.7 million of gross proceeds during 2021, we may need to raise additional funding, or we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe we have sufficient funds for our current or future operating plans. Such funding may mean the sale of common or preferred equity or convertible debt securities, entry into one or more credit facilities or another form of third-party funding, or seeking other debt financing. We may also consider raising additional capital in the future to expand our business, to pursue strategic investments, to take advantage of financing opportunities, or for other reasons, including to:

- expand our sales and marketing efforts to further commercialize our products, technologies and services and address competitive developments;
- expand our research and development efforts to improve our existing products, technologies and services and develop and launch new products, technologies and services, particularly if any of our products, technologies and services are deemed by the U.S. Food and Drug Administration, or FDA, to be medical devices or otherwise subject to additional regulation by the FDA;

- seek FDA approval to market our existing RUO products or new products utilized for diagnostic purposes;
- lease additional facilities or build out existing facilities as we continue to grow our employee headcount, inventory and research and development;
- further expand our operations outside the United States;
- enter into collaboration arrangements, if any, or in-license products and technologies;
- acquire or invest in complimentary businesses or assets;
- add operational, financial and management information systems; and
- cover increased costs incurred as a result of continued operation as a public company, including costs resulting from our no longer qualifying as an emerging growth company and a smaller reporting company and becoming a large accelerated filer.

Our future funding requirements will be influenced by many factors, including:

- market acceptance of our products, technologies and services, and the variability in costs to achieve such acceptance;
- the cost and timing of establishing additional sales, marketing and distribution capabilities;
- the cost of our research and development activities;
- our ability to satisfy any outstanding or future debt obligations;
- the success of our existing distribution and marketing arrangements and our ability to enter into additional arrangements in the future;
- the effects of the COVID-19 pandemic; and
- the effect of competing technological and market developments.

The various ways we could raise additional capital carry potential risks. We cannot assure you that we will be able to obtain additional funds on acceptable terms, or at all. If we raise additional funds by issuing equity or equity-linked securities, our stockholders may experience dilution. Any equity or debt securities we issue could provide for rights, preferences, or privileges senior to those of holders of our common stock. Future debt financing, if available, may involve covenants restricting our operations or our ability to incur additional debt. Any debt or equity financing may contain terms that are not favorable to us or our stockholders. If we raise additional funds through collaboration and licensing arrangements with third parties, it may be necessary to relinquish some rights to our technologies or our products, or grant licenses on terms that are not favorable to us.

If we do not have, or are not able to obtain, sufficient funds, we may have to delay development or commercialization of our technologies and products. We also may have to reduce marketing, customer support or other resources devoted to our products or technologies or cease operations. Any of these factors could have a material adverse effect on our financial condition, operating results and business. Any of the foregoing could significantly harm our business, prospects, financial condition and results of operation and could cause the price of our securities to decline.

Our business, and that of our customers, has been adversely affected by the effects of public health crises, including the COVID-19 pandemic. In particular, the COVID-19 pandemic has materially affected our operations globally, including at our headquarters in San Diego, California, as well as the business or operations of our research partners, customers and other third parties with whom we conduct business.

Our business could be adversely affected by health crises in regions where we have operations, concentrations of sales and marketing teams, distributors or other business operations. Such health crises could also affect the business or operations of our research partners, customers and other third parties with whom we conduct business. In particular, the evolving effects of the COVID-19 pandemic and government measures taken in response have had significant impacts, both direct and indirect, on businesses and commerce, as significant reductions in business-related activities have occurred, supply chains have been disrupted, and manufacturing and clinical development activities have been curtailed or suspended. Continued remote work policies, quarantines, shelter-in-place and similar government orders, shutdowns or other restrictions on the conduct of business operations related to the effects of the COVID-19 pandemic have materially affected and may continue to materially affect how we, our customers, and our suppliers are operating our businesses.

In response to public health directives and orders implemented in response to the COVID-19 pandemic, we have implemented work-from-home policies for certain employees. We have also modified certain business practices, including those related to employee travel and cancellation of physical participation in meetings, events and conferences, and implemented new protocols to promote social distancing and enhance sanitary measures in our offices and facilities. The quarantine of our personnel and the inability to access our facilities or customer sites has adversely affected, and is expected to continue adversely affecting, our operations, namely in sales and marketing and product delivery. For example, we experienced at various times during the

pandemic the inability to visit certain customer sites to support installation or service our OGM systems. In addition, certain members of our workforce are now performing their duties remotely and these employees have not been able to maintain the same level of productivity and efficiency due a lack of resources that would otherwise be available to them in our offices and additional demands on their time, such as increased responsibilities resulting from school closures or the illness of family members. Furthermore, our remote workforce poses increased risks to our information technology systems and data as more of our personnel leverage resources not necessarily within our control.

The effects of these public health directives and orders and our related adjustments in our business have negatively impacted productivity, disrupted our business and delayed our timelines, the magnitude of which will depend, in part, on the length and severity of the restrictions and other limitations on our ability to conduct our business in the ordinary course. The spread of COVID-19 has resulted in a widespread health crisis that is also adversely affecting economies and financial markets globally, which may negatively affect demand for our products, technologies and services and materially affect us financially. For example, customers who have committed to order minimum quantities of consumables or to purchase our Saphyr instrument have delayed these commitments. Further, restrictions on our ability to travel, stay-at-home orders and other similar restrictions on our business have limited our ability to support our global and domestic operations, including providing installation and training and customer service, resulting in disruptions in our sales and marketing efforts and negative impacts on our commercial strategy. In addition, while many of our employees have been vaccinated, we do not know if vaccination will remain effective against further COVID-19 variants such as the Delta and Omicron variants. To the extent our employees are exposed to or become ill with COVID-19, our ability to conduct our operations may be impaired from time to time.

In addition, disruption of global financial markets as a result of COVID-19 may limit our ability to access capital, which could negatively affect our liquidity. A recession or market correction resulting from the spread of COVID-19 could also materially affect our business and the value of our securities even after the outbreak of COVID-19 has subsided due to, among other things, unforeseen adverse impacts on us or our third-party manufacturers, vendors and customers.

Also, in connection with our Lineagen diagnostic services, COVID-19 poses the risk that we or our employees, contractors, suppliers, courier delivery services and other partners may be prevented from conducting business activities for an indefinite period of time, including due to spread of the disease within these groups or due to shutdowns that may be requested or mandated by governmental authorities. The continued spread of COVID-19 and the measures taken by the governments of countries affected could disrupt the supply chain of materials needed for our diagnostic tests, interrupt our ability to receive specimens, impair our ability to perform or deliver the results from our tests, impede patient movement or interrupt healthcare services causing a decrease in test volumes, delay coverage decisions from Medicare and third-party payors, delay ongoing and planned clinical trials involving our tests and have a material adverse effect on our business, financial condition and results of operations. For example, COVID-19 related disruptions to the global supply chain created challenges in our getting sufficient components and raw materials for production of our OGM systems and consumables. If the pandemic persists, these disruptions could reoccur or persist.

These and similar, and perhaps more severe, disruptions in our operations could negatively impact our business, operating results and financial condition. In addition, quarantines, stay-at-home, executive and similar government orders, or the perception that such orders, shutdowns or other restrictions on the conduct of business operations could occur, have disrupted our supply chain and affected customer decision-making. For example, any actual or perceived disruption in our product distribution channel could alter customer buying decisions, prompting customers to delay or cancel their orders, which would negatively impact our sales revenue and could harm our reputation. In addition, we anticipate that ongoing disruptions in our supply chain will cause shortages in the materials required to operate our instruments, therefore limiting our ability to process customer samples and the ability of users of our system to operate our system.

The ultimate impact of the COVID-19 outbreak or a similar health epidemic is highly uncertain and subject to change. We do not yet know the full extent of delays or impacts on our business or the global economy as a whole, and such impacts may not be fully recoverable. In addition, the current and potential adverse impacts of the COVID-19 pandemic on our business, financial condition, results of operations and growth prospects, may also have the effect of heightening many of the other risks and uncertainties described in this Annual Report.

Changes in tax laws or regulations that are applied adversely to us or our customers may have a material adverse effect on our business, cash flow, financial condition or results of operations.

New income, sales, use or other tax laws, statutes, rules, regulations or ordinances could be enacted at any time, which could adversely affect our business operations and financial performance. Further, existing tax laws, statutes, rules, regulations or ordinances could be interpreted, changed, modified or applied adversely to us. For example, legislation enacted in 2017 informally titled the Tax Cuts and Jobs Act, or the Tax Act, enacted many significant changes to the U.S. tax laws. Future guidance from the Internal Revenue Service and other tax authorities with respect to the Tax Act may affect us, and certain aspects of the Tax Act could be repealed or modified in future legislation. For example, the Coronavirus Aid, Relief and Economic Security Act, or the CARES Act, modified certain provisions of the Tax Act. In addition, it is uncertain if and to what extent various states will conform to the Tax Act, the CARES Act or any newly enacted federal tax legislation. In

addition, the Biden administration and Congress have proposed various changes to the U.S. federal tax regime. Certain of these proposals include, among other things, eliminating or modifying some of the provisions enacted in the Tax Act, a significant increase in the corporate income tax rate, a new alternative minimum tax on book income and changes in the taxation of non-U.S. income. While these proposals have not yet been enacted and it is unclear whether these proposals or similar changes will ultimately ever be enacted, the passage of any legislation as a result of these proposals or any other future changes in U.S. tax laws could have a material impact on the value of our deferred tax assets, could result in significant one-time charges, and could increase our future U.S. tax expense. Moreover, should the scale of our international business activities expand, any changes in the U.S. taxation of such activities or any other changes in applicable non-U.S. tax laws could increase our worldwide effective tax rate and harm our future financial position and results of operations.

Our ability to use net operating losses and certain other tax attributes to offset future taxable income and taxes may be subject to limitations.

As of December 31, 2021, we have federal and state tax net operating loss carryforwards of $341.1 million and $158.4 million, respectively. The federal tax loss carryforwards include $176.8 million that do not expire, but utilization of such tax loss carryforwards in taxable years beginning after December 31, 2021 is limited to 80% of our taxable income. The remaining federal tax loss carryforwards of $164.3 million and state tax loss carryforwards begin to expire in 2027 and 2023, respectively, unless previously utilized. As of December 31, 2021, we also have federal and California research credit carryforwards of $6.7 million and $6.1 million, respectively. The federal research credit carryforwards begin to expire in 2027 unless previously utilized. The California research credits carry forward indefinitely.

In addition, utilization of net operating losses and research and development credit carryforwards may be subject to limitations due to ownership changes that have occurred or that could occur in the future in accordance with applicable provisions of the Internal Revenue Code of 1986, as amended, or the Code, and corresponding provisions of state law. We may have experienced one or more ownership changes in the past and we may also experience additional ownership changes in the future as a result of subsequent changes in our stock ownership, some of which may be outside of our control. If an ownership change occurs and our ability to use our net operating loss or research and development credit carryforwards is materially limited, it would harm our future operating results by increasing our future tax obligations. In addition, at the state level, there may be periods during which the use of net operating loss carryforwards is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

U.S. taxation of international business activities or the adoption of tax reform policies could materially impact our future financial position and results of operations.

Limitations on the ability of taxpayers to claim and utilize foreign tax credits and the deferral of certain tax deductions until earnings outside of the U.S. are repatriated to the U.S., as well as changes to U.S. tax laws that may be enacted in the future, could impact the tax treatment of future foreign earnings. Should the scale of our international business activities expand, any changes in the U.S. taxation of such activities could increase our worldwide effective tax rate and harm our future financial position and results of operations.

If our estimates or judgments relating to our critical accounting policies are based on assumptions that change or prove to be incorrect, our results of operation could fall below our publicly announced guidance or the expectations of securities analysts and investors, resulting in a decline in the market price of our securities.

The preparation of financial statements in conformity with generally accepted accounting principles in the United States, or GAAP, requires management to make estimates and assumptions that affect the amounts reported in our financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets, liabilities, equity, revenue and expenses that are not readily apparent from other sources. If our assumptions underlying our estimates and judgements relating to our critical accounting policies change or if actual circumstances differ from our assumptions, estimates or judgements, our operating results may be adversely affected and could fall below our publicly announced guidance or the expectations of securities analysts and investors, resulting in a decline in the market price of our securities.

Risks related to our business operations

Acquisitions, joint ventures and other strategic transactions could disrupt or otherwise harm our business and may cause dilution to our stockholders.

As part of our growth strategy, we have acquired and may continue to acquire other businesses, products or technologies as well as pursue strategic alliances, joint ventures, technology licenses or investments in complementary businesses or assets. We may not be able to locate or make suitable acquisitions on acceptable terms, and future acquisitions may not be effectively and profitably integrated into our business. Our failure to successfully complete the integration of any business or assets that we

acquire could have an adverse effect on our prospects, business activities, cash flow, financial condition, results of operations and stock price. Integration challenges may include the following:

- disruption in our relationships with customers, distributors or suppliers as a result of such a transaction;
- unanticipated expenses and liabilities related to acquired companies or assets;
- disputes with the seller(s) of any acquired companies or assets or litigation resulting from acquired companies or assets;
- difficulties integrating acquired personnel, technologies, operations and legal compliance obligations into our existing business;
- diversion of management time and focus from operating our business to acquisition integration challenges;
- increases in our expenses and reductions in our cash available for operations and other uses;
- possible write-offs or impairment charges relating to acquired businesses or assets;
- difficulties developing and marketing new products, technologies and services;
- entering markets in which we have limited or no prior experience; and
- coordinating our efforts throughout various localities and time zones.

Foreign acquisitions involve unique risks in addition to those mentioned above, including those related to integration of operations across different cultures and languages, currency risks and the particular economic, political and regulatory risks associated with specific countries.

In addition, in connection with any such transactions, we may also issue equity securities in a dilutive manner, incur additional debt, assume contractual obligations or liabilities or expend significant cash. Such transactions could harm our operating results and cash position, negatively affect the price of our stock and cause dilution to our current stockholders. For example, in connection with our acquisition of Lineagen, Inc., or Lineagen, a U.S.-based provider of proprietary molecular diagnostics services for individuals presenting with certain neurodevelopmental disorders, we issued 6.2 million shares of our common stock, and in our acquisition of BioDiscovery, LLC., or BioDiscovery, a U.S.-based software company with solutions for analysis, interpretation and reporting of genomics data, we paid upfront consideration consisting of a combination of approximately $52.3 million in cash and 2.7 million shares of our common stock. In connection with the acquisition of BioDiscovery, we issued an additional 5.0 million shares of our common stock subject to vesting based on continued service of a key employee. The issuances of shares in connection with the Lineagen and BioDiscovery acquisitions resulted in dilution to our existing stockholders, the payment of cash in the BioDiscovery acquisition reduced our cash by approximately $52.3 million and our headcount increased by more than 50 employees as a result of both acquisitions. Accordingly, in addition to transaction costs, these acquisitions have increased our operating expenses, further increasing our net losses. We cannot predict the number, timing or size of any future strategic transactions, or the effect that any such transactions might have on our operating results.

Although we conducted extensive business, financial and legal due diligence in connection with our evaluation of our recent acquisitions, our due diligence investigations may not have identified every matter that could adversely affect our business, operating results and financial condition, and such investigations may have identified matters that, in the opinion of our management based on information available at the time, bore an acceptable level of risk that they, individually or in the aggregate, might or might not adversely affect our business, operating results or financial condition. We may be unable to adequately address the financial, legal and operational risks introduced by our recent acquisitions and may have difficulty developing experience with the industries in which Lineagen and/or BioDiscovery operate. Accordingly, we cannot guarantee that our recent acquisitions will yield the results we have anticipated and unforeseen complexities and expenses may arise. In addition, we may not achieve the revenues, growth prospects and synergies expected from these recent acquisitions, and any such benefits we do achieve may not offset our increased costs, resulting in a potential impairment of goodwill or other assets that were acquired. For any future acquisitions, we may similarly be unable to achieve revenue, growth prospects and synergies in a manner consistent with our expectations. Our failure to do so could adversely affect our business, operating results and financial condition.

If our products or technologies fail to achieve and sustain sufficient market acceptance, our revenue will be adversely affected.

Our success depends on our ability to develop and market products and technologies that are recognized and accepted as reliable, enabling and cost-effective. Most of the potential customers for our products and technologies already use expensive research systems in their laboratories that they have used for many years and may be reluctant to replace those systems with ours. Market acceptance of our systems will depend on many factors, including our ability to demonstrate to potential customers that our technology is an attractive alternative to existing technologies. Compared to some competing technologies,

our technology is new and complex, and many potential customers have limited knowledge of, or experience with, our products and technologies. Prior to adopting our systems, some potential customers may need to devote time and effort to testing and validating our systems. Any failure of our systems to meet these customer benchmarks could result in potential customers choosing to retain their existing systems or to purchase systems other than ours. In addition, it is important that our gene mapping systems be perceived as accurate and reliable by the scientific and medical research community as a whole. The scientific community is comprised of a small number of early adopters and key opinion leaders who significantly influence the rest of the community. Historically, a significant part of our sales and marketing efforts has been directed at demonstrating the advantages of our technology to industry leaders, including those key opinion leaders, and encouraging such leaders to publish or present the results of their evaluation of our system. If we are unable to continue to motivate leading researchers to use our technology, or if such researchers are unable to achieve or unwilling to publish or present significant experimental results using our systems, acceptance and adoption of our systems will be slowed and our ability to increase our revenue would be adversely affected. We also run the risk that researchers may produce publications or presentations with findings that are negative about our technologies or systems, and that such findings may be due to factors outside of our control, which may also slow acceptance and adoption of our systems and adversely affect our ability to increase our revenue.

Equity issuances in connection with strategic transactions or raising additional capital may cause dilution to our stockholders or restrict our operations.

From time to time, we expect to finance our strategic transactions or cash needs through a combination of equity and debt financings. To the extent that we finance our strategic transactions or raise additional capital through the sale of equity or convertible debt securities, your ownership interest could be diluted and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends and may be secured by all or a portion of our assets.

For example, on August 13, 2020, we entered into an At Market Issuance Sales Agreement with Ladenburg Thalmann & Co. Inc., as sales agent, or Ladenburg, under which we were eligible to offer and sell up to $40.0 million of shares of our common stock from time to time through Ladenburg. In the first half of the fiscal year ended December 31, 2021, we sold approximately 6.3 million shares of common stock through Ladenburg for aggregate gross proceeds of approximately $16.9 million and exhausted our capacity under this sales agreement. In January 2021, we completed two underwritten public offerings pursuant to which we issued an aggregate of approximately 71.7 million shares of our common stock for gross proceeds, before deducting underwriting discounts and commissions and offering expenses, of approximately $331.8 million. In March 2021, we entered into a new at-the-market facility with Cowen and Company, LLC, or Cowen, which provides for the sale, in our sole discretion, of shares of our common stock having an aggregate offering price of up to $350.0 million through or to Cowen, acting as sales agent or principal. In August and September 2021, we sold 2.3 million shares of common stock through Cowen for gross proceeds of approximately $13.9 million before deducting offering costs. In addition, we issued shares of our common stock in connection with our recent acquisitions of Lineagen and BioDiscovery. Any future significant sales of our capital stock or strategic transactions in which we use equity as consideration would result in further dilution to our current stockholders. As a result of these issuances, our investors experienced dilution of their ownership interests.

The issuance of shares under awards granted under existing or future employee equity benefit plans may cause immediate and substantial dilution to our existing stockholders.

In order to provide persons who have a responsibility for our management and/or growth with additional incentive, to increase their proprietary interest in our success, and to support and increase our ability to attract and retain individuals of exceptional talent, we maintain multiple equity incentive plans. The total number of shares of our common stock available for the grant of awards under these plans is 6.2 million, 0.2 million and 0.7 million for our 2018 Equity Incentive Plan, as amended, 2018 Employee Stock Purchase Plan and 2020 Inducement Plan, respectively, subject to adjustment, including pursuant to automatic “evergreen” increases in certain of our plans. As of December 31, 2021, we had outstanding equity awards underlying those plans of 13.4 million. We may also adopt one or more additional employee equity benefit plans in the future. The issuance of shares under an employee equity benefit plan may result in substantial dilution to the interests of other stockholders. For example on February 15, 2022, our Board of Directors granted our executive officers options to purchase an aggregate of 4.3 million shares of our common stock, which represented approximately 1% of our outstanding shares of common stock based on the 289.6 million shares of common stock outstanding as of February 24, 2022. Accordingly, the issuance of shares under current or future employee equity benefit plans will have the effect of further diluting the proportionate equity interest and voting power of holders of our common stock.

If we are unable to execute our sales and marketing strategy for our Lineagen products and services, including diagnostic assays, and are unable to gain acceptance in the market, we may be unable to generate sufficient revenue to sustain our Lineagen business.

Our Lineagen business provides molecular diagnostics services and has engaged in only limited sales and marketing activities for the diagnostic assays currently offered through our CLIA-certified laboratory. To date, the revenue generated by our Lineagen business has been insufficient to fund operations.

Although we believe that our current assays and our planned future assays represent a promising commercial opportunity, our products or assays may never gain significant acceptance in the marketplace and therefore may never generate substantial revenue or profits for us. We will need to establish a market for our products and diagnostic assays and build that market through physician education, awareness programs and the publication of clinical trial results. Gaining acceptance in medical communities requires, among other things, publications in leading peer-reviewed journals of results from studies using our current products, assays and services and/or our planned future products, assays and services. The process of publication in leading medical journals is subject to a peer review process and peer reviewers may not consider the results of our studies sufficiently novel or worthy of publication. Failure to have our studies published in peer-reviewed journals would limit the adoption of our current products, assays and services and our planned future products, assays and services.

Our ability to successfully market the products and diagnostic assays that we have developed, and may develop in the future, will depend on numerous factors, including:

- conducting clinical utility studies of such assays in collaboration with key thought leaders to demonstrate their use and value in important medical decisions such as treatment selection;
- whether our current or future partners, vigorously support our offerings;
- the success of our sales force;
- whether healthcare providers believe such diagnostic assays provide clinical utility;
- whether the medical community accepts that such diagnostic assays are sufficiently sensitive and specific to be meaningful in patient care and treatment decisions;
- our ability to continually source raw materials, shipping kits and other products that we sell or consume in our manufacturing process that are of sufficient quality and supply;
- our ability to continue to fund planned sales and marketing activities; and
- whether private health insurers, government health programs and other third-party payors will adopt our current and future assays in their guidelines, or cover such diagnostic assays and, if so, whether they will adequately reimburse us.

The COVID-19 pandemic may also increase the risk and uncertainty of the events described above and delay our development timelines. Failure to achieve widespread market acceptance of our current products, assays and services, as well as our planned future products, assays and services, would materially harm our business, financial condition and results of operations.

In the near term, sales of our Saphyr system, the NxClinical software, our consumables and our genome analysis services will depend on levels of research and development spending by clinical research laboratories, academic and governmental research institutions and biopharmaceutical companies, a reduction in which could limit demand for our technologies and adversely affect our business and operating results.

In the near term, we expect that our revenue from sales of our Saphyr system, NxClinical software, consumables and OGM services will be derived primarily from sales to academic and governmental research institutions, as well as biopharmaceutical and contract research companies worldwide for research applications. The demand for our products and technologies will depend in part upon the research and development budgets of these customers, which are impacted by factors beyond our control, such as:

- changes in government programs that provide funding to research institutions and companies;
- macroeconomic conditions and the political climate;
- changes in the regulatory environment;
- scientists' and customers' opinions of the utility of new products, technologies or services
- reductions in or other difficulties relating to staffing, capacity, shutdowns or slowdowns of laboratories and other institutions as well as other impacts stemming from the COVID-19 pandemic;
- differences in budgetary cycles; and
- market acceptance of relatively new technologies, such as ours.

For example, in March 2017, the federal government announced the intent to cut federal biomedical research funding by as much as 18%. While there has been significant opposition to these funding cuts, the uncertainty regarding the availability of research funding for potential customers may adversely affect our operating results. Our operating results may fluctuate

substantially due to reductions and delays in research and development expenditures by these customers. Any decrease in customers' budgets or expenditures, including impacts stemming from the COVID-19 pandemic, or in the size, scope or frequency of capital or operating expenditures, could materially and adversely affect our business, operating results and financial condition.

The sales cycle for our systems can be lengthy and variable, which makes it difficult for us to forecast revenue and other operating results.

The sales process for our systems generally involves numerous interactions with multiple individuals within an organization, and often includes in-depth analysis by potential customers of our technology and products and a lengthy review process. Our customers' evaluation processes often involve a number of factors, many of which are beyond our control. As a result of these factors, the capital investment required to purchase our systems and the budget cycles of our customers, the time from initial contact with a customer to our receipt of a purchase order can vary significantly. Given the length and uncertainty of our sales cycle, we have in the past experienced, and expect to in the future experience, fluctuations in our sales on a period-to-period basis. In addition, any failure to meet customer expectations could result in customers choosing to retain their existing systems, use existing assays not requiring capital equipment or purchase systems other than ours.

Our long-term results depend upon our ability to improve existing products and technologies and introduce and market new products and technologies successfully.

Our business is dependent on the continued improvement of our existing products and technologies and our development of new products and technologies utilizing our current or other potential future technology. As we introduce new products or technologies or refine, improve or upgrade versions of existing products or technologies, we cannot predict the level of market acceptance or the amount of market share these products or technologies will achieve, if any. We cannot assure you that we will not experience material delays in the introduction of new products or technologies in the future.

Consistent with our strategy of offering new products and product refinements, we expect to continue to use a substantial amount of capital for product development and refinement. We may need additional capital for product development and refinement than is available on terms favorable to us, if at all, which could adversely affect our business, financial condition or results of operations.

We generally sell our products and technologies in industries that are characterized by rapid technological changes, frequent new product and technology introductions and changing industry standards. If we do not develop new products and technologies and product and technology enhancements based on technological innovation on a timely basis, our products and technologies may become obsolete over time and our revenues, cash flow, profitability and competitive position will suffer. Our success will depend on several factors, including our ability to:

- correctly identify customer needs and preferences and predict future needs and preferences;
- allocate our research and development funding to products and technologies with higher growth prospects;
- anticipate and respond to our competitors' development of new products and technological innovations;
- innovate and develop new technologies and applications, including software applications through our BioDiscovery subsidiary, and acquire or obtain rights to third-party technologies that may have valuable applications in the markets we serve;
- successfully commercialize new technologies in a timely manner, price them competitively and manufacture and deliver sufficient volumes of new products of appropriate quality on time; and
- customers' willingness to adopt new technologies.

In addition, if we fail to accurately predict future customer needs and preferences or fail to produce viable technologies, we may invest heavily in research and development of products and technologies that do not lead to significant revenue. For example, we completed the BioDiscovery Acquisition in October 2021 and will need to devote time and resources in order to further develop and integrate BioDiscovery's software and technology solutions for our current and anticipated product offerings. We may be unsuccessful in achieving our desired results or in marketing such solutions to our future customers. Even if we successfully innovate and develop new products and technologies and product and technological enhancements, we may incur substantial costs in doing so, and our profitability may suffer.

Our ability to develop new products and technologies based on innovation can affect our competitive position and often requires the investment of significant resources. Difficulties or delays in research, development or production of new products, technologies and services or failure to gain market acceptance of new products and technologies may reduce future revenues and adversely affect our competitive position.

If we do not successfully manage the development and launch of new products and technologies, our financial results could be adversely affected.

We face risks associated with launching new products and technologies. If we encounter development or manufacturing challenges or discover errors during our product or technology development cycle, the launch dates of new products and technologies may be delayed. The expenses or losses associated with unsuccessful product and technology development or launch activities or lack of market acceptance of our new products and technologies could adversely affect our business or financial condition.

Our future success is dependent upon our ability to further penetrate our existing customer base and attract new customers.

Our current customer base for our products and technologies is primarily composed of academic and governmental research institutions and biopharmaceutical and contract research companies and, for our Lineagen diagnostic services, physicians and their patients. Our success will depend upon our ability to respond to the evolving needs of, and increase our market share among, existing customers and additional potential customers, marketing new products, technologies and services as we develop them. Identifying, engaging and marketing to customers who are unfamiliar with our current products and technologies requires substantial time, expertise and expense and involves a number of risks, including:

- our ability to attract, retain and manage the sales, marketing and service personnel necessary to expand market acceptance for our technology;
- the time and cost of maintaining and growing a specialized sales, marketing and service force; and
- the fact that our sales, marketing and service force may be unable to execute successful commercial activities.

We have utilized third parties to assist with sales, distribution and customer support in certain regions of the world. There is no guarantee, when we enter into such arrangements, that we will be successful in attracting desirable sales and distribution partners. There is also no guarantee that we will be able to enter into such arrangements on favorable terms. Any failure of our sales and marketing efforts, or those of any third-party sales and distribution partners, could adversely affect our business.

We are currently limited to "research use only" with respect to many of the materials and components used in our consumable products including our assays.

Our instruments, consumable products and assays are purchased from suppliers with a restriction that they be used for research use only, or RUO. While we have focused initially on the life sciences research market and RUO products only, part of our business strategy is to expand our product line to encompass products that are intended to be used for the diagnosis of disease and precision healthcare, either alone or in collaboration with third parties. The use of our RUO products for any such diagnostic purposes would require that we obtain regulatory clearance or approval to market our products for those purposes and also that we acquire the materials and components used in such products from suppliers without an RUO restriction. There can be no assurance that we will be able to acquire these materials and components for use in diagnostic products on acceptable terms, if at all. If we are unable to do so, we would not be able to expand our non-Lineagen product offerings beyond RUO, and our business and prospects would suffer.

The FDA Guidance on "Distribution of In Vitro Diagnostic Products Labeled for Research Use Only or Investigational Use Only", or, the RUO/IUO Labeling Guidance, emphasizes that the FDA will review the totality of the circumstances when evaluating whether equipment and testing components are properly labeled as RUO. It further states that merely including a labeling statement that a product is intended for research use only will not necessarily render the device exempt from the FDA's 510(k) clearance, PMA, or other requirements, if the circumstances surrounding the distribution of the product indicate that the manufacturer intends for its product to be offered for clinical diagnostic use. These circumstances may include written or verbal marketing claims or links to articles regarding a product's performance in clinical applications, a manufacturer's provision of technical support for clinical validation or clinical applications, or solicitation of business from clinical laboratories, all of which could be considered evidence of intended uses that conflict with RUO labeling. If the FDA were to determine that our RUO products were intended for use in clinical investigation, diagnosis or treatment decisions, or that express or implied clinical or diagnostic claims were made for our RUO products, those products could be considered misbranded or adulterated under the Federal Food, Drug, and Cosmetic Act. If the FDA determines that our RUO products are being marketed for clinical diagnostic use without the required PMA or 510(k) clearance, we may be required to cease marketing our products as planned, recall the products from customers, revise our marketing plans, and/or suspend or delay the commercialization of our products until we obtain the required authorization. We also may be subject to a range of enforcement actions by the FDA, including warning or untitled letters, injunctions, civil monetary penalties, criminal prosecution, and recall and/or seizure of products, as well as significant adverse publicity.

If, in the future, we choose to commercialize our RUO products for clinical diagnostic use, we will be required to comply with the FDA's premarket review and post-market control requirements for IVDs, as may be applicable. Complying with the FDA's PMA and/or 510(k) clearance requirements may be expensive, time-consuming, and subject us to significant and/or unanticipated delays. Our efforts may never result in an approved PMA or 510(k) clearance for our products. Even if we obtain a PMA or 510(k) clearance, where required, such authorization may not be for the use or uses we believe are commercially attractive and/or are critical to the commercial success of our products. As a result, being subject to the FDA's premarket

review and/or post-market control requirements for our products could materially and adversely affect our business, financial condition and results of operations.

We have limited experience in marketing and selling our products and technologies, and if we are unable to successfully commercialize our products and technologies, our business and operating results will be adversely affected.

We have limited experience marketing and selling our products and technologies. We currently sell our Saphyr system for research use only, through our direct field sales and support organizations located in North America and Europe and through a combination of our own sales force and third-party distributors in additional major markets such as Australian, China, Japan and South Korea.

The future sales of our products and technologies will depend in large part on our ability to effectively market and sell our products and technologies, successfully manage and expand our sales force, and increase the scope of our marketing efforts. We may also enter into additional distribution arrangements in the future. Because we have limited experience in marketing and selling our products and technologies, our ability to forecast demand, the infrastructure required to support such demand and the sales cycle to customers is unproven. If we do not build an efficient and effective sales force, our business and operating results will be adversely affected.

We rely on a single contract manufacturer for our optical genome mapping systems and a single contract manufacturer for our chip consumables. If either of these manufacturers should fail or not perform satisfactorily, our ability to supply these products would be negatively and adversely affected.

We currently rely on a single contract manufacturer to manufacture and supply all of our OGM-based instruments. See “Business — Key Agreements” in this Annual Report. In addition, we rely on a single contract manufacturer to manufacture and supply all of our chip consumables. Since our contracts with these manufacturers do not commit them to supply quantities beyond the amounts included in our purchase orders, and do not commit them to carry inventory or make available any particular quantities, these contract manufacturers may give other customers’ needs higher priority than ours, and we may not be able to obtain adequate supplies in a timely manner or on commercially reasonable terms. If either of these manufacturers were to be unable to supply instruments, our business would be harmed.

In the event it becomes necessary to utilize different contract manufacturers for our OGM-based instruments or chip consumables, we would experience additional costs, delays and difficulties in doing so as a result of identifying and entering into an agreement with a new supplier as well as preparing such new supplier to meet the logistical requirements associated with manufacturing our units, and our business would suffer. We may also experience additional costs and delays in the event we need access to or rights under any intellectual property of these current manufacturers.

We have experienced manufacturing problems or delays that could limit the growth of our revenue or increase our losses.

We have encountered situations that resulted in delays or shortfalls caused by our outsourced manufacturing suppliers and by other third-party suppliers who manufacture components for our products. We have been negatively impacted by unfavorable flowcell yields in the production cycle. If we are unable to solve for the yield issue, it could lead to lower gross margins in future periods. If we are unable to keep up with demand for our products, our revenue could be impaired, market acceptance for our products could be adversely affected and our customers might instead purchase our competitors’ products. Our inability to successfully manufacture our products would have a material adverse effect on our operating results.

If our laboratory facilities become damaged or inoperable or we are required to vacate our existing facilities, our ability to conduct our laboratory analysis and pursue our research and development efforts may be jeopardized.

We currently perform all research and development activities and most of our OGM services at a single laboratory facility in San Diego, California with the remaining genome analysis services at a facility we occupy at a customer’s lab in Clermont-Ferrand, France. All of our molecular diagnostics services are processed at a single laboratory facility in Salt Lake City, Utah.

Our facilities and equipment could be harmed or rendered inoperable by natural or man-made disasters, including war, fire, earthquake, power loss, communications failure, terrorism, burglary, public health crises (including restrictions that may be imposed on businesses by state and local governments under stay-at-home or similar orders and mandates, such as those implemented in response to the COVID-19 pandemic) or other events, which may make it difficult or impossible for us to perform our testing services for some period of time or to receive and store samples. The inability to perform tests or to reduce the backlog of sample analysis that could develop if one or both of our facilities become inoperable, for even a short period of time, may result in the loss of revenue, loss of customers or harm to our reputation, and we may be unable to regain that revenue, those customers or repair our reputation in the future. Furthermore, integral parties in our supply chain are operating from single sites, increasing their vulnerability to natural disasters and man-made disasters or other sudden, unforeseen and severe adverse events.

In addition, the loss of our samples due to such events could limit or prevent our ability to conduct research and development analysis on existing tests as well as tests in development.

Our facilities and the equipment we use to perform our testing and research and development could be unavailable or costly and time-consuming to repair or replace. It would be difficult, time-consuming and expensive to rebuild our facilities, to locate and qualify a new facility, replace certain pieces of equipment or license or transfer our proprietary technology to a third party, particularly in light of licensure and accreditation requirements. Even in the unlikely event that we are able to find a third party with such qualifications to enable us to resume our operations, we may be unable to negotiate commercially reasonable terms.

We carry insurance for damage to our property and the disruption of our business, but this insurance may not cover all of the risks associated with damage or disruption to our business, may not provide coverage in amounts sufficient to cover our potential losses and may not continue to be available to us on acceptable terms, if at all.

We rely on a limited number of suppliers or, in some cases, one supplier, for some of our materials and components used in our products, and may not be able to find replacements or immediately transition to alternative suppliers, which could have a material adverse effect on our business, financial condition, results of operations and reputation.

We rely on limited or sole suppliers for certain reagents and other materials and components that are used in our products. While we periodically forecast our needs for such materials and enter into standard purchase orders with our suppliers, we do not have long-term contracts with many of these suppliers. If we were to lose such suppliers, there can be no assurance that we will be able to identify or enter into agreements with alternative suppliers on a timely basis on acceptable terms, if at all. An interruption in our operations, including our laboratory operations, could occur if we encounter delays or difficulties in securing these materials, or if the quality of the materials supplied do not meet our requirements, or if we cannot then obtain an acceptable substitute. The time and effort required to qualify a new supplier and ensure that the new materials provide the same or better quality results could result in significant additional costs. Any such interruption could significantly affect our business, financial condition, results of operations and reputation.

In addition, certain of the components used in our instruments are sourced from limited or sole suppliers. If we were to lose such suppliers, there can be no assurance that we will be able to identify or enter into agreements with alternative suppliers on a timely basis on acceptable terms, if at all. An interruption in our ability to sell and deliver instruments to customers could occur if we encounter delays or difficulties in securing these components, or if the quality of the components supplied do not meet specifications, or if we cannot then obtain an acceptable substitute. If any of these events occur, our business and operating results could be harmed.

Also, in order to mitigate these risks, we maintain inventories of certain supplies at higher levels than would be the case if multiple sources of supply were available. If our sales or testing volume decreases or we switch suppliers, we may hold excess supplies with expiration dates that occur before use which would adversely affect our losses and cash flow position. As we introduce any new products, we may experience supply issues as we ramp up our sales or test volume. If we should encounter delays or difficulties in securing, reconfiguring or revalidating the equipment, reagents or other materials we require for our products, our business, financial condition, results of operations and reputation could be adversely affected.

Undetected errors or defects in our products or technologies could harm our reputation, decrease market acceptance of our products or technologies or expose us to product liability claims.

Our products or technologies may contain undetected errors or defects when first introduced or as new versions or new products or technologies are released. Disruptions affecting the introduction or release of, or other performance problems with, our products or technologies may damage our customers' businesses and could harm their and our reputations. If that occurs, we may incur significant costs, the attention of our key personnel could be diverted, or other significant customer relations problems may arise. We may also be subject to warranty and liability claims for damages related to errors or defects in our products or technologies. In addition, if we do not meet industry or quality standards, if applicable, our products may be subject to recall. A material liability claim, recall or other occurrence that harms our reputation or decreases market acceptance of our products or technologies could harm our business and operating results.

If our customers develop or use our products or assays for diagnostic purposes, someone could file a product liability claim alleging that one of our products contained a design or manufacturing defect that resulted in the failure to adequately perform, leading to death or injury. In addition, the marketing, sale and use of our current or future products and assays could lead to the filing of product liability claims against us if someone alleges that our products failed to perform as designed. We may also be subject to liability for errors in the results we provide or for a misunderstanding of, or inappropriate reliance upon, the information we provide.

A product liability claim could result in substantial damages and be costly and time consuming to defend, either of which could materially harm our business or financial condition. We cannot assure investors that our product liability insurance would adequately protect our assets from the financial impact of defending a product liability claim. Any product liability claim brought against us, with or without merit, could increase our product liability insurance rates or prevent us from securing insurance coverage in the future. Additionally, any product liability lawsuit could damage our reputation, or cause current partners to terminate existing agreements and potential partners to seek other partners, any of which could impact our results of operations.

We may also initiate a correction to our existing products or assays, which could lead to increased costs and increased scrutiny by regulatory authorities and our customers regarding the quality and safety of our products or services, as well as negative publicity. The occurrence of any of these events could have an adverse effect on our business and results of operations.

Our reliance on distributors for sales of our products outside of the United States could limit or prevent us from selling our products and could impact our revenue.

We intend to continue to grow our business internationally, and to do so we must attract additional distributors and retain existing distributors to maximize the commercial opportunity for our products. There is no guarantee that we will be successful in attracting or retaining desirable sales and distribution partners or that we will be able to enter into such arrangements on favorable terms. Distributors may not commit the necessary resources to market and sell our products to the level of our expectations or may choose to favor marketing the products of our competitors. If current or future distributors do not perform adequately, or we are unable to enter into effective arrangements with distributors in particular geographic areas, we may not realize long-term international revenue growth. In addition, if our distributors fail to comply with applicable laws and ethical standards, including anti-bribery laws, this could damage our reputation and could have a significant adverse effect on our business and our revenues.

We expect to generate a substantial portion of our revenue internationally in the future and can become further subject to various risks relating to our international activities, which could adversely affect our business, operating results and financial condition.

During 2021 approximately 54% of our product revenue was generated from customers located outside of the U.S. We believe that a substantial percentage of our future revenue will come from international sources as we expand our overseas operations and develop opportunities in additional areas. We have limited experience operating internationally and engaging in international business involves a number of difficulties and risks, including:

- required compliance with existing and changing foreign regulatory requirements and laws;
- difficulties and costs of staffing and managing foreign operations;
- difficulties protecting or procuring intellectual property rights;
- required compliance with anti-bribery laws, such as the U.S. Foreign Corrupt Practices Act, data privacy and security requirements, labor laws and anti-competition regulations;
- export or import restrictions;
- laws and business practices favoring local companies;
- longer payment cycles and difficulties in enforcing agreements and collecting receivables through certain foreign legal systems;
- political and economic instability; and
- potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements and other trade barriers.

Historically, most of our revenue has been denominated in U.S. dollars. For sales made to customers outside of the U.S., we may sell our products and services in local currency outside of the U.S. As our operations in countries outside of the U.S. grow, our results of operations and cash flows may be subject to fluctuations due to changes in foreign currency exchange rates, which could harm our business in the future. For example, if the value of the U.S. dollar increases relative to foreign currencies, in the absence of a corresponding change in local currency prices, our revenue could be adversely affected as we convert revenue from local currencies to U.S. dollars. If we dedicate significant resources to our international operations and are unable to manage these risks effectively, our business, operating results and financial condition will suffer.

We are subject to U.S. and foreign anti-corruption and anti-money laundering laws with respect to our operations and non-compliance with such laws can subject us to criminal and/or civil liability and harm our business.

We are subject to the U.S. Foreign Corrupt Practices Act, as amended, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act, the United Kingdom Bribery Act 2010, and other state and national anti-bribery and anti-money laundering laws in countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit companies and their employees and third-party intermediaries from authorizing, promising, offering, providing, soliciting, or accepting, directly or indirectly, improper payments or benefits to or from any person whether in the public or private sector for the purpose of obtaining or retaining business or securing any other improper advantage. We rely on third-party representatives, distributors, and other business partners to support sales of our products and services and our efforts to ensure regulatory compliance. In addition, as we increase our international sales and business, we may engage with additional business partners. We can be held liable for the corrupt or other illegal activities of our employees, representatives, contractors, business partners, and agents, even if we do not explicitly authorize or have actual knowledge of such activities.

Any violations of anti-corruption and anti-money laundering laws, or allegations of such violations, could disrupt our operations, involve significant management distraction, involve significant costs and expenses, including legal fees, and could result in a material adverse effect on our business, prospects, financial condition, or results of operations. We could also incur severe penalties, including criminal and civil penalties, disgorgement, and other remedial measures.

We are subject to governmental export and import controls that could impair our ability to compete in international markets due to licensing requirements and subject us to liability if we are not in compliance with applicable laws.

Our products are subject to export control and import laws and regulations, including the U.S. Export Administration Regulations, U.S. Customs regulations, and various economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls. Exports of our products must be made in compliance with these laws and regulations. If we fail to comply with these laws and regulations, we and certain of our employees could be subject to substantial civil or criminal penalties, including the possible loss of export or import privileges; fines, which may be imposed on us and responsible employees or managers; and, in extreme cases, the incarceration of responsible employees or managers.

In addition, changes in our products or changes in applicable export or import laws and regulations may create delays in the introduction and sale of our products in international markets, prevent our customers from deploying our products or, in some cases, prevent the export or import of our products to certain countries, governments or persons altogether. Any change in export or import laws and regulations, shift in the enforcement or scope of existing laws and regulations, or change in the countries, governments, persons or technologies targeted by such laws and regulations, could also result in decreased use of our products, or in our decreased ability to export or sell our products to existing or potential customers. Any decreased use of our products or limitation on our ability to export or sell our products would likely adversely affect our business, financial condition and results of operations.

If we are unable to recruit, train, retain, motivate and integrate key personnel, we may not achieve our goals.

Our future success depends on our ability to recruit, train, retain, motivate and integrate key personnel, including our recently expanded senior management team, as well as our research and development, manufacturing and sales and marketing personnel. Competition for qualified personnel is intense. Our growth depends, in particular, on attracting and retaining highly-trained sales personnel with the necessary scientific background and ability to understand our systems at a technical level to effectively identify and sell to potential new customers and develop new products and technologies. Because of the complex and technical nature of our products and technologies and the dynamic market in which we compete, any failure to attract, train, retain, motivate and integrate qualified personnel could materially harm our operating results and growth prospects.

If we cannot provide quality technical and applications support, we could lose customers and our business and prospects will suffer.

The placement of our products at new customer sites, the introduction of our technology into our customers' existing laboratory workflows and ongoing customer support can be complex. Accordingly, we need highly trained technical support personnel. Hiring technical support personnel is very competitive in our industry due to the limited number of people available with the necessary scientific and technical backgrounds and ability to understand our technology at a technical level. To effectively support potential new customers and the expanding needs of current customers, we will need to substantially expand our technical support staff. If we are unable to attract, train or retain the number of highly qualified technical services personnel that our business needs, our business and prospects will suffer.

If our information systems or data or those of third parties upon which we rely, are or were compromised, we could experience adverse consequences resulting from such compromise, including but not limited to regulatory investigations or actions; litigation; fines and penalties; disruptions of our business operations; reputational harm; loss of revenue or profits; loss of customers or sales; and other adverse consequences.

We are increasingly dependent upon information technology systems, infrastructure and data to operate our business. In the ordinary course of our business, we collect, store, use, transmit, disclose, and otherwise process sensitive, proprietary, and confidential information, including intellectual property, trade secrets, financial information, and personal data (including protected health information). We may rely upon third-party service providers and technologies to operate critical business systems to process confidential and personal data in a variety of contexts, including, without limitation, third-party providers of cloud-based infrastructure, encryption and authentication technology, employee email, content delivery to customers, and other functions. Our ability to monitor these third parties' cybersecurity practices is limited, and these third parties may not have adequate information security measures in place. We may share or receive sensitive data with or from third parties.

Cyberattacks, malicious internet-based activity, and online and offline fraud are prevalent and continue to increase. Moreover, these threats are becoming increasingly difficult to detect, and they come from a variety of sources. In addition to traditional computer "hackers," threat actors, personnel (such as through theft or misuse), sophisticated nation-states, and nation-state-supported actors now engage and are expected to continue to engage in attacks, including without limitation nation-state actors for geopolitical reasons and in conjunction with military conflicts and defense activities. During times of war and other major

conflicts, we and the third parties upon which we rely may be vulnerable to a heightened risk of these attacks, including cyber-attacks that could materially disrupt our systems and operations, supply chain, and ability to produce, sell and distribute our goods and services. We and the third parties upon which we rely may be subject to a variety of evolving threats, including but not limited to social-engineering attacks (such as through phishing attacks), malicious code (such as viruses and worms), malware (including as a result of advanced persistent threat intrusions), denial-of-service attacks (such as credential stuffing), personnel misconduct or error, ransomware attacks, supply-chain attacks, software bugs, server malfunctions, software or hardware failures, loss of data or other information technology assets, adware, telecommunications failures, earthquakes, fires, floods, and other similar threats. Ransomware attacks, including those perpetrated by organized criminal threat actors, nation-states, and nation-state supported actors, are becoming increasingly prevalent and severe and can lead to significant interruptions in our operations, loss of data and income, reputational harm, and diversion of funds. Extortion payments may alleviate the negative impact of a ransomware attack, but we may be unwilling or unable to make such payments due to, for example, applicable laws or regulations prohibiting such payments. Similarly, supply chain attacks have increased in frequency and severity, and we cannot guarantee that third parties and infrastructure in our supply chain or our third-party partners' supply chains have not been compromised or that they do not contain exploitable defects or bugs that could result in a breach of or disruption to our information technology systems (including our software) or the third-party information technology systems that support us and our services. The COVID-19 pandemic and our remote workforce also poses increased risks to our information technology systems and data, as more of our personnel work from home, utilizing network connections outside our premises. Future business transactions (such as acquisitions or integrations) could expose us to additional cybersecurity risks and vulnerabilities, as our systems could be negatively affected by vulnerabilities present in acquired or integrated entities' systems and technologies.

Any of the previously identified or similar threats could cause a security incident or other interruption. A security incident or other interruption could result in unauthorized, unlawful, or accidental acquisition, modification, destruction, loss, alteration, encryption, disclosure of, or access to data. A security incident or other interruption could disrupt our ability (and that of third parties upon whom we rely) to provide our products, software and services. We may expend significant resources or modify our business activities in an effort to protect against security incidents. Certain data privacy and security obligations may require us to implement and maintain specific security measures, industry-standard, or reasonable security measures to protect our information technology systems and data.

While we have implemented security measures designed to protect against security incidents, there can be no assurance that these measures will be effective. We may be unable in the future to detect vulnerabilities in our information technology systems (including our software) because such threats and techniques change frequently, are often sophisticated in nature, and may not be detected until after a security incident has occurred. Despite our efforts to identify and remediate vulnerabilities, if any, in our information technology systems (including our software), our efforts may not be successful. Further, we may experience delays in developing and deploying remedial measures designed to address any such identified vulnerabilities.

Applicable data privacy and security obligations may require us to notify relevant stakeholders of security incidents. Such disclosures are costly, and the disclosures or the failure to comply with such requirements could lead to adverse consequences. If we (or a third party upon whom we rely) experience a security incident or are perceived to have experienced a security incident, we may experience adverse consequences. These consequences may include: government enforcement actions (for example, investigations, fines, penalties, audits, and inspections); additional reporting requirements and/or oversight; restrictions on processing data (including personal data); litigation (including class claims); indemnification obligations; negative publicity; reputational harm; monetary fund diversions; interruptions in our operations (including availability of data); financial loss; and other similar harms. Security incidents and attendant consequences may cause customers to stop using our software or services, deter new customers from using our software or services, and negatively impact our ability to grow and operate our business.

Our contracts may not contain limitations of liability, and even where they do, there can be no assurance that limitations of liability in our contracts are sufficient to protect us from liabilities, damages, or claims related to our data privacy and security obligations. We cannot be sure that our insurance coverage, if any, will be adequate or sufficient to protect us from or to mitigate liabilities arising out of our privacy and security practices, that such coverage will continue to be available on commercially reasonable terms or at all, or that such coverage will pay future claims.

We are subject to stringent and changing obligations related to data privacy and security. Our actual or perceived failure to comply with such obligations could lead to regulatory investigations or actions; litigation; fines and penalties; disruption of our business operations; reputational harm; loss of revenue or profits; loss of customers or sales; and other adverse business consequences.

In the ordinary course of business, we process personal data (including protected health information) and other sensitive information, including proprietary and confidential business data, trade secrets, and intellectual property. Our data processing activities subject us to numerous data privacy and security obligations, such as various laws, regulations, guidance, industry standards, external and internal privacy and security policies, contracts, and other obligations that govern the processing of personal data by us and on our behalf.

In the United States, federal, state, and local governments have enacted numerous data privacy and security laws, including data breach notification laws, personal data privacy laws, and consumer protection laws. For example, the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their respective implementing regulations, impose specific requirements relating to the privacy, security, and transmission of individually identifiable health information. Among other things, HITECH, through its implementing regulations, makes certain of HIPAA's privacy and security standards directly applicable to business associates, defined as a person or organization, other than a member of a covered entity's workforce, that creates, receives, maintains or transmits protected health information for or on behalf of a covered entity for a function or activity regulated by HIPAA as well as their covered subcontractors. Most healthcare providers in the United States, including clinical laboratories and institutions from which we may obtain customer data, are subject to privacy and security regulations promulgated under HIPAA, as amended by HITECH. Further, a person may be prosecuted for alleged HIPAA violations either directly or indirectly such as under aiding-and-abetting or conspiracy principles. Further, depending on the facts and circumstances, we could face substantial civil and criminal penalties and liabilities if we fail to comply with our obligations (required by law and/or contract) under HIPAA.

In the United States, at the state level, the California Consumer Privacy Act of 2018, or the CCPA, imposes obligations on businesses to which it applies. These obligations include, but are not limited to, providing specific disclosures in privacy notices and affording California residents certain rights related to their personal data. The CCPA allows for statutory fines for noncompliance (up to $7,500 per violation). The California Privacy Rights Act of 2020, or the CPRA, which takes effect January 1, 2023, is anticipated to expand the CCPA's obligations on businesses. For example, the CPRA establishes a new California Privacy Protection Agency to implement and enforce relevant laws, which could increase the risk of an enforcement action. Other states have also recently enacted data privacy laws. For example, Virginia passed the Consumer Data Protection Act, and Colorado passed the Colorado Privacy Act, both of which differ from the CPRA and take effect in 2023. If we become subject to new state-level data privacy laws, the risk of enforcement action against us could increase because we may become subject to additional obligations, and the number of individuals or entities that can initiate actions against us may increase (including individuals, via a private right of action, and state actors). Data privacy and security laws have been proposed at the federal, state, and local levels in recent years, which, if passed, could further complicate compliance efforts.

Outside the United States, an increasing number of laws, regulations, and industry standards apply to data privacy and security. For example, the European Union's General Data Protection Regulation ("EU GDPR"), and the United Kingdom's GDPR ("UK GDPR") impose strict requirements for processing the personal data of individuals. For example, under the EU GDPR, government regulators may impose temporary or definitive bans on data processing, as well as fines of up to 20 million euros or 4% of annual global revenue, whichever is greater. Further, individuals may initiate litigation related to our processing of their personal data. In Canada, the Personal Information Protection and Electronic Documents Act ("PIPEDA") and various related provincial laws, as well as Canada's Anti-Spam Legislation ("CASL"), may apply to our operations. In addition, privacy advocates and industry groups have proposed, and may propose in the future, standards with which we are legally or contractually bound to comply.

Certain jurisdictions have enacted data localization laws and cross-border personal data transfer laws. For example, absent appropriate safeguards or other circumstances, the EU GDPR generally restricts the transfer of personal data to countries outside of the EEA, such as the United States, which the European Commission does not consider to provide an adequate level of data privacy and security. The European Commission released a set of "Standard Contractual Clauses" ("SCCs") that are designed to be a valid mechanism by which entities can transfer personal data out of the EEA to jurisdictions that the European Commission has not found to provide an adequate level of protection. Currently, these SCCs are a valid mechanism to transfer personal data outside of the EEA. However, the SCCs require parties that rely on them to comply with additional obligations, such as conducting transfer impact assessments to determine whether additional security measures are necessary to protect personal data. Moreover, due to potential legal challenges, there exists some uncertainty regarding whether the SCCs will remain a valid mechanism for transfers of personal data out of the EEA. Laws in Switzerland and the UK similarly restrict transfers of personal data outside of those jurisdictions to countries such as the United States that do not provide an adequate level of personal data protection. In addition to European restrictions on cross-border transfers of personal data, other countries, such as China and Brazil, have enacted or are considering similar cross-border personal data transfer laws and local personal data residency laws, any of which could increase the cost and complexity of doing business. If we cannot implement a valid compliance mechanism for cross-border data transfers, we may face increased exposure to regulatory actions, substantial fines, and injunctions against processing or transferring personal data from Europe or elsewhere. The inability to import personal data to the United States could significantly and negatively impact our business operations, including by limiting our ability to collaborate with parties that are subject to European and other data privacy and security laws or by requiring us to increase our personal data processing capabilities and infrastructure in Europe and/or elsewhere at significant expense.

Our data privacy and security obligations are quickly changing, creating some uncertainty as to the effective future legal framework. Additionally, these obligations may be subject to differing applications and interpretations, which may be inconsistent or in conflict among jurisdictions. Preparing for and complying with these obligations requires us to devote

significant resources (including, without limitation, financial and time-related resources). These obligations may necessitate changes to our information technologies, systems, and practices and to those of any third parties on which we rely. Although we endeavor to comply with all applicable data privacy and security obligations, we may at times fail (or be perceived to have failed) to do so. Moreover, despite our efforts, our personnel or third parties upon which we rely may fail to comply with such obligations, which could negatively impact our business operations and compliance posture. For example, any failure by a third-party processor to comply with applicable law, regulations, or contractual obligations could result in adverse effects, including inability to operate our business and proceedings against us by governmental entities or others. If we fail, or are perceived to have failed, to address or comply with data privacy and security obligations, we could face significant consequences. These consequences may include, but are not limited to, government enforcement actions (e.g., investigations, fines, penalties, audits, inspections, and similar); litigation (including class-related claims); additional reporting requirements and/or oversight; bans on processing personal data; orders to destroy or not use personal data; and imprisonment of company officials. Any of these events could have a material adverse effect on our reputation, business, or financial condition, including but not limited to, loss of customers; interruptions or stoppages in our business operations; inability to process personal data or to operate in certain jurisdictions; limited ability to develop or commercialize our products; expenditure of time and resources to defend any claim or inquiry; adverse publicity; or revision or restructuring of our operations.

The life sciences research and diagnostic markets are highly competitive. If we fail to effectively compete, our business, financial condition and operating results will suffer.

We face significant competition in the life sciences research and diagnostic markets. We currently compete with both established and early stage companies that design, manufacture and market systems and consumable supplies. We believe our principal competitors in the life sciences research and genome mapping markets include PacBio, Oxford Nanopore Technologies, Genomic Vision and Dovetail Genomics. In addition, there are a number of new market entrants in the process of developing novel technologies for the life sciences research, diagnostic and screening markets.

Many of our current competitors are either publicly-traded, or are divisions of publicly-traded companies, and may enjoy a number of competitive advantages over us, including:

- greater name and brand recognition;
- substantially greater financial and human resources;
- broader product lines;
- larger sales forces and more established distributor networks;
- substantial intellectual property portfolios;
- larger and more established customer bases and relationships; and
- better established, larger scale, and lower cost manufacturing capabilities.

We believe that the principal competitive factors in all of our target markets include:

- cost of instruments and consumables;
- accuracy, including sensitivity and specificity, and reproducibility of results;
- reputation among customers;
- innovation in product offerings;
- flexibility and ease of use; and
- compatibility with existing laboratory processes, tools and methods.

We cannot assure investors that our products or technologies will compete favorably or that we will be successful in the face of increasing competition from new products and technologies introduced by our existing competitors or new companies entering our markets. In addition, we cannot assure investors that our competitors do not have or will not develop products or technologies that currently or in the future will enable them to produce competitive products or technologies with greater capabilities or at lower costs than ours. Any failure to compete effectively could materially and adversely affect our business, financial condition and operating results.

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

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets. A severe or prolonged global economic downturn could result in a variety of risks to our business, including our ability to raise additional capital when needed on acceptable terms, if at all. This is particularly true in Europe, which is undergoing a continued severe economic crisis. A weak or declining economy could also strain our suppliers, possibly resulting

in supply disruption. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

In addition, the conflict between Russia and Ukraine could lead to disruption, instability and volatility in global markets and industries that could negatively impact our operations. The U.S. government and other governments in jurisdictions in which we operate have imposed severe sanctions and export controls against Russia and Russian interests and threatened additional sanctions and controls. The impact of these measures, as well as potential responses to them by Russia, is currently unknown and they could adversely affect our business, supply chain, partners or customers.

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

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative action or proceeding brought on our behalf;
- any action asserting a breach of fiduciary duty;
- any action asserting a claim against us arising under the Delaware General Corporation Law, our amended and restated certificate of incorporation, or our amended and restated bylaws; and
- any action asserting a claim against us that is governed by the internal-affairs doctrine.

This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated certificate of incorporation further provides that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our amended and restated certificate of incorporation. This may require significant additional costs associated with resolving such action in other jurisdictions and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions.

These exclusive forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage lawsuits against us and our directors, officers and other employees. If a court were to find either exclusive-forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with resolving the dispute in other jurisdictions, all of which could adversely affect our results of operations and financial condition.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We, and any the third parties with access to our facilities, are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Each of our operations involve the use of hazardous and flammable materials, including chemicals and biological and radioactive materials. Our operations also produce hazardous waste. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. We could be held liable for any resulting damages in the event of contamination or injury resulting from the use of hazardous materials by us or the third parties with whom we contract, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties. Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials. We do not have any insurance for liabilities arising from medical or hazardous materials. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. Compliance with applicable environmental laws and regulations is expensive, and these current or future laws and regulations may impair our research, development and commercialization efforts, which could harm our business, prospects, financial condition or results of operations. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Risks related to government regulation and diagnostic product reimbursement

If the FDA determines that our RUO products are medical devices or if we seek to market our RUO products for clinical diagnostic or health screening use, we will be required to obtain regulatory clearance(s) or approval(s), and may be required to cease or limit sales of our then marketed products, which could materially and adversely affect our business, financial condition and results of operations. Any such regulatory process would be expensive, time-consuming and uncertain both in timing and in outcome.

Our RUO products are focused on the life sciences research market. This includes laboratories associated with academic and governmental research institutions, as well as pharmaceutical, biotechnology and contract research companies. Accordingly, our products are labeled as "Research Use Only," or RUO, and are not intended for diagnostic use. While we have focused initially on the life sciences research market and RUO products only, our strategy is to expand our product line to encompass products that are intended to be used for the diagnosis of disease, either alone or in collaboration with third parties. Such in-vitro diagnostic, or IVD, products will be subject to regulation by the FDA as medical devices, or comparable international agencies, including requirements for regulatory clearance or approval of such products before they can be marketed. If the FDA were to determine that our products are intended for clinical use or if we decided to market our products for such use, we would be required to obtain FDA 510(k) clearance or premarket approval in order to sell our products in a manner consistent with FDA laws and regulations. Such regulatory approval processes or clearances are expensive, time-consuming and uncertain; our efforts may never result in any approved premarket approval application, or PMA, or 510(k) clearance for our products; and failure by us or a collaborator to obtain or comply with such approvals and clearances could have an adverse effect on our business, financial condition or operating results.

IVD products may be regulated as medical devices by the FDA and comparable international agencies and may require either clearance from the FDA following the 510(k) pre-market notification process or PMA from the FDA, in each case prior to marketing. If we or our collaborators are required to obtain a PMA or 510(k) clearance for products based on our technology, we or they would be subject to a substantial number of additional requirements for medical devices, including establishment registration, device listing, Quality Systems Regulations which cover the design, testing, production, control, quality assurance, labeling, packaging, servicing, sterilization (if required), and storage and shipping of medical devices (among other activities), product labeling, advertising, recordkeeping, post-market surveillance, post-approval studies, adverse event reporting, and correction and removal (recall) regulations. One or more of the products we or a collaborator may develop using our technology may also require clinical trials in order to generate the data required for PMA approval. Complying with these requirements may be time-consuming and expensive. We or our collaborators may be required to expend significant resources to ensure ongoing compliance with the FDA regulations and/or take satisfactory corrective action in response to enforcement action, which may have a material adverse effect on the ability to design, develop, and commercialize products using our technology as planned. Failure to comply with these requirements may subject us or a collaborator to a range of enforcement actions, such as warning letters, injunctions, civil monetary penalties, criminal prosecution, recall and/or seizure of products, and revocation of marketing authorization, as well as significant adverse publicity. If we or our collaborators fail to obtain, or experience significant delays in obtaining, regulatory approvals for IVD products, such products may not be able to be launched or successfully commercialized in a timely manner, or at all.

Laboratory developed tests, or LDTs, are a subset of IVD tests that are designed, manufactured and used within a single laboratory. Our Lineagen diagnostic services are provided as LDTs. The FDA maintains that LDTs are medical devices and has for the most part exercised enforcement discretion for most LDTs. A significant change in the way that the FDA regulates any LDTs that we, our collaborators or our customers market or develop using our technology could affect our business. If the FDA requires laboratories to undergo premarket review and comply with other applicable FDA requirements in the future, the cost and time required to commercialize an LDT will increase substantially, and may reduce the financial incentive for us to continue to offer our Lineagen genetic diagnostic services or for our customer laboratories to develop LDTs, which could reduce demand for our RUO instruments and our other products. In addition, if the FDA were to change the way that it regulates LDTs to require that we undergo pre-market review or comply with other applicable FDA requirements before we can sell our RUO instruments or our other products to clinical cytogenetics laboratories, our ability to sell our RUO instruments and other products to this addressable market would be delayed, thereby impeding our ability to penetrate this market and generate revenue from sales of our instruments and our other products.

Failure to comply with applicable FDA requirements could subject us to misbranding or adulteration allegations under the Federal Food, Drug, and Cosmetic Act. We could be subject to a range of enforcement actions, including warning letters, injunctions, civil monetary penalties, criminal prosecution, and recall and/or seizure of products, as well as significant adverse publicity. In addition, 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, which may negatively affect our ability to obtain or maintain FDA or comparable regulatory approval of our products, if required.

Foreign jurisdictions have laws and regulations similar to those described above, which may adversely affect our ability to market our products as planned in such countries. The number and scope of these requirements are increasing. As in the U.S.,

the cost and time required to comply with regulatory requirements may be substantial, and there is no guarantee that we will obtain the necessary authorization(s) required to make our products commercially viable. As a result, the imposition of foreign requirements may also have a material adverse effect on the commercial viability of our operations.

We expect to rely on third parties in conducting any required future studies of diagnostic products that may be required by the FDA or other regulatory authorities, and those third parties may not perform satisfactorily.

We do not have the ability to independently conduct clinical trials or other studies that may be required to obtain FDA and other regulatory clearance or approval for future diagnostic products. Accordingly, we expect that we would rely on third parties, such as clinical investigators, consultants, and collaborators to conduct such studies if needed. Our reliance on these third parties for clinical and other development activities would reduce our control over these activities. If these third parties do not successfully carry out their contractual duties or regulatory obligations or meet expected deadlines, if the third parties need to be replaced or if the quality or accuracy of the data they obtain is compromised, we may not be able to obtain regulatory clearance or approval.

Billing for our Lineagen diagnostic testing procedures is complex and requires substantial time and resources to collect payment.

Billing for clinical laboratory testing services in connection with our Lineagen diagnostic services is complex, time-consuming and expensive. Depending on the billing arrangement and applicable law, we bill various payors, including Medicare, Medicaid, private insurance companies, private healthcare institutions, and patients, all of which have different billing requirements. We generally bill third-party payors for our diagnostic testing services and pursue reimbursement on a case-by-case basis where pricing contracts are not in place. To the extent laws or contracts require us to bill patient co-payments or co-insurance, we must also comply with these requirements. We may also face increased risk in our collection efforts, including potential write-offs of accounts receivable and long collection cycles, which could adversely affect our business, results of operations and financial condition.

Several factors make the billing process complex, including:

- differences between the billing rates and reimbursement rates for our products;
- compliance with complex federal and state regulations related to billing government healthcare programs, including Medicare, Medicaid and TRICARE;
- risk of government audits related to billing;
- disputes among payors as to which party is responsible for payment;
- differences in coverage and information and billing requirements among payors, including the need for prior authorization and/or advanced notification;
- the effect of patient co-payments or co-insurance and our ability to collect such payments from patients;
- changes to billing codes used for our products;
- changes to requirements related to our current or future clinical studies, including our registry studies, which can affect eligibility for payment;
- ongoing monitoring provisions of LCDs for our products, which can affect the circumstances under which a claim would be considered medically necessary;
- incorrect or missing billing information; and
- the resources required to manage the billing and claims appeals process.

We use standard industry billing codes, known as Current Procedural Terminology, or CPT, codes, to bill for our diagnostic testing services. If these codes were to change, there is a risk of an error being made in the claim adjudication process. Such errors can occur with claims submission, third-party transmission or in the processing of the claim by the payor. Claim adjudication errors may result in a delay in payment processing or a reduction in the amount of the payment we receive.

As we introduce new products, we may need to add new codes to our billing process as well as our financial reporting systems. Failure or delays in effecting these changes in external billing and internal systems and processes could negatively affect our collection rates, revenue and cost of collecting.

Additionally, our billing activities require us to implement compliance procedures and oversight, train and monitor our employees, and undertake internal audits to evaluate compliance with applicable laws and regulations as well as internal compliance policies and procedures. When payors deny our claims, we may challenge the reason, low payment amount or payment denials. Payors also conduct external audits to evaluate payments, which add further complexity to the billing process.

If the payor makes an overpayment determination, there is a risk that we may be required to return all or some portion of prior payments we have received.

Additionally, the Patient Protection and Affordable Care Act of 2010, as amended by the Health Care and Education Reconciliation Act of 2010, collectively the ACA, requires providers and suppliers to report and return any overpayments received from government payors under the Medicare and Medicaid programs within 60 days of identification. Failure to identify and return such overpayments exposes the provider or supplier to liability under federal false claims laws. These billing complexities, and the related uncertainty in obtaining payment for our products, could negatively affect our revenue and cash flow, our ability to achieve sustained profitability, and the consistency and comparability of our results of operations.

If our Lineagen diagnostic testing procedures are subject to unfavorable pricing regulations or third-party payor coverage and reimbursement policies, our business could be harmed.

Our Lineagen-related revenue depends on achieving and maintaining broad coverage and adequate reimbursement for our Lineagen products and diagnostic assays from third-party payors, including both government and commercial third-party payors. If third-party payors do not provide coverage of, or do not provide adequate reimbursement for, a substantial portion of the list price of our Lineagen products and diagnostic assays, we may need to seek additional payment from the patient beyond any co-payments and deductibles, which may adversely affect demand for our Lineagen products and diagnostic assays. Coverage determinations by a third-party payor may depend on a number of factors, including, but not limited to, a third-party payor's determination of whether our products or services are appropriate, medically necessary or cost-effective. If we are unable to provide third-party payors with sufficient evidence of the clinical utility and validity of our Lineagen products and diagnostic assays, they may not provide coverage, or may provide limited coverage, which will adversely affect our revenues and our ability to succeed.

Since each third-party payor makes its own decision as to whether to establish a policy to cover our Lineagen products and diagnostic assays, enter into a contract with us and set the amount it will reimburse for a product, these negotiations are a time-consuming and costly process, and they do not guarantee that the third-party payor will provide coverage or adequate reimbursement for our Lineagen products and diagnostic assays. In addition, the determinations by a third-party payor whether to cover our Lineagen products and diagnostic assays and the amount it will reimburse for them are often made on an indication-by-indication basis.

In cases where there is no coverage policy or we do not have a contracted rate for reimbursement as a participating provider, the patient is typically responsible for a greater share of the cost of the product, which may result in further delay of our revenue, increase our collection costs or decrease the likelihood of collection.

Our claims for reimbursement from third-party payors may be denied upon submission, and we may need to take additional steps to receive payment, such as appealing the denials. Such appeals and other processes are time-consuming and expensive, and may not result in payment. Third-party payors may perform audits of historically paid claims and attempt to recoup funds years after the funds were initially distributed if the third-party payors believe the funds were paid in error or determine that our Lineagen products and diagnostic assays were medically unnecessary. If a third-party payor audits our claims and issues a negative audit finding, and we are not able to overturn the audit findings through appeal, the recoupment may result in a material adverse effect on our revenue. Additionally, in some cases commercial third-party payors for whom we are not a participating provider may elect at any time to review claims previously paid and determine the amount they paid was too much. In these situations, the third-party payor will typically notify us of their decision and then offset whatever amount they determine they overpaid against amounts they owe us on current claims. We cannot predict when, or how often, a third-party payor might engage in these reviews and we may not be able to dispute these retroactive adjustments.

Additionally, coverage policies and third-party payor reimbursement rates may change at any time. Therefore, even if favorable coverage and reimbursement status is attained, less favorable coverage policies and reimbursement rates may be implemented in the future that may adversely affect the coverage and reimbursement of our Lineagen products and diagnostic assays.

If diagnostic procedures that are enabled by our Saphyr technology are subject to unfavorable pricing regulations or third-party payor coverage and reimbursement policies, our business could be harmed.

Currently, our Saphyr product is for research use only, but clinical laboratories may acquire our instrumentation through a capital purchase or capital lease and use the Saphyr and direct label stain chemistry to create their own potentially reimbursable products, such as laboratory developed tests for in vitro diagnostics. Our customers may generate revenue for these testing services by seeking the necessary approval of their product from the FDA or the Centers for Medicare & Medicaid Services, or CMS, along with coverage and reimbursement from third-party payors, including government health programs and private health plans. The ability of our customers to commercialize diagnostic tests based on our technology will depend in part on the extent to which coverage and reimbursement for these tests will be available from such third-party payors.

In the U.S., molecular testing laboratories have multiple options for reimbursement coding, but we expect that the primary codes used will be the genomic sequencing procedure codes, or GSPs. The American Medical Association, or AMA, added

GSPs to its clinical laboratory fee schedule in 2015. In addition, CMS recently issued a coverage determination providing for the reimbursement of next-generation sequencing for certain cancer diagnostics using an FDA-approved in vitro diagnostic test. Private health plans often follow CMS coverage and reimbursement guidelines to a substantial degree, and it is difficult to predict what CMS will decide with respect to the coverage and reimbursement of any products our customers try to commercialize.

In Europe, coverage for molecular diagnostic testing is varied. Countries with statutory health insurance (e.g., Germany, France, The Netherlands) tend to be more progressive in technology adoption with favorable reimbursement for molecular diagnostic testing. In countries such as the United Kingdom with tax-based insurance, adoption and reimbursement for molecular diagnostic testing is not uniform and is influenced by local budgets.

Ultimately, coverage and reimbursement of new products is uncertain, and whether laboratories that use our instruments to develop their own products will attain coverage and adequate reimbursement is unknown. In the U.S., there is no uniform policy for determining coverage and reimbursement. Coverage can differ from payor to payor, and the process for determining whether a payor will provide coverage may be separate from the process for setting the reimbursement rate. In addition, the U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid healthcare costs, including price controls and restrictions on reimbursement. We cannot be sure that coverage will be available for any diagnostic tests based on our technology, and, if coverage is available, the level of payments. Reimbursement may impact the demand for those tests. If coverage and reimbursement is not available or is available only to limited levels, our customers may not be able to successfully commercialize any tests for which they receive marketing authorization.

Healthcare legislative or regulatory reform measures may have a negative impact on our business and results of operations.

In March 2010, the ACA became law. The ACA is a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. For example, the ACA contained a 2.3% excise tax on certain entities that manufacture or import medical devices offered for sale in the U.S., with limited exceptions, which has been permanently eliminated as part of the 2020 spending package.

There have been executive, judicial and Congressional challenges to certain aspects of the ACA. For example, while Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA such as removing penalties, starting January 1, 2019, for not complying with the ACA's individual mandate to carry health insurance. On June 17, 2021 the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA was unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Thus, the ACA will remain in effect in its current form. In addition, other legislative changes have been proposed and adopted since the ACA was enacted. For example, on April 1, 2014, the Protecting Access to Medicare Act of 2014, or PAMA, was signed into law, which, among other things, significantly altered the payment methodology under the Medicare Clinical Laboratory Fee Schedule, or CLFS. PAMA requires certain laboratories performing clinical diagnostic laboratory tests to report to CMS the amounts paid by private payors for laboratory tests. Such reporting has been subject to numerous delays. Beginning on January 1, 2018, CMS has begun using reported private payor pricing to periodically revise payment rates under the CLFS. Based on current law, between January 1, 2023 and March 31, 2023, applicable laboratories will be required to report on data collected during January 1, 2019 and June 30, 2019. This data will be utilized to determine 2024 to 2026 CLFS rates.

We expect that the ACA, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and additional downward pressure on the price that we or our collaborators will receive for any cleared or approved product. Congress is considering additional health reform measures. Further, it is possible that additional governmental action is taken in response to the COVID-19 pandemic. Any reduction in payments from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent our customers from successfully commercializing any tests for which they receive approval, which could prevent us from being able to generate revenue and attain profitability.

Complying with numerous regulations pertaining to our business is an expensive and time-consuming process, and any failure to comply could result in substantial penalties.

We are subject to the Clinical Laboratory Improvement Amendment of 1988, or CLIA, which is a federal law regulating clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease. Our clinical laboratory is located in Utah and must be certified under CLIA in order for us to perform testing on human specimens. CLIA is intended to ensure the quality and reliability of clinical laboratories in the United States by mandating specific standards in the areas of personnel qualifications, administration, and participation in proficiency testing, patient test management, quality control, quality assurance and inspections. We have a current certificate of compliance under CLIA to perform cytogenetics. To renew this certificate, we are subject to survey and

inspection every two years. Moreover, CLIA inspectors may make periodic inspections of our clinical laboratory outside of the renewal process. The failure to comply with CLIA requirements can result in enforcement actions, including the revocation, suspension, or limitation of our CLIA certificate of compliance, as well as a directed plan of correction, state on-site monitoring, civil money penalties, civil injunctive suit and/or criminal penalties. We must maintain CLIA compliance and certification to be eligible to bill for assays provided to Medicare beneficiaries. If we were to be found out of compliance with CLIA program requirements and subjected to sanctions, our business and reputation could be harmed. Even if it were possible for us to bring our laboratory back into compliance, we could incur significant expenses and potentially lose revenue in doing so.

We hold laboratory licenses from the states of California, Pennsylvania, and Maryland, to test specimens from patients in those states or received from ordering physicians in those states. Other states may have similar requirements or may adopt similar requirements in the future. Finally, we may be subject to regulation in foreign jurisdictions if we seek to expand international distribution of our assays outside the United States.

If we were to lose our CLIA certification or state laboratory licenses, whether as a result of a revocation, suspension or limitation, we would no longer be able to offer our assays, which would limit our revenues and harm our business. If we were to lose, or fail to obtain, a license in any other state where we are required to hold a license, we would not be able to test specimens from those states. If we were to lose our CAP accreditation, our reputation for quality, as well as our business, financial condition and results of operations, could be significantly and adversely affected.

We are subject to federal and state healthcare fraud and abuse laws and other federal and state laws applicable to our business activities, including our marketing practices. If we are unable to comply, or have not complied, with such laws, we could face substantial penalties.

Our operations are subject to various federal and state fraud and abuse laws, including, without limitation, the federal and state anti-kickback statutes and false claims laws. These laws may impact, among other things, our sales and marketing and education programs, and our financial and business relationships with health care professionals. The laws that may affect our ability to operate include, but are not limited to:

- the federal Anti-Kickback Statute, or the AKS, which prohibits, among other things, any person or entity from knowingly and willfully soliciting, receiving, offering or paying any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of an item or service reimbursable, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs. The term ‘‘remuneration’’ has been broadly interpreted to include anything of value. There are a number of statutory exceptions and regulatory safe harbors protecting some common activities from prosecution, however these are drawn narrowly. Additionally, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, the ACA codified case law that a claim including items or services resulting from a violation of the AKS constitutes a false or fraudulent claim for purposes of the federal False Claims Act, or the FCA;
- the Stark Law, which prohibits a physician from making a referral for certain designated health services covered by the Medicare or Medicaid program, including laboratory and pathology services, if the physician or an immediate family member of the physician has a financial relationship with the entity providing the designated health services and prohibits that entity from billing, presenting or causing to be presented a claim for the designated health services furnished pursuant to the prohibited referral, unless an exception applies;
- federal civil and criminal false claims laws and civil monetary penalty laws, such as the FCA, which can be enforced by private citizens through civil qui tam actions, prohibits individuals or entities from, among other things, knowingly presenting, or causing to be presented false, fictitious or fraudulent claims for payment or approval by the federal government, including federal health care programs, such as Medicare and Medicaid, and knowingly making, using or causing to be made or used a false record or statement material to a false or fraudulent claim, or knowingly making a false statement to improperly avoid, decrease or conceal an obligation to pay money to the federal government;
- the Eliminating Kickbacks in Recovery Act of 2018, or EKRA, prohibits payments for referrals to recovery homes, clinical treatment facilities, and laboratories. EKRA’s reach extends beyond federal health care programs to include private insurance (i.e., it is an “all payor” statute). For purposes of EKRA, the term “laboratory” is defined broadly and without reference to any connection to substance use disorder treatment. The law includes a limited number of exceptions, some of which closely align with corresponding federal Anti-Kickback Statute exceptions and safe harbors, and others that materially differ;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which, among other things, imposes criminal liability for executing or attempting to execute a scheme to defraud any healthcare benefit program, including private third-party payors, knowingly and willfully embezzling or stealing from a healthcare benefit program, willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying,

concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement or representation, in connection with the delivery of or payment for healthcare benefits, items or services. Like the AKS, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, which imposes privacy, security and breach reporting obligations with respect to individually identifiable health information upon entities subject to the law, such as health plans, healthcare clearinghouses and certain healthcare providers, known as covered entities, and their respective business associates, individuals or entities that perform services for them that involve individually identifiable health information as well as their covered subcontractors;
- state laws that prohibit other specified practices, such as billing physicians for tests that they order or providing tests at no or discounted cost to induce physician or patient adoption; insurance fraud laws; waiving coinsurance, co-payments, deductibles, and other amounts owed by patients; billing a state Medicaid program at a price that is higher than what is charged to one or more other third-party payors employing, exercising control over or splitting professional fees with licensed professionals in violation of state laws prohibiting fee splitting or the corporate practice of medicine and other professions; and
- federal and state consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers;
- the prohibition on reassignment of Medicare claims, which, subject to certain exceptions, precludes the reassignment of Medicare claims to any other party;
- state and foreign law equivalents of each of the above federal laws, such as anti-kickback and false claims laws, that may impose similar or more prohibitive restrictions, and may apply to items or services reimbursed by any non-governmental third-party payors, including private insurers; and
- federal, state and foreign laws that govern the privacy and security of health information or personally identifiable information in certain circumstances, including state health information privacy and data breach notification laws which govern the collection, use, disclosure, and protection of health-related and other personal data, many of which differ from each other in significant ways and often are not pre-empted by HIPAA, thus complicating compliance efforts.

As a clinical laboratory, our business practices may face additional scrutiny from government regulatory agencies such as the Department of Justice, the U.S. Department of Health and Human Services Office of Inspector General, or OIG, and CMS.

Certain arrangements between clinical laboratories and referring physicians have been identified in fraud alerts issued by the OIG as implicating the AKS. The OIG has stated that it is particularly concerned about these types of arrangements because the choice of laboratory, as well as the decision to order laboratory tests, typically are made or strongly influenced by the physician, with little or no input from patients. Moreover, the provision of payments or other items of value by a clinical laboratory to a referral source could be prohibited under the Stark Law unless the arrangement meets all criteria of an applicable exception. The government has been active in enforcement of these laws as they apply to clinical laboratories.

We have entered into consulting and scientific advisory board arrangements, speaking arrangements and clinical research agreements with physicians and other healthcare providers, including some who could influence the use of our products. Although we believe that these have been structured in compliance with applicable laws, because of the complex and far-reaching nature of these laws, regulatory agencies may view these transactions as prohibited arrangements that must be restructured, or discontinued, or for which we could be subject to other significant penalties. We could be adversely affected if regulatory agencies interpret our financial relationships with providers who may influence the ordering of and use of our products to be in violation of applicable laws.

Ensuring that our business arrangements with third parties comply with applicable healthcare laws and regulations is costly. If our operations are found to be in violation of any of these laws, we may be subject to significant penalties, including, without limitation, civil, criminal, and administrative penalties, damages, fines, disgorgement, the curtailment or restructuring of our operations, exclusion from participation in federal and state healthcare programs, additional integrity oversight and reporting obligations, imprisonment, contractual damages, and reputational harm, any of which could adversely affect our ability to operate our business and our results of operations. If any of the physicians or other healthcare providers or entities with whom we do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

Additionally, sales of our products outside of the U.S. will subject us to similar foreign regulatory requirements.

Risks Related to Intellectual Property

If we are unable to protect our intellectual property, it may reduce our ability to maintain any technological or competitive advantage over our competitors and potential competitors, and our business may be harmed.

We rely on patent protection as well as trademark, copyright, trade secret and other intellectual property rights protection and contractual restrictions to protect our proprietary technologies, all of which provide limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage. As of March 1, 2022, we (directly or through our wholly owned subsidiaries Lineagen, Inc and BioDiscovery, LLC) were the assignee of 28 granted U.S. patents or allowed U.S. patent applications and 21 pending U.S. patent applications. We also were the assignee of approximately 96 pending patent applications and granted patents in particular jurisdictions outside the U.S. If we fail to protect and/or maintain our intellectual property, third parties may be able to compete more effectively against us, we may lose our technological or competitive advantage, and/or we may incur substantial litigation costs in our attempts to recover or restrict use of our intellectual property.

We cannot assure investors that any of our currently pending or future patent applications will result in granted patents, and we cannot predict how long it will take for such patents to issue, if at all. It is possible that, for any of our patents that have issued or that may issue in the future, our competitors may design their products, technologies or services around our patented technologies. Further, we cannot assure investors that other parties will not challenge any patents granted to us, or that courts or regulatory agencies will hold our patents to be valid, enforceable, and/or infringed. We cannot guarantee investors that we will be successful in defending challenges made against our patents and patent applications. Any successful third-party challenge or challenges to our patents could result in the unenforceability or invalidity of such patents, or such patents being interpreted narrowly and/or in a manner adverse to our interests. Our ability to establish or maintain a technological or competitive advantage over our competitors and/or market entrants may be diminished because of these uncertainties. For these and other reasons, our intellectual property may not provide us with any competitive advantage. For example:

- we or our licensors might not have been the first to make the inventions claimed or disclosed by our pending patent applications or issued patents;
- we or our licensors might not have been the first to file patent applications for these inventions. To determine the priority of these inventions, we may have to participate in interference proceedings or derivation proceedings declared by the U.S. Patent and Trademark Office, or the USPTO, which could result in substantial cost to us, and could possibly result in a loss or narrowing of patent rights. No assurance can be given that our or our licensors' patent applications or granted patents will have priority over any other patent or patent application involved in such a proceeding, or will be held valid as an outcome of the proceeding;
- other parties may independently develop similar or alternative products and technologies or duplicate any of our products and technologies, which can potentially impact our market share, revenue, and goodwill, regardless of whether intellectual property rights are successfully enforced against these other parties;
- it is possible that our owned or licensed pending patent applications will not result in granted patents, and even if such pending patent applications issue as patents, they may not provide intellectual property protection of commercially viable products or product features, may not provide us with any competitive advantages, or may be challenged and invalidated by third parties, patent offices, and/or the courts;
- we may be unaware of or unfamiliar with prior art and/or interpretations of prior art that could potentially impact the validity or scope of our patents or pending patent applications, or patent applications that we intend to file;
- we take efforts to enter into agreements with employees, consultants, collaborators, and, as applicable, advisors to confirm ownership and chain of title in intellectual property rights. However, an inventorship or ownership dispute could arise that may permit one or more third parties to practice or enforce our intellectual property rights, including possible efforts to enforce rights against us;
- we may elect not to maintain or pursue intellectual property rights that, at some point in time, may be considered relevant to or enforceable against a competitor;
- we may not develop additional proprietary products and technologies that are patentable, or we may develop additional proprietary products and technologies that are not patentable;
- the patents or other intellectual property rights of others may have an adverse effect on our business; and
- we apply for patents relating to our products and technologies and uses thereof, as we deem appropriate. However, we or our representatives or their agents may fail to apply for patents on important products and technologies in a timely fashion or at all, or we or our representatives or their agents may fail to apply for patents in potentially relevant jurisdictions.

To the extent our intellectual property offers inadequate protection, or is found to be invalid or unenforceable, we would be exposed to a greater risk of direct or indirect competition. If our intellectual property does not provide adequate coverage of our competitors' products, technologies or services, our competitive position could be adversely affected, as could our business.

Further, to the extent that computation methods implemented by software included in our products or technologies are not protected by our patents, our dependence on copyright and trade secret protection may not provide adequate protection. In addition, the Supreme Court's ruling in Alice Corporation Pty. Ltd. v. CLS Bank International has narrowed the scope of patent protection available for computational methods in certain circumstances.

The measures that we use to protect the security of 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 pursuing patents on our technologies, 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 take steps to protect our intellectual property and proprietary technologies by entering into confidentiality agreements and intellectual property assignment agreements with our employees, consultants, corporate partners and, when needed, our advisors. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets and/or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure. Moreover, if a party having an agreement with us has an overlapping or conflicting obligation to a third-party, our rights in and to certain intellectual property could be undermined. Monitoring unauthorized and inadvertent disclosure is difficult, and we do not know whether the steps we have taken to prevent such disclosure are, or will be, adequate. If we were to enforce a claim that a third-party had illegally obtained and was using our trade secrets, it would be expensive and time consuming, the outcome would be unpredictable, and any remedy may be inadequate. In addition, courts outside the U.S. may be less willing to protect trade secrets.

In addition, competitors could purchase our products or technologies and attempt to replicate and/or improve some or all of the competitive advantages we derive from our development efforts, willfully infringe our intellectual property rights, design their products or technologies around our protected technologies or develop their own competitive technologies that fall outside of our intellectual property rights. If our intellectual property does not adequately protect our market share against competitors' products or technologies, services and methods, our competitive position could be adversely affected, as could our business.

We have rights in some intellectual property that has been discovered through government funded programs and thus is subject to federal regulations such as "march-in" rights, certain reporting requirements, and a preference for U.S. industry. Compliance with such regulations may limit our exclusive rights, subject us to expenditure of resources with respect to reporting requirements, and limit our ability to contract with non-U.S. manufacturers.

Some of the intellectual property rights assigned to us and/or in-licensed to us have been generated through the use of U.S. government funding and are therefore subject to certain federal regulations. For example, all of the intellectual property rights licensed to us under our license agreement with Princeton University have been generated using U.S. government funds. As a result, the U.S. government has certain rights to intellectual property embodied in our current or future products pursuant to the Bayh-Dole Act of 1980. These U.S. government rights in certain inventions developed under a government-funded program include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right to require us to grant exclusive, partially exclusive, or non-exclusive licenses to any of these inventions to a third-party if the government determines that: (i) adequate steps have not been taken to commercialize the invention; (ii) government action is necessary to meet public health or safety needs; or (iii) government action is necessary to meet requirements for public use under federal regulations (also referred to as "march-in rights"). The U.S. government also has the right to take title to these inventions if we fail, or the applicable licensor fails, to disclose the invention to the government, elect title, and file an application to register the intellectual property within specified time limits. In addition, the U.S. government may acquire title to these inventions in any country in which a patent application is not filed within specified time limits. Intellectual property generated under a government funded program is also subject to certain reporting requirements, compliance with which may require us, or the applicable licensor, to expend substantial resources. In addition, the U.S. government requires that any products embodying the subject invention or produced through the use of the subject invention be manufactured substantially in the U.S. The manufacturing preference requirement can be waived if the owner of the intellectual property can show that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the U.S. or that, under the circumstances, domestic manufacture is not commercially feasible. This preference for U.S. manufacturing may limit our ability to license the applicable patent rights on an exclusive basis under certain circumstances.

If we enter into future arrangements involving government funding, and we make or license inventions that result from such funding, intellectual property rights to such discoveries may be subject to the applicable provisions of the Bayh-Dole Act. To the extent any of our current or future intellectual property is generated through the use of U.S. government funding, the

provisions of the Bayh-Dole Act may similarly apply. Any exercise by the government of certain of its rights could harm our competitive position, business, financial condition, results of operations and prospects.

We depend on technology that is licensed to us by Princeton University. Any loss of our rights to this technology could prevent us from selling our products.

Some technology that relates to analysis of nucleic acids is licensed exclusively to us from Princeton University, or Princeton. We do not own the patents that underlie this license. Our rights to use this technology and employ the inventions claimed in the licensed patents are subject to the continuation of and compliance with the terms of the license. Our principal obligations under our license agreement with Princeton are as follows:

- royalty payments;
- annual maintenance fees;
- using commercially reasonable efforts to develop and sell a product using the licensed technology and developing a market for such product;
- paying and/or reimbursing fees related to prosecution, maintenance and enforcement of patent rights; and
- providing certain reports.

If we breach any of these obligations, Princeton may have the right to terminate or modify the license, which could result in our being unable to develop, manufacture and sell our products or a competitor gaining access to the relevant technology. Termination or certain modifications of our license agreement with Princeton would have a material adverse effect on our business.

In addition, we are a party to a number of other agreements that include licenses to intellectual property, including non-exclusive licenses. We may need to enter into additional license agreements in the future. Our business could suffer, for example, if any current or future licenses terminate, if the licensors fail to abide by the terms of the license, if the licensed patents or other rights are found to be invalid or unenforceable, or if we are unable to enter into necessary licenses on acceptable terms.

As we have done previously, we may need or may choose to obtain licenses and/or acquire intellectual property rights from third parties to advance our research or begin commercialization of our current or future products or services, and we cannot provide any assurances that third-party patents do not exist that might be enforced against our current or future products or services in the absence of such a license. We may fail to obtain any of these licenses or intellectual property rights on commercially reasonable terms. Even if we are able to obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we may be unable to develop or commercialize the affected products or services, which could materially harm our business and the third parties owning such intellectual property rights could seek either an injunction prohibiting our sales, or, with respect to our sales, an obligation on our part to pay royalties and/or other forms of compensation.

Licensing of intellectual property is important to our business and involves complex legal, business and scientific issues. Disputes may arise between us and our licensors regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- whether and the extent to which our technologies and processes infringe any intellectual property of the licensor that is not subject to the licensing agreement;
- whether to take action to enforce any intellectual property rights against an allegedly infringing product or process of a third-party;
- our right to sublicense patent and other rights to third parties;
- our diligence obligations with respect to the use of licensed technology in relation to our development and commercialization of our products and services, and what activities satisfy those diligence obligations; and
- the ownership of inventions and know-how, such as intellectual property resulting from the joint creation or use of intellectual property by our licensors and us and our partners.

If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product or service, or the dispute may have an adverse effect on our results of operation.

In addition to agreements pursuant to which we in-license intellectual property, we may in the future grant licenses under our intellectual property, or sell certain intellectual property. Like in-licenses, out-licenses can be complex and disputes may arise

between us and our licensees, such as the types of disputes described above. Moreover, licensees may breach their obligations, or we may be exposed to liability due to our failure or alleged failure to satisfy our obligations. Any such occurrence could have an adverse effect on our business.

If we or any of our partners is sued for infringing intellectual property rights of third parties, it would be costly and time consuming, and an unfavorable outcome in that litigation could have a material adverse effect on our business.

Our success also depends on our ability to develop, manufacture, market and sell our products and technologies and perform our services without infringing the proprietary rights of third parties. Numerous U.S. and foreign-issued patents and pending patent applications owned by third parties exist in the fields in which we are developing manufacturing, marketing and selling products and technologies and performing services. As part of a business strategy to impede our successful commercialization and entry into new markets, competitors may allege that our products, technologies and/or services infringe their intellectual property rights.

We could incur substantial costs and divert the attention of our management and technical personnel in defending ourselves against claims of infringement made by third parties. Any adverse ruling by a court or administrative body, or perception of an adverse ruling, may have a material adverse impact on our ability to conduct our business and our finances. Moreover, third parties making claims against us may be able to obtain injunctive relief against us, which could block our ability to offer one or more products, technologies or services and could result in a substantial award of damages against us. In addition, since we sometimes indemnify customers, collaborators or licensees, we may have additional liability in connection with any infringement or alleged infringement of third-party intellectual property. Intellectual property litigation can be very expensive, and we may not have the financial means to defend ourselves or our customers, collaborators and licensees.

Because patent applications can take many years to issue, there may be pending applications, some of which are unknown to us, that may result in issued patents upon which our products, services or proprietary technologies may infringe. Moreover, we may fail to identify issued patents of relevance or incorrectly conclude that an issued patent is invalid or not infringed any of our products, services or proprietary technologies. There is a substantial amount of litigation involving patents and other intellectual property rights in our industry. If a third-party claims that we or any of our licensors, customers or collaboration partners infringe upon a third-party's intellectual property rights, we may have to:

- seek to obtain licenses that may not be available on commercially reasonable terms, if at all;
- abandon any product or service alleged or held to infringe, or redesign our products or technologies or processes to avoid potential assertion of infringement;
- pay substantial damages including, in exceptional cases, treble damages and attorneys' fees, which we may have to pay if a court decides that the product or proprietary technology at issue infringes upon or violates the third-party's rights;
- pay substantial royalties or fees for, or grant cross-licenses to, our technology; or
- defend litigation or administrative proceedings that may be costly whether we win or lose, and which could result in a substantial diversion of our financial and management resources.

We may be involved in lawsuits to protect or enforce our patents or the patents of our licensors, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe our patents or the patents we license in. In the event of infringement or unauthorized use, we may file one or more infringement lawsuits, which can be expensive and time-consuming. An adverse result in any such litigation proceedings could put one or more of our patents at risk of being invalidated, being found to be unenforceable, and/or being interpreted narrowly and could put our patent applications at risk of not issuing and/or could impact the validity or enforceability positions of our other patents or those we license. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation.

Most of our competitors are larger than we are and have substantially greater resources. They are, therefore, likely to be able to sustain the costs of complex patent litigation longer than we could. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise the funds necessary to continue our operations, continue our internal research programs, in-license needed technology, pursue, obtain or maintain intellectual property rights, or enter into development partnerships that would help us bring our products, technologies or services to market.

In addition, patent litigation can be very costly and time-consuming. An adverse outcome in such litigation or proceedings may expose us or any of our future development partners to loss of our proprietary position, expose us to significant liabilities, or require us to seek licenses that may not be available on commercially acceptable terms, if at all.

Our issued patents could be found invalid or unenforceable if challenged in court or at the Patent Office or other administrative agency, which could have a material adverse impact on our business.

If we or any of our partners were to initiate legal proceedings against a third-party to enforce a patent related to one of our products, technologies or services, the defendant in such litigation could counterclaim that our patent is invalid and/or unenforceable. In patent litigation in the U.S., defendant counterclaims alleging invalidity and/or unenforceability are commonplace, as are validity challenges by the defendant against the subject patent or other patents before the USPTO. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement, failure to meet the written description requirement, indefiniteness, and/or failure to disclose the best mode or to claim patent eligible subject matter. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent intentionally withheld material information from the USPTO, or made a misleading statement, during prosecution. Additional grounds for an unenforceability assertion include an allegation of misuse or anticompetitive use of patent rights, and an allegation of incorrect inventorship with deceptive intent. Third parties may also raise similar claims before the USPTO even outside the context of litigation. The outcome is unpredictable following legal assertions of invalidity and unenforceability. With respect to the validity question, for example, we cannot be certain that no invalidating prior art existed of which we and the patent examiner were unaware during prosecution. These assertions may also be based on information known to us or the Patent Office. If a defendant or third-party were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the claims of the challenged patent. Such a loss of patent protection would or could have a material adverse impact on our business.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed alleged trade secrets of their other clients or former employers to us, and/or that their other clients or former employers allegedly have rights in our intellectual property, which could subject us to costly litigation.

As is common in the life sciences industry, we engage the services of consultants and independent contractors to assist us in the development of our products, technologies and services. Many of these consultants and independent contractors were previously employed at, or may have previously or may be currently providing consulting or other services to, universities or other technology, biotechnology or pharmaceutical companies, including our competitors or potential competitors. We may become subject to claims that our company, a consultant or an independent contractor inadvertently or otherwise used or disclosed trade secrets or other information proprietary to their former employers or their former or current clients. We may similarly be subject to claims stemming from similar actions of an employee, such as one who was previously employed by another company, including a competitor or potential competitor. We may become subject to claims that one or more current or former employees, consultants, advisors, or independent contractors of ours owns rights in our intellectual property and/or has assigned or is under an obligation to assign rights in our intellectual property to another party. This may include a competitor of ours. If a competitor has rights in our patents, the competitor or a licensee or related entity of the competitor may be able to make, use, sell, import, and/or export the patented technology without liability to us under our patents or the patents we license. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to our management team. If we were not successful, we could lose valuable intellectual property rights.

We may be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.

We generally enter into confidentiality and intellectual property assignment agreements with our employees, consultants, contractors, and, as applicable, advisors. These agreements generally provide that inventions conceived by the party in the course of rendering services to us will be our exclusive property. However, those agreements may not be honored and may not effectively assign or may be alleged to ineffectively assign intellectual property rights to us. For example, even if we have a consulting agreement in place with an academic advisor pursuant to which such academic advisor is required to assign any inventions developed in connection with providing services to us, such academic advisor may not have the right to assign such inventions to us, as it may conflict with his or her obligations to assign all such intellectual property to his or her employing institution.

In addition, we sometimes enter into agreements where we provide services to third parties, such as customers. Under such circumstances, our agreements may provide that certain intellectual property that we conceive in the course of providing those services is assigned to the customer. In those cases, we may not be able to use that particular intellectual property in, for example, our work for other customers without a license.

We may not be able to protect our intellectual property rights throughout the world, which could materially and negatively affect our business.

Filing, prosecuting, maintaining, and defending patents on current and future products, technologies and services in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the U.S. can be less extensive than those in the U.S. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the U.S. Consequently, regardless of whether we are able to

prevent third parties from practicing our inventions in the U.S., we may not be able to prevent third parties from practicing our inventions in all countries outside the U.S., or from selling or importing products made using our inventions in and into the U.S. or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not pursued and obtained patent protection to develop their own products, technologies or services, and further, may export otherwise infringing products or technologies to territories where we have patent protection, but enforcement is not as strong as it is in the U.S. These products, technologies or services may compete with our products, technologies or services and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing. Even if we pursue and obtain issued patents in particular jurisdictions, our patent claims or other intellectual property rights may not be effective or sufficient to prevent third parties from so competing. Patent protection must ultimately be sought on a country-by-country basis, which is an expensive and time-consuming process with uncertain outcomes. Accordingly, we may choose not to seek patent protection in certain countries, and we will not have the benefit of patent protection in such countries.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement of our patents or marketing of competing products, technologies or services in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful.

Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license and may adversely impact our business.

In addition, we and our partners also face the risk that our products or components thereof are imported, reimported, or exported into markets with relatively higher prices from markets with relatively lower prices, which would result in a decrease of sales and any payments we receive from the affected market. Recent developments in U.S. patent law have made it more difficult to stop these and related practices based on theories of patent infringement.

Changes in patent laws or patent jurisprudence could diminish the value of patents in general, thereby impairing our ability to protect our products or technologies.

As is the case with other life science industry companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents involve both technological complexity and legal complexity. Therefore, obtaining and enforcing patents is costly, time-consuming and inherently uncertain. In addition, the America Invents Act, or the AIA, became effective on March 16, 2013.

An important change introduced by the AIA is that the U.S. transitioned to a “first-to-file” system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. A third-party that files a patent application in the USPTO after that date but before us could therefore be awarded a patent claiming or disclosing an invention of ours even if we had made the invention before it was made by the third-party. This will require us to be cognizant going forward of the time from invention to filing of a patent application, but circumstances could prevent us from promptly filing patent applications on our inventions. Additionally, there can be a trade-off between obtaining an earlier filing date, and waiting to obtain additional data and/or further refine a patent application. In some circumstances, the effects of a decision to pursue an earlier filing or a later filing will not be known until prior art or third-party activities are subsequently discovered, such as by the USPTO or by a third-party seeking to challenge patent rights. These circumstances may apply, for example, to patent applications prepared and filed around the time of the implementation of the AIA, or with a priority application that preceded the implementation of the AIA.

Among some of the other changes introduced by the AIA are changes that limit where a patent holder may file a patent infringement suit and providing additional opportunities for third parties to challenge an issued patent in the USPTO. This applies to all of our owned and in-licensed U.S. patents, even those issued before March 16, 2013. Because of a lower standard for evidence in USPTO proceedings compared to the standard for evidence in U.S. federal courts necessary to invalidate a patent claim, a third-party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a court action. Accordingly, a third-party may try to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third-party in court. The AIA and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. In addition, the contours of the laws under the AIA are subject to further judicial interpretation and/or legislative changes.

Additionally, the U.S. Supreme Court has ruled on several patent cases in recent years, such as Impression Products, Inc. v. Lexmark International, Inc., Association for Molecular Pathology v. Myriad Genetics, Inc., Mayo Collaborative Services v.

Prometheus Laboratories, Inc. and Alice Corporation Pty. Ltd. v. CLS Bank International, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition to increasing uncertainty with our ability to obtain patents in the future, this combination of events has created uncertainty as to the value of patents, once obtained, including patents in the molecular biology analysis and diagnostic space in particular. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other provisions during the patent process. There are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case. In some cases, our licensors may be responsible for these payments, thereby decreasing our control over compliance with these requirements.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our registered or unregistered trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing other marks. We may not be able to protect our rights to these trademarks and trade names, which we need to build name recognition by potential partners or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other registered trademarks. Over the long term, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected.

We may use third-party open source software components in future products or technologies, and failure to comply with the terms of the underlying open source software licenses could restrict our ability to sell such products or technologies.

While our current products do not contain any software tools licensed by third-party authors under “open source” licenses, we may choose to use open source software in future products. Use and distribution of open source software may entail greater risks than use of third-party commercial software, as open source licensors generally do not provide warranties or other contractual protections regarding infringement claims or the quality of the code. Some open source licenses may contain requirements that we make available source code for modifications or derivative works we create based upon the type of open source software we use. If we combine our proprietary software with open source software in a certain manner, we could, under certain open source licenses, be required to release the source code of our proprietary software to the public. This would allow our competitors to create similar products with less development effort and time, and ultimately could result in a loss of product sales.

Although we intend to monitor any use of open source software to avoid subjecting our products to conditions, we do not intend, the terms of many open source licenses have not been interpreted by U.S. courts, and there is a risk that any such licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our products. Moreover, we cannot assure investors that our processes for controlling our use of open source software in our products will be effective. If we are held to have breached the terms of an open source software license, we could be required to seek licenses from third parties to continue offering our products on terms that are not economically feasible, to re-engineer our products, to discontinue the sale of our products if re-engineering could not be accomplished on a timely basis, or to make generally available, in source code form, our proprietary code, any of which could adversely affect our business, operating results, and financial condition.

We use third-party software that may be difficult to replace or cause errors or failures of our products that could lead to lost customers or harm to our reputation.

We use software licensed from third parties in our products. In the future, this software may not be available to us on commercially reasonable terms, or at all. Any loss of the right to use any of this software could result in delays in the production of our products until equivalent technology is either developed by us, or, if available, is identified, obtained and integrated, which could harm our business. In addition, any errors or defects in third-party software or other third-party software failures could result in errors or defects or cause our products to fail, which could harm our business and be costly to correct. Many of these providers attempt to impose limitations on their liability for such errors, defects or failures, and, if enforceable, we may have additional liability to our customers or third-party providers that could harm our reputation and increase our operating costs.

We intend to maintain our relationships with third-party software providers and to seek software from such providers that does not contain any errors or defects. Any failure to do so could adversely impact our ability to deliver reliable products to our customers and could harm our results of operations.

Numerous factors may limit any potential competitive advantage provided by our intellectual property rights.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business, provide a barrier to entry against our competitors or potential competitors, or permit us to maintain our competitive advantage. Moreover, if a third-party has intellectual property rights that cover or impact our use of our technologies, we may not be able to fully use or extract value from our intellectual property rights. For example:

- others may be able to develop and/or use technologies that are similar to our technologies or aspects of our technologies but that does not cover the claims of any our patents or patents that may issue from our patent applications or those we license;
- we or the licensor of our licensed-in patents might not have been the first to make the inventions disclosed and/or claimed in a pending patent application that we own or license;
- we or the licensor of our licensed-in patents might not have been the first to file patent applications disclosing and/or claiming an invention;
- others may independently develop similar or alternative technologies without infringing our or our licensors' intellectual property rights;
- pending patent applications that we own or license may not lead to issued patents or may not result in the claims that we want (for example, as to the scope of issued claims, if any);
- patents, if issued, that we own or license may not provide us with any competitive advantages, or may be held invalid or unenforceable, as a result of legal challenges by our competitors or other third parties;
- third parties may compete with us in jurisdictions where we do not pursue and obtain patent protection;
- we may not be able to obtain and/or maintain necessary or useful licenses on reasonable terms or at all;
- third parties may assert an ownership interest in our intellectual property and, if successful, such disputes may preclude us from exercising exclusive rights over that intellectual property;
- we may not be able to maintain the confidentiality of our trade secrets or other proprietary information;
- we may not develop or in-license additional proprietary technologies that are patentable; and
- the patents or other intellectual property of others may have an adverse effect on our business.

Should any of these events occur, they could significantly harm our business and results of operations.

Risks Related to Ownership of our Securities

The price of our securities has been and may in the future be volatile or may decline regardless of our operating performance, and you could lose all or part of your investment.

Our stock price has been and may continue to be volatile. The daily closing market price for our common stock has varied significantly, ranging between a high price of $15.57 on February 16, 2021 and a low price of $1.85 on February 23, 2022. During this time, the price per share of common stock has ranged from an intra-day low of $1.63 per share to an intra-day high of $15.69 per share.

The trading price of our securities is likely to be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control, including limited trading volume. In addition to the risk factors discussed in this section and elsewhere in our Annual Report, these factors include:

- our commercial progress in marketing and selling our genome analysis systems, including sales and revenue trends;
- changes in laws or regulations applicable to our systems;
- adverse developments related to our laboratory facilities;
- increased competition in the diagnostics services industry;
- changes in the structure or funding of research at academic and governmental research institutions, as well as pharmaceutical, biotechnology and contract research companies, including changes that would affect their ability to purchase our products, consumables and technologies;

- the failure to obtain and/or maintain coverage and adequate reimbursement for our Lineagen products and diagnostic assays and patients' willingness to pay out-of-pocket in the absence of such coverage and adequate reimbursement;
- the failure of our customers to obtain and/or maintain coverage and adequate reimbursement for their services using our Saphyr systems or our NxClinical software;
- adverse developments concerning our manufacturers and suppliers;
- our inability to establish future collaborations;
- additions or departures of key scientific or management personnel;
- introduction of new testing services offered by us or our competitors;
- announcements of significant acquisitions, dispositions, strategic partnerships, joint ventures or capital commitments by us or our competitors;
- our ability to effectively manage our growth;
- the size and growth, if any, of our targeted markets;
- the failure or discontinuation of any of our product development and research programs;
- actual or anticipated variations in quarterly operating results;
- our cash position;
- our failure to meet the estimates and projections of the investment community and securities analysts or that we may otherwise provide to the public;
- publication of research reports about us or our industries or positive or negative recommendations or withdrawal of research coverage by securities analysts;
- changes in the market valuations of similar companies;
- overall performance of the equity markets;
- issuances of debt or equity securities;
- sales of our securities by us or our stockholders in the future;
- trading volume of our securities;
- changes in accounting practices;
- ineffectiveness of our internal controls;
- data breaches of our company, providers, vendors or customers;
- regulatory or legal developments in the United States and other countries;
- disputes or other developments relating to proprietary rights, including our ability to adequately protect our proprietary rights in our technologies;
- significant lawsuits, including patent or stockholder litigation;
- general political and economic conditions;
- natural disasters, infectious diseases, conflict, civil unrest, epidemics or pandemics including COVID-19, outbreaks, resurgences or major catastrophic events; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general, and the market for life science technology companies in particular (including companies in the diagnostic, genomic and biotechnology related sectors), have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our securities, regardless of our actual operating performance. In the past, securities class action litigation has often been instituted against companies following periods of volatility in the market price of a company's securities. Because of the potential volatility of our stock price, we may become the target of securities litigation in the future. This type of litigation, if instituted, could result in substantial costs and a diversion of management's attention and resources, which would harm our business, operating results or financial condition.

If we are not able to comply with the applicable continued listing requirements or standards of The Nasdaq Capital Market, Nasdaq could delist our common stock.

Our ability to publicly or privately sell equity securities and the liquidity of our common stock could be adversely affected if we are delisted from The Nasdaq Capital Market or if we are unable to transfer our listing to another stock market. In order to maintain this listing, we must satisfy minimum financial and other continued listing requirements and standards, including a requirement to maintain a minimum bid price of the Company's common stock of $1.00 per share.

For example, in a letter dated April 22, 2020, or the Notice, we were notified by the Nasdaq Stock Market LLC, or Nasdaq, that for 30 consecutive trading days preceding the date of the Notice, the bid price of our common stock had closed below the $1.00 per share minimum required for continued listing on The Nasdaq Capital Market pursuant to Nasdaq Listing Rule 5550(a)(2), or the Minimum Bid Price Requirement.

On January 13, 2021, Nasdaq notified that Company that it had regained compliance with the Minimum Bid Price Requirement because the closing bid price of our common stock had been at least $1.00 per share or greater from December 29, 2020 to January 12, 2021. Although we have regained compliance with Nasdaq continued listing requirements, if we fail to satisfy another Nasdaq requirement for continued listing, Nasdaq staff could provide notice that our common stock may become subject to delisting. We cannot assure you that such an event will not happen and, if it does, that we will be able to regain compliance. Accordingly, there can be no guarantee that we will be able to maintain our Nasdaq listing. If our common stock is delisted by Nasdaq, it could lead to a number of negative implications, including an adverse effect on the price of our common stock, increased volatility in our common stock, reduced liquidity in our common stock, the loss of federal preemption of state securities laws and greater difficulty in obtaining financing. In addition, delisting of our common stock could deter broker-dealers from making a market in or otherwise seeking or generating interest in our common stock, could result in a loss of current or future coverage by certain sell-side analysts and might deter certain institutions and persons from investing in our securities at all. Delisting could also cause a loss of confidence of our customers, collaborators, vendors, suppliers and employees, which could harm our business and future prospects.

We have never paid dividends and we do not intend to pay dividends on our capital stock.

We have never declared or paid any cash dividend on our capital stock. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any determination to pay dividends in the future will be at the discretion of our board of directors and will depend upon results of operations, financial condition, contractual restrictions, restrictions imposed by applicable law and other factors our board of directors deems relevant. Accordingly, realization of a gain on your investment will depend on the appreciation of the price of our securities, which may never occur.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

Our executive officers, directors and 5% stockholders and their affiliates currently beneficially own a significant percentage of our outstanding voting stock. These stockholders may be able to determine all matters requiring stockholder approval. For example, these stockholders may be able to control elections of directors, amendments of our organizational documents, or approval of any merger, sale of assets or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our securities that you may feel are in your best interest as one of our stockholders

If we fail to maintain effective internal control over financial reporting, we may not be able to accurately report our financial results or file our periodic reports in a timely manner, which may cause adverse effects on our business and may cause investors to lose confidence in our reported financial information and may lead to a decline in our stock price.

We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, the Sarbanes-Oxley Act and the rules and regulations of Nasdaq. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal controls over financial reporting. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with accounting principles generally accepted in the U.S. Effective internal control over financial reporting is necessary for us to provide reliable financial reports in a timely manner. The rules governing the standards that must be met for our management to assess our internal control over financial reporting are complex and require significant documentation, testing and possible remediation.

For the year ended December 31, 2020, we concluded there was a material weakness in our internal control environment over financial reporting because we did not have a sufficient number of resources to support the growth and complexity of our financial reporting requirements. This material weakness contributed to a material weakness in our control activities based on the criteria set forth in the 2013 Framework. Specifically, the design of certain controls did not adequately provide appropriate segregation of duties. The failure to maintain appropriate segregation of duties had a pervasive impact and as such, this deficiency resulted in a risk that could have impacted all financial statement account balances and disclosures and was therefore considered a material weakness. The material weaknesses did not result in any identified material misstatements to our financial statements, and there were no changes to previously released financial results, and as of December 31, 2021, we concluded that

as of such date our controls and procedures were effective at a reasonable assurance level due to the implementation of remediation measures that we undertook.

Although we were able to remediate our prior material weakness, we cannot assure you that we will not experience future material weaknesses or that we will be able to successfully remediate any such material weakness in a timely manner or at all. If our independent registered public accounting firm is subsequently unable to conclude that our internal control over financial reporting is effective, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of our securities could decline, and we could be subject to sanctions or investigations by Nasdaq, the SEC or other regulatory authorities and we could be subject to shareholder litigation. Failure to remedy any material weakness in our internal control over financial reporting, or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

We have designed our disclosure controls and procedures to reasonably assure that information we must disclose in reports we file or submit under the Exchange Act is accumulated and communicated to management, and recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal control over financial reporting, no matter how well-conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met.

These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple errors or mistakes. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements due to error or fraud may occur and not be detected.

Based on the evaluation of our internal control over financial reporting as of December 31, 2021, we concluded that, as of such date, our internal control over financial reporting was effective at a reasonable assurance level due to our implementation of the above-mentioned measures to address material weakness discussed above.

We incur significant costs as a result of operating as a public company, and our management is required to devote substantial time to compliance initiatives.

We have incurred significant legal, accounting and other expenses that we did not incur as a private company. We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, which require, among other things, that we file with the SEC annual, quarterly and current reports with respect to our business and financial condition. In addition, the Sarbanes-Oxley Act, as well as rules subsequently adopted by the SEC and Nasdaq to implement provisions of the Sarbanes-Oxley Act, impose significant requirements on public companies, including requiring establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. Further, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, was enacted. There are significant corporate governance and executive-compensation-related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas. As of June 30, 2021, the market value of our common stock held by non-affiliates exceeded $700.0 million. Consequently, we are a large accelerated filer and cease to be an emerging growth company effective December 31, 2021. As a result of this transition, we are subject to certain disclosure and compliance requirements that apply to other public companies but did not previously apply to us due to our previous status as an emerging growth company and expect to incur additional legal and financial compliance costs as a result. Stockholder activism, the current political environment and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

We expect the rules and regulations applicable to public companies will continue to substantially increase our legal and financial compliance costs and to make some activities more time-consuming and costly, especially as we no longer qualify as an emerging growth company or a smaller reporting company and are therefore required to comply with additional, costly disclosure and compliance requirements, subject to a transition period. If these requirements divert the attention of our management and personnel from other business concerns, they could have a material adverse effect on our business, financial condition and results of operations. The increased costs will decrease our net income or increase our consolidated net loss, and may require us to reduce costs in other areas of our business or increase the prices of our products, technologies or services. For example, these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance and we are required to incur substantial costs to maintain the same or similar coverage. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers.

A significant portion of our total outstanding shares are restricted from immediate resale but may be sold into the market in the near future. This could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market could occur at any time, subject to the restrictions and limitations described below. If our stockholders sell, or the market perceives that our stockholders intend to sell, substantial amounts of our common stock in the public market, the market price of our common stock could decline significantly. All of our outstanding shares of common stock are available for sale in the public market, subject only to the restrictions of Rule 144 under the Securities Act in the case of our affiliates.

In addition, as of December 31, 2021, we have filed registration statements on Form S-8 under the Securities Act registering the issuance of an aggregate of 22,104,867 shares of common stock subject to options or other equity awards issued or reserved for future issuance under our equity incentive plans. We also intend to file future registration statements on Form S-8 under the Securities Act registering the issuance of additional shares of common stock as the number of shares that may be issued under certain employee equity benefit plans automatically increase due to "evergreen" provisions. Shares registered under these registration statements on Form S-8 are available for sale in the public market subject to vesting arrangements and exercise of options, the lock-up agreements described above and the restrictions of Rule 144 in the case of our affiliates.

Anti-takeover provisions under our charter documents and Delaware law could delay or prevent a change of control which could limit the market price of our securities and may prevent or frustrate attempts by our security holders to replace or remove our current management.

Our amended and restated certificate of incorporation and amended and restated bylaws, contain provisions that could delay or prevent a change of control of our company or changes in our board of directors that our stockholders might consider favorable. Some of these provisions include:

- a board of directors divided into three classes serving staggered three-year terms, such that not all members of the board will be elected at one time;
- a prohibition on stockholder action through written consent, which requires that all stockholder actions be taken at a meeting of our stockholders;
- a requirement that special meetings of stockholders be called only by the chairman of the board of directors, the chief executive officer, the president or by a majority of the total number of authorized directors;
- advance notice requirements for stockholder proposals and nominations for election to our board of directors;
- a requirement that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of not less than two-thirds of all outstanding shares of our voting stock then entitled to vote in the election of directors;
- a requirement of approval of not less than two-thirds of all outstanding shares of our voting stock to amend any bylaws by stockholder action or to amend specific provisions of our certificate of incorporation; and
- the authority of the board of directors to issue preferred stock on terms determined by the board of directors without stockholder approval and which preferred stock may include rights superior to the rights of the holders of common stock.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporate Law, which may prohibit certain business combinations with stockholders owning 15% or more of our outstanding voting stock. These anti-takeover provisions and other provisions in our amended and restated certificate of incorporation and amended and restated bylaws could make it more difficult for stockholders or potential acquirers to obtain control of our board of directors or initiate actions that are opposed by the then-current board of directors and could also delay or impede a merger, tender offer or proxy contest involving our company. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors of your choosing or cause us to take other corporate actions you desire. Any delay or prevention of a change of control transaction or changes in our board of directors could cause the market price of our securities to decline.

An active trading market for our common stock may not be sustained.

Our shares of common stock began trading on The Nasdaq Capital Market on September 21, 2018. Given the limited trading history of our common stock, there is a risk that an active trading market for our shares will not be sustained, which could put downward pressure on the market price of our common stock and thereby affect the ability of our stockholders to sell their shares.

General Risk Factors

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, the price of our securities and trading volume could decline.

The trading market for our securities will depend in part on the research and reports that securities or industry analysts publish about us or our business. As a newly public company, we have only limited research coverage on our company by equity research analysts. If securities or industry analysts elect not to initiate or continue to provide coverage of our company, the trading price for our securities would likely be negatively impacted. If one or more of the analysts who covers us downgrades our securities or publishes inaccurate or unfavorable research about our business, the price of our securities may decline. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our securities could decrease, which might cause the price of our securities and trading volume to decline.

Future sales of substantial amounts of our common stock, or the possibility that such sales could occur, could adversely affect the market price of our common stock.

Future sales in the public market of shares of our common stock, including shares issued upon exercise of our outstanding stock options, or the perception by the market that these sales could occur, could lower the market price of our common stock or make it difficult for us to raise additional capital.

Our business could be negatively affected as a result of actions of activist stockholders, and such activism could impact the trading value of our securities.

Stockholders may, from time to time, engage in proxy solicitations or advance stockholder proposals, or otherwise attempt to effect changes and assert influence on our board of directors and management. Activist campaigns that contest or conflict with our strategic direction or seek changes in the composition of our board of directors could have an adverse effect on our operating results and financial condition. A proxy contest would require us to incur significant legal and advisory fees, proxy solicitation expenses and administrative and associated costs and require significant time and attention by our board of directors and management, diverting their attention from the pursuit of our business strategy. Any perceived uncertainties as to our future direction and control, our ability to execute on our strategy, or changes to the composition of our board of directors or senior management team arising from a proxy contest could lead to the perception of a change in the direction of our business or instability which may result in the loss of potential business opportunities, make it more difficult to pursue our strategic initiatives, or limit our ability to attract and retain qualified personnel and business partners, any of which could adversely affect our business and operating results. If individuals are ultimately elected to our board of directors with a specific agenda, it may adversely affect our ability to effectively implement our business strategy and create additional value for our stockholders. We may choose to initiate, or may become subject to, litigation as a result of the proxy contest or matters arising from the proxy contest, which would serve as a further distraction to our board of directors and management and would require us to incur significant additional costs. In addition, actions such as those described above could cause significant fluctuations in our stock price based upon temporary or speculative market perceptions or other factors that do not necessarily reflect the underlying fundamentals and prospects of our business.

Securities class action litigation could divert our management's attention and harm our business and could subject us to significant liabilities.

The stock markets have from time to time experienced significant price and volume fluctuations that have affected the market prices for the equity securities of life sciences and biotechnology companies. These broad market fluctuations may cause the market price of our ordinary shares to decline. In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for us because biotechnology and biopharma companies have experienced significant stock price volatility in recent years. Even if we are successful in defending claims that may be brought in the future, such litigation could result in substantial costs and may be a distraction to our management and may lead to an unfavorable outcome that could adversely impact our financial condition and prospects.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We lease an aggregate of approximately 35,823 square feet of office, laboratory, and manufacturing space in two buildings at our headquarters in San Diego, California, with the lease for all rented space expiring December 31, 2025. In December 2021, we executed a new lease for approximately 11,978 additional square feet of office and laboratory space in San Diego, California that expires in January 2026. In January 2022, we executed an amendment to our headquarters lease for a new unit adding an additional 5,278 square feet of office and laboratory space in San Diego, California that expires in January 2026.

In August 2020, through the acquisition of Lineagen, we obtained a lease for approximately 9,710 square feet of office space in a Salt Lake City, Utah under a non-cancelable operating lease that expires in December 2026.

In October 2021, through the acquisition of BioDiscovery, we obtained a finance lease for approximately 4,786 square feet of office space in El Segundo, California that expires in February 2041.

We feel our properties are sufficient to satisfy our current needs.

ITEM 3. LEGAL PROCEEDINGS

We are not currently a party to any material legal proceedings and we are not aware of any pending or threatened legal proceedings against us that could reasonably be expected to have a material adverse effect on our business, financial condition or results of operations.

ITEM 4. MINE SAFETY DISCLOSURES

None.

PART II

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

Market Information

Our common stock began trading on The Nasdaq Capital Market on September 21, 2018 under the symbol “BNGO.” Prior to such time, there was no public market for our common stock.

Common Stock Holders

As of February 24, 2022, there were approximately 108 holders of record of our common stock. Certain shares of our common stock are held in “street” name and thus the actual number of beneficial owners of such shares is not known or included in the foregoing number.

Warrant Holders

As of February 24, 2022, there was one holder of record of our warrants issued in our initial public offering, which are listed on the Nasdaq Stock Market LLC under the symbol “BNGOW” (“Warrants”). Certain of our warrants are held in “street” name and thus the actual number of beneficial owners of such warrants is not known or included in the foregoing number.

Dividend Policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain any future earnings for use in the operation of our business and do not intend to declare or pay any cash dividends in the foreseeable future. Any future determination to pay dividends on our capital stock would be at the discretion of our board of directors, subject to applicable laws, and would depend on our financial condition, results of operations, capital requirements, general business conditions and other factors that our board of directors considers relevant.

Securities Authorized for Issuance under Equity Compensation Plans

The information required by this Item regarding equity compensation plans is incorporated herein by reference to Item 12 of Part III of this Annual Report on Form 10-K, or this Annual Report.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

None.

Recent Sales of Unregistered Securities

Not applicable.

ITEM 6. [RESERVED]

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 in conjunction with our financial statements and the related notes included elsewhere in this Annual Report. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report, including information with respect to our plans and strategy for our business and expected financial results, includes forward-looking statements that

involve risks and uncertainties. You should review the risks described in Part I, Item 1A Risk Factors and elsewhere in this Annual Report.

Overview

We are a provider of genome analysis solutions that can enable researchers and clinicians to reveal answers to challenging questions in biology and medicine. Our mission is to transform the way the world sees the genome through optical genome mapping, or OGM, solutions, diagnostic services and software. We offer OGM solutions for applications across basic, translational and clinical research. Through our Lineagen business, we provide diagnostic testing for patients with clinical presentations consistent with autism spectrum disorder and other neurodevelopmental disabilities. Through our BioDiscovery business, we offer an industry-leading, platform-agnostic software solution, which integrates next-generation sequencing and microarray data designed to provide analysis, visualization, interpretation and reporting of copy number variants, single-nucleotide variants and absence of heterozygosity across the genome in one consolidated view.

We have incurred losses in each year since our inception. Our net losses were $72.4 million and $41.1 million for the years ended December 31, 2021, and 2020, respectively. As of December 31, 2021, we had an accumulated deficit of $216.1 million.

We expect to continue to incur significant expenses and operating losses as we:

- expand our sales and marketing efforts to further commercialize our products;
- continue research and development efforts to improve our existing products;
- hire additional personnel;
- enter into collaboration arrangements, if any;
- add operational, financial and management information systems; and
- incur increased costs as a result of operating as a public company.

COVID-19

We are subject to additional risks and uncertainties as a result of the continued spread of COVID-19 and uncertain market conditions, which could continue to have a material impact on our business and financial results. We closely monitor and comply with various applicable guidelines and legal requirements in the jurisdictions in which we operate, which may continue to result in reduced business operations in response to new or existing stay-at-home orders, travel restrictions and other social distancing measures. If restrictions related to COVID-19 persist, we could see additional supply chain disruptions that impact our ability to produce our products and may cause us to make strategic determinations regarding, among other things, the cost and quality of the components and supplies we acquire. At various times throughout the pandemic, we have been unable to visit certain customer sites to support installation of service our OGM systems. Our manufacturing partners, suppliers, and customers, have implemented similar operational reductions. This overall reduction in activity has contributed to a decrease in sales which negatively impacted the Company's 2021 financial results. The future effects of COVID-19 are unknown and our financial results may continue to be negatively affected in the future.

During the twelve months ended December 31, 2021, we experienced supply chain challenges, which we largely attribute to the COVID-19 pandemic. While the COVID-19 pandemic did not prevent us from operating our business during the twelve months ended December 31, 2021, we experienced substantially increased cost to secure certain component parts in our products and to produce our products at our contract manufacturers.

There may be long-term negative effects of the COVID-19 pandemic, even after it has subsided. Specifically, product demand may be reduced due to an economic recession, a decrease in corporate capital expenditures, prolonged unemployment, reduction in consumer confidence, or any similar negative economic condition. Further, the travel restrictions on our business have limited our ability to support our global and domestic operations, including providing installation and training and customer service, which has and may continue to slow the pace of our commercial strategy, sales and marketing efforts. These negative effects could have a material impact on our operations, business, earnings, and liquidity.

Financial Overview

Revenue

We generate product revenue from sales of our instruments and consumables. We currently sell our products for research use only applications and our customers are primarily laboratories associated with academic and governmental research institutions, as well as pharmaceutical, biotechnology and contract research companies. In addition, we provide instruments to certain customers under our reagent rental program, under which we provide an instrument to customers at no cost and the customers agree to purchase minimum quantities of consumables. Consumable revenue consists of sales of complete assays which are developed internally by us, plus sales of kits which contain all the elements necessary to run tests. We generate service revenue from the sale of diagnostic testing services for those with autism spectrum disorder and other neurodevelopmental disabilities

through our wholly owned subsidiary Lineagen. We also generate service and product revenue through BioDiscovery's NxClinical software which provides customers with solutions for analysis, interpretation and reporting of genomics data. Other revenue consists of warranty and other service-based revenue.

The following table presents our revenue for the periods indicated:

	Years Ended December 31,	
	2021	2020
Product revenue	$ 11,695,000	$ 6,230,000
Service and other revenue[1]	6,286,000	2,273,000
Total	$ 17,981,000	$ 8,503,000

[1] Includes $1.1 million of revenue generated by BioDiscovery from the date of acquisition through December 31, 2021.

The following table reflects total revenue by geography and as a percentage of total revenue, based on the billing address of our customers. North America consists of the United States and Canada. EMEIA consists of Europe, Middle East, India and Africa. Asia Pacific includes China, Japan, South Korea, Singapore and Australia.

	Years Ended December 31,			
	2021		2020	
	$	%	$	%
North America	$ 9,329,000	52 %	$ 4,489,000	53 %
EMEIA	5,604,000	31 %	3,163,000	37 %
Asia Pacific	3,048,000	17 %	851,000	10 %
Total	$ 17,981,000	100 %	$ 8,503,000	100 %

Cost of Revenue

Cost of revenue for our instruments and consumables includes raw material parts costs and associated freight, shipping and handling costs, contract manufacturing costs, salaries and other personnel costs, equipment depreciation, overhead and other direct costs related to those sales recognized as product revenue in the period. Cost of service and other revenue consists of third-party laboratory costs to process the diagnostic samples, salaries of our clinical technicians who interpret and deliver the results to patients, warranty services, and other costs of servicing equipment at customer sites.

Research and Development Expenses

Research and development expenses consist of salaries and other personnel costs, stock-based compensation, research supplies, third-party development costs for new products, materials for prototypes, equipment depreciation, and allocated overhead costs that include facility and other overhead costs. We have made substantial investments in research and development since our inception, and plan to continue to make investments in the future. Our research and development efforts have focused primarily on the tasks required to support development and commercialization of new and existing products. We believe that our continued investment in research and development is essential to our long-term competitive position.

Selling, General and Administrative Expenses

Selling, general and administrative expenses consist primarily of salaries and other personnel costs, intangibles amortization, and stock-based compensation for our sales and marketing, finance, legal, human resources and general management, as well as professional services, such as legal and accounting services.

Results of Operations

The following table sets forth our results of operations for the years ended December 31, 2021 and 2020:

	Years Ended December 31,		Period-to-Period Change	Period-to-Period Percentage Change
	2021	2020	2021 to 2020	2021 to 2020
Product revenue	$ 11,695,000	$ 6,230,000	$ 5,465,000	88%
Service and other revenue	6,286,000	2,273,000	4,013,000	177%
Total revenue	17,981,000	8,503,000	9,478,000	111%
Cost of product revenue	10,524,000	4,810,000	5,714,000	119%
Cost of service and other revenue	3,583,000	920,000	2,663,000	289%
Total cost of revenue	14,107,000	5,730,000	8,377,000	146%
Research and development	22,485,000	10,256,000	12,229,000	119%
Selling, general and administrative	58,490,000	31,068,000	27,422,000	88%
Total operating expenses	80,975,000	41,324,000	39,651,000	96%
Loss from operations	(77,101,000)	(38,551,000)	(38,550,000)	100%
Interest income	236,000	—	236,000	100%
Interest expense	(927,000)	(2,519,000)	1,592,000	(63)%
Gain on forgiveness of Paycheck Protection Program loan	1,775,000	—	1,775,000	100%
Loss on debt extinguishment	(2,076,000)	—	(2,076,000)	(100)%
Other expense	(59,000)	(7,000)	(52,000)	743%
Loss before income taxes	(78,152,000)	(41,077,000)	(37,075,000)	90%
Provision for income taxes	5,717,000	(29,000)	5,746,000	(19,814)%
Net loss	$ (72,435,000)	$ (41,106,000)	$ (31,329,000)	76%

Revenue

	Years Ended December 31,		Period-to-Period Change	Period-to-Period Percentage Change
	2021	2020	2021 to 2020	2021 to 2020
Instrument revenue	$ 5,887,000	$ 3,085,000	$ 2,802,000	91%
Consumable revenue	5,808,000	3,145,000	2,663,000	85%
Product revenue	11,695,000	6,230,000	5,465,000	88%
Services and other revenue	6,286,000	2,273,000	4,013,000	177%
Total revenue	$ 17,981,000	$ 8,503,000	$ 9,478,000	111%

Revenue increased by $9.5 million, or 111% to $18.0 million for the year ended December 31, 2021, as compared to $8.5 million for the same period in 2020. The increase in product sales was driven by increased demand for our Saphyr OGM solutions, including increased instrument sales and greater demand for our reagent rental program and consumables. We believe increased demand for our OGM systems was primarily driven by increased market awareness and additional published data demonstrating the utility of OGM. During the year ended December 31, 2021, the total install base of our OGM systems increased by approximately 69%, 97 as of December 31, 2020 to 164 as of December 31, 2021. Additionally, for the year ended December 31, 2021, total flowcells sold reached 12,518, an increase of approximately 100% from the 6,311 flowcells sold during the year ended December 31, 2020. The increase in service and other revenue was primarily driven by sales generated by our Lineagen and BioDiscovery subsidiaries.

Cost of Revenue

Cost of revenue increased by $8.4 million, or 146%, to $14.1 million for the year ended December 31, 2021, as compared to $5.7 million for the same period in 2020. Cost of product revenue increased primarily due to increased product sales, but was also negatively impacted by unfavorable flowcell yields in the production cycle. The yield issues led us to record a $1.2 million inventory write-off in the fourth quarter of 2021, charged to cost of product revenue. If we are unable to solve for the yield issue, it could lead to lower gross margins in future periods. Cost of service and other revenue increased primarily due to costs from Lineagen sales contributing for a full year in 2021 versus a little more than one quarter in 2020.

Research and Development Expenses

Research and development, or R&D expenses, increased by $12.2 million, or 119%, to $22.5 million for the year ended December 31, 2021 as compared to $10.3 million for the same period in 2020. This is due to headcount additions to our development teams, resulting in a $7.2 million increase in R&D compensation expense. This increase was further driven by a $5.0 million increase in product development costs, including internal materials and supply consumption costs, foundry expenses, clinical trial research, and consulting costs.

We expect research and development expenses to increase in 2022 relative to 2021 as we have added headcount in order to support our efforts to develop more scalable and efficient manufacturing workflows, expand the utility of Saphyr, and develop the next versions of OGM products – including integration of OGM data into our NxClinical software. We expect that stock based compensation will drive a significant portion of the increase in expense in 2022 as a result of the stock issued as consideration in the BioDiscovery acquisition, which primarily rolls up into research and development expense.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased $27.4 million, or 88%, to $58.5 million for the year ended December 31, 2021 as compared to $31.1 million for the same period in 2020. This increase is primarily due to a $17.0 million increase in compensation costs driven by increased headcount, and a $2.6 million increase in other headcount-related expenses. Other headcount-related expenses included the cost of recruiting, temporary employment, and facilities expenses incurred in order to support increased product demand. Headcount increased 103% from 2020 to 2021 to our global sales and back-office teams to support world-wide product distribution. In addition, we increased headcount as a result of the acquisition of BioDiscovery. Professional services – including accounting, legal, investor relations, market research, and annual meeting expenses – increased by $4.6 million. In 2021, legal costs include a total of $1.5 million in transaction-related expenses that were recorded for the BioDiscovery acquisition. The increase in accounting fees was primarily due to SOX compliance efforts and accounting for the BioDiscovery transaction while the increase in annual meeting expense is tied to the increase in the number of Bionano shareholders.

We expect selling, general, and administrative expenses to increase in 2022 due to our continuing investment in growing and supporting our customer base. We expect stock based compensation to drive a significant portion of the increase in expense in 2022 due to stock option awards issued to senior-level Q4 2021 hires as well as awards annual refresher grants issued to executives and non-executives in February 2022.

Interest Expense

Interest expense decreased by $1.6 million, or 63%, to $0.9 million for the year ended December 31, 2021, as compared to $2.5 million for the same period in 2020. In May 2021, we paid off the outstanding principal balance of the Company's March 2019 Loan and Security Agreement ("Innovatus LSA"). The Innovatus LSA was outstanding for all of 2020.

Interest Income

Interest income was $0.2 million, for the year ended December 31, 2021, as compared to $0.0 million for the same period in 2020 resulting from positive returns on investments. Our total available-for-sale securities balance was $226.0 million as of December 31, 2021.

Gain on forgiveness of Paycheck Protection Program loan

A gain on forgiveness of our Paycheck Protection Program loan, or PPP Loan, of $1.8 million was recognized during the year ended December 31, 2021 in connection with the forgiveness of the PPP Loan, including all accrued interest in full.

Loss on debt extinguishment

A loss on debt extinguishment of $2.1 million was recognized during the year ended December 31, 2021 in connection with our payment in full of the Innovatus LSA, including all accrued interest, an end of term fee, a prepayment fee, and write-off of unamortized debt issuance costs

Income tax benefit (expense)

Income tax benefit increased by $5.7 million, or 19,814%, to a $5.7 million benefit for the year ended December 31, 2021, as compared to a $29,000 expense for the same period in 2020, driven by the acquisition of BioDiscovery. As a result of the acquisition, we recorded a $5.8 million deferred tax liability related to customer lists, patents/trademarks, developed technology, and fixed assets as part of the business combination which reduced the Company's valuation allowance by $5.8 million, resulting in an income tax benefit for the period.

Liquidity and Capital Resources

Since our inception, we have incurred net losses and negative cash flows from operations. We incurred net losses of $72.4 million and $41.1 million, and used $71.9 million and $38.3 million of cash from our operating activities for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021, we had an accumulated deficit of $216.1 million, cash and cash equivalents of $24.6 million and $226.0 million in available-for-sale securities.

Sources of Liquidity

In the years ended December 31, 2021 and 2020, we have generated cash flows from sales of common stock and other equity instruments. Additionally, during the year ended December 31, 2020, we relied on debt as a source of liquidity. We anticipate that future sources of liquidity will principally come from sales of common stock and other equity instruments, borrowings from credit facilities and revenue from our commercial operations. Revenue from our commercial operations has increased due to our acquisition of revenue-positive BioDiscovery. See Note 10 to our consolidated financial statements for a discussion of our recent equity activity and Note 9 to our consolidated financial statements for a discussion of terms and provisions of our debt included in this Annual Report.

Future Capital Requirements

We expect that our near and longer-term liquidity requirements will consist of working capital and general corporate expenses associated with the growth of our business, including, without limitation, expenses associated with scaling up our operations and continuing to increase our manufacturing capacity, sales and marketing expense, increasing market awareness of our products and services to target customers, instrument placements with customers via the reagent rental sales strategy, additional research and development expenses associated with expanding our offerings, expenses associated with continuing to build out our corporate infrastructure and expenses associated with being a public company. Our short-term capital expenditure needs relate primarily to the ongoing build out of our manufacturing and research facilities, service lab and service-related capabilities, research and development expenses related to current and future product offerings, and enhancements to information technology. We expect such expenditures to continue throughout 2022.

Cash Flows

We derive cash flows from operations primarily from the sale of our products and services. Our cash flows from operating activities are also significantly influenced by our use of cash for operating expenses to support the growth of our business. We have historically experienced negative cash flows from operating activities as we have developed our technology, expanded our business and built our infrastructure and this may continue in the future. The following table sets forth the cash flow from operating, investing and financing activities for the periods presented:

	Years Ended December 31,	
	2021	2020
Net cash provided by (used in):		
Operating activities	$ (71,927,000)	$ (38,314,000)
Investing activities	(278,062,000)	(2,450,000)
Financing activities	336,111,000	61,902,000

Operating Activities

2021 Compared to 2020

Net cash used in operating activities was $71.9 million during the year ended December 31, 2021 as compared to $38.3 million during the year ended December 31, 2020. The increase in cash used in operating activities of $33.6 million is attributed to increased headcount of 103% across the business, increased professional fees to support ongoing business operations and increase our international presence, increased spending on materials and supplies, as well as $1.5 million in acquisition-related transaction costs, including financial advisor fees, legal expenses and accounting fees during the year ended December 31, 2021. We anticipate our use of cash in operating activities to increase in the next 12 to 24 months due to anticipated increases in headcount and ongoing support of our growing operations, including, R&D operations. As discussed below, we anticipate our available cash balance will be sufficient to fund those increases in cash used in operating activities through at least the next 12 months, but we may consider funding those increases or increases beyond the next 12 months with the methods discussed in the section below entitled “Capital Resources.”

Investing Activities

2021 Compared to 2020

Historically, our primary investing activities have consisted of capital expenditures for the purchase of capital equipment to support our expanding infrastructure, as well as the acquisitions of Lineagen and BioDiscovery to grow our business. We

expect to continue to incur additional costs for capital expenditures related to these efforts in future periods. Net cash used in investing activities was $278.1 million during the year ended December 31, 2021, compared to $2.5 million during the year ended December 31, 2020. This increase in cash used in investment activities of $275.6 million is attributed to the acquisition of BioDiscovery, our new wholly owned subsidiary, as well as purchases of available-for-sale investment securities.

Financing Activities

2021 Compared to 2020

Net cash provided by financing activities was $336.1 million during the year ended December 31, 2021 as compared to $61.9 million during the year ended December 31, 2020, an increase of $274.2 million. During the year ended December 31, 2021, we raised approximately $311.1 million in net proceeds from executing two follow-on offerings, $10.0 million from warrant and stock option exercises, and $29.9 million in sales under our at-the-market facilities with Landenburg Thalmann & Co. Inc., or Landenburg, and Cowen and Company, LLC, or Cowen. These proceeds were offset by our repayment in full of all outstanding amounts under our Innovatus LSA of $15.0 million, including all accrued interest, the end of term fee, and a prepayment fee.

Capital Resources

As of December 31, 2021, we had approximately $24.6 million in cash and cash equivalents, $226.0 million of available-for-sale securities, and $250.6 million of working capital.

During the fourth quarter of 2020, we sold 27.0 million shares of our common stock under our prior at-the-market facility at an average share price of $0.82, and received gross proceeds of approximately $22.1 million before deducting offering costs of $0.6 million. In January 2021, we sold an additional 6.3 million shares of our common stock under the such prior at-the-market facility at an average share price of $2.68, and received gross proceeds of approximately $16.9 million before deducting offering costs of $0.4 million. This at-the-market facility was terminated effective March 22, 2021 and replaced by an ATM with Cowen and Company, LLC, or the Cowen ATM.

On January 12, 2021, we completed an underwritten public offering of 33.4 million shares of our common stock, including 4.4 million shares of our common stock sold pursuant to the underwriters' exercise in full of their option to purchase additional shares. The price to the public in the offering was $3.05 per share and the underwriters purchased the shares from us pursuant to the underwriting agreement at a price of $2.867 per share. The gross proceeds to us were approximately $101.8 million before deducting underwriting discounts and commissions and other offering expenses.

On January 19, 2021, we filed an automatically effective shelf registration statement on Form S-3 (File No. 333-252216) with the U.S. Securities and Exchange Commission, or SEC, as a “well-known seasoned issuer.” The registration statement allows us to issue an indeterminate number or amount of common stock, preferred stock, debt securities and warrants from time to time in one or more offerings. However, there can be no assurance that we will complete any future offerings of securities. Any future offerings under this registration statement will be dependent upon, among other factors, market conditions, available pricing, our financial condition, investor perception of our prospects, our capital needs and our ability to maintain status as a well-known seasoned issuer.

On January 25, 2021, we completed an underwritten public offering pursuant to our shelf registration statement of 38.3 million shares of our common stock, including 5.0 million shares of our common stock sold pursuant to the underwriters’ exercise in full of their option to purchase additional shares. The price to the public in the offering was $6.00 per share and the underwriters purchased the shares from us pursuant to the underwriting agreement at a price of $5.64 per share. The gross proceeds to us were approximately $230.0 million before deducting underwriting discounts and commissions and other offering expenses.

On March 23, 2021, we entered into a Sales Agreement with Cowen and Company, LLC, or the Cowen ATM, or Cowen, pursuant to which we may offer and sell, from time to time at our sole discretion, shares of our common stock having an aggregate offering price of up to $350.0 million, through or to Cowen, acting as sales agent or principal. In the third quarter of 2021, the Company sold 2.3 million shares of common stock under the Cowen ATM at an average share price of $6.15 per share, and received gross proceeds of approximately $13.9 million before deducting offering costs of $0.6 million.

We believe that our cash, cash equivalents, and available for sale securities will be sufficient to fund our planned operations, obligations as they become due, and capital investments for at least the next twelve months. This estimate is based on our current business plan. This estimate does not reflect any additional expenditures resulting from potential acquisitions or strategic transactions. We have based these estimates on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. See Note 1 to our consolidated financial statements included elsewhere in this Annual Report for more information.

Contractual Obligations

The following table summarizes our future cash outflows for contractual obligations as of December 31, 2021.

	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 years
Operating lease obligations, including interest	$ 8,162,000	$ 1,881,000	$ 3,961,000	$ 2,320,000	$ —
Finance lease obligations, including interest, related party	7,599,000	314,000	652,000	684,000	5,949,000
Purchase obligations	6,480,000	3,240,000	1,350,000	—	—
Total contractual obligations	$ 22,241,000	$ 5,435,000	$ 5,963,000	$ 3,004,000	$ 5,949,000

Operating lease obligations relate to our office, laboratory and manufacturing space for our corporate headquarters in San Diego, California and Lineagen operations in Salt Lake City, Utah. Finance lease obligations relate to our BioDiscovery office in El Segundo, California. See Note 11, Commitments and Contingencies to our consolidated financial statements included in this Annual Report.

Purchase obligations primarily represent commitments for purchases of inventory from our supplier as disclosed in Note 11, Commitments and Contingencies to our consolidated financial statements included in this Annual Report.

Critical Accounting Policies and Estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with generally accepted accounting principles in the United States. These accounting principles require us to make certain estimates, judgments and assumptions that affect the reported amounts of assets and liabilities as of the date of the financial statements, as well as the reported amounts of revenues and expenses during the periods presented. We believe that the estimates, judgments and assumptions are reasonable based upon information available to us at the time that these estimates, judgments and assumptions are made. To the extent there are material differences between these estimates, judgments or assumptions and actual results, our financial statements will be affected. Historically, revisions to our estimates have not resulted in a material change to our financial statements. While our significant accounting policies are more fully described in Note 2 to our consolidated financial statements appearing elsewhere in this Annual Report, the significant accounting estimates that we believe are important to aid in fully understanding and evaluating our reported financial results include the following:

Stock-Based Compensation Expense

We recognize compensation expense for employees based on an estimated grant date fair value using the Black-Scholes option-pricing method. We have elected to account for forfeitures as they occur.

The inputs for the Black-Scholes valuation model require management's significant assumptions. The common share price was determined by using the quoted price on the grant date. The risk-free interest rates were based on the rate for U.S. Treasury securities at the date of grant with maturity dates approximately equal to the expected life at the grant date. The expected life was based on the simplified method in accordance with the SEC Staff Accounting Bulletin Nos. 107 and 110. The expected volatility was estimated based on historical volatility information of peer companies that are publicly available. Our expected dividend yield assumption is zero as we have never paid dividends and have no present intention to do so in the future.

Goodwill

We review goodwill annually at the reporting unit level at the same time every year or when an event occurs or circumstances change such that it is reasonably possible that an impairment may exist. We have established December 31 as the annual impairment test date. We first make a qualitative assessment as to whether goodwill is impaired and if it is more likely than not that goodwill is impaired, we perform a quantitative impairment analysis to determine if goodwill is impaired. We may also determine to skip the qualitative assessment in any year and move directly to the quantitative test. For the quantitative test, we determine the fair value of the reporting unit, then compare the fair value of the reporting unit to its carrying value. Goodwill impairment is recorded for any excess of a reporting unit's carrying amount over its fair value, not to exceed the total amount of goodwill allocated to the reporting unit. The determination of fair value requires a number of significant assumptions and judgments, including assumptions about future economic conditions, revenue growth, operating margins, and discount rates.

We have determined that the Company is a single reporting unit for purposes of goodwill impairment testing. As of December 31, 2021, we performed a qualitative assessment of goodwill impairment which included an evaluation of changes in industry, market and macroeconomic conditions as well as consideration of our financial performance and any significant trends. Our qualitative assessment indicated that it was not more likely that not that goodwill is impaired. No impairments of goodwill were reported during the years ended December 31, 2021 and 2020.

Business Combinations

We apply the provisions of ASC 805, Business Combinations, in accounting for acquisitions. It requires us to recognize separately from goodwill the identifiable assets acquired and the liabilities assumed at the acquisition date fair values. Goodwill as of the acquisition date is measured as the excess of consideration transferred over the net of the acquisition date fair values of the identifiable assets acquired and the liabilities assumed. While we use our best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as any contingent consideration, where applicable, our estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which may be up to one year from the acquisition date, we may record adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are required to be recorded to our consolidated statements of operations.

Accounting for business combinations requires management to make significant estimates and assumptions, especially at the acquisition date, including estimates for intangible assets, contractual obligations assumed, pre-acquisition contingencies and any contingent consideration, where applicable. Although we believe that the assumptions and estimates we have made in the past have been reasonable and appropriate, they are based in part on historical experience and information obtained from management of the acquired company and are inherently uncertain.

We generally use the income approach to derive the fair value of the above identified intangible assets when accounting for business combinations. This approach calculates fair value by estimating future cash flows attributable to the assets and then discounting these cash flows to a present value using a risk-adjusted discount rate. We selected this method because we believe the income approach most appropriately measures the value of our income producing assets. This approach requires significant management judgment with respect to future volume, revenue and expense growth rates, changes in working capital use, appropriate discount rates, terminal values and other assumptions and estimates. The estimates and assumptions used are consistent with our business plans. The use of alternative estimates and assumptions could increase or decrease the estimated fair value of the asset. Actual results may differ from management's estimates.

We record contingent consideration resulting from a business combination at its fair value on the acquisition date. On a quarterly basis, we revalue this obligation and record any increase or decrease in fair value as an adjustment to the consolidated statement of operations. Changes to the fair value of the contingent consideration obligation may result from changes to the discount rate, the passage of time, or changes in our estimate of the likelihood or timing of achieving the criteria for payment of the contingent consideration. Significant judgment is employed in determining the appropriateness of these assumptions as of the acquisition date and for each subsequent reporting period. Accordingly, changes in the assumptions described above could have a material impact on the amount of income or expense we record for contingent consideration in any given period.

Recent Accounting Pronouncements

Refer to Note 2, ''Summary of Significant Accounting Policies,'' in the accompanying notes to our consolidated financial statements included in this Annual Report for a discussion of recent accounting pronouncements.

JOBS Act Accounting Election

Previously, we were an emerging growth company within the meaning of the JOBS Act. Section 107(b) of the JOBS Act provides that an emerging growth company can leverage the extended transition period, provided in Section 102(b) of the JOBS Act, for complying with new or revised accounting standards. However, because the market value of our common stock held by non-affiliates exceeded $700.0 million as of June 30, 2021, we are no longer an emerging growth company effective December 31, 2021. As a result, we now apply public company adoption dates for new or revised accounting standards. Further, we were required to comply with the auditor attestation requirements of Section 404(b) of Sarbanes-Oxley regarding our internal control over financial reporting as of December 31, 2021.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not applicable.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Index to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

Stockholders and Board of Directors

Bionano Genomics, Inc.

San Diego, California

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Bionano Genomics, Inc. (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations, stockholders' equity, and cash flows for the years then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") and our report dated March 1, 2022 expressed an unqualified opinion thereon.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for leases in 2021 due to the adoption of Accounting Standards Codification Topic 842, Leases.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audit. 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 consolidated financial statements are free of material misstatement, whether due to error or fraud.

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

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) 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 separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Acquisition of BioDiscovery, LLC.

As described in Note 14 to the Company's consolidated financial statements, the Company acquired 100% of BioDiscovery, LLC. for a purchase price of $74.8 million. As a result of the acquisition, management was required to determine estimated fair values of the assets acquired, including certain identifiable intangible assets, and liabilities assumed.

We identified the determination of fair values of the identifiable intangible assets as a critical audit matter. Management applied significant judgment in determining the unobservable inputs including revenue and expense forecasts and discount rates utilized. Auditing these elements involved especially challenging auditor judgment due to the nature and extent of audit effort required to address these matters, including the extent of specialized skill or knowledge needed.

The primary procedures we performed to address this critical audit matter included:

- Assessing the reasonableness of the revenue and expense forecasts through: (i) evaluating historical performance of the target entity, and (ii) assessing financial projections against industry metrics and peer-group companies.
- Testing samples of opening balance sheet amounts by tracing to supporting documentation, including evaluating that the transactions were recorded in the appropriate period.
- Utilizing personnel with specialized knowledge and skill in valuation to assist in: (i) assessing the reasonableness of the discount rates incorporated into the various valuation models, and (ii) performing independent estimates to evaluate the potential effect of changes in the significant assumptions.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2020.

San Diego, CA

March 1, 2022

BIONANO GENOMICS, INC.
Consolidated Balance Sheets

	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 24,571,000	$ 38,449,000
Investments	226,041,000	—
Accounts receivable, net of allowance for doubtful accounts of $690,000 and $2,119,000 as of December 31, 2021 and 2020, respectively	4,934,000	2,775,000
Inventory	12,387,000	3,315,000
Prepaid expenses and other current assets	4,481,000	2,250,000
Total current assets	272,414,000	46,789,000
Property and equipment, net	10,318,000	4,910,000
Operating lease right-of-use assets	6,691,000	—
Finance lease right-of-use assets, related party	3,926,000	—
Intangible assets, net	26,842,000	1,475,000
Goodwill	56,160,000	7,173,000
Other long-term assets	749,000	103,000
Total assets	$ 377,100,000	$ 60,450,000
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 9,696,000	$ 2,930,000
Accrued expenses	9,694,000	5,599,000
Contract liabilities	684,000	416,000
Operating lease liability	1,467,000	—
Finance lease liability, related party	299,000	—
Total current liabilities	21,840,000	8,945,000
Operating lease liability, net of current portion	5,288,000	—
Finance lease liability, net of current portion, related party	3,642,000	—
Contingent consideration	9,066,000	—
Long-term debt, net of current portion	—	16,325,000
Long-term contract liabilities	146,000	98,000
Total liabilities	$ 39,982,000	$ 25,368,000
Commitments and contingencies (Note 11)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 10,000,000 shares authorized and no shares issued or outstanding as of December 31, 2021 and 2020	—	—
Common stock, $0.0001 par value, 400,000,000 shares authorized at December 31, 2021 and 2020; 289,602,000 and 189,953,000 shares issued and outstanding at December 31, 2021 and 2020, respectively	29,000	19,000
Additional paid-in capital	553,747,000	178,747,000
Accumulated deficit	(216,119,000)	(143,684,000)
Accumulated other comprehensive loss	(539,000)	—
Total stockholders' equity	337,118,000	35,082,000
Total liabilities and stockholders' equity	$ 377,100,000	$ 60,450,000

See accompanying notes to the consolidated financial statements.

BIONANO GENOMICS, INC.
Consolidated Statements of Operations

	Years Ended December 31,	
	2021	2020
Revenue:		
Product revenue	$ 11,695,000	$ 6,230,000
Service and other revenue	6,286,000	2,273,000
Total revenue	17,981,000	8,503,000
Cost of revenue:		
Cost of product revenue	10,524,000	4,810,000
Cost of service and other revenue	3,583,000	920,000
Total cost of revenue	14,107,000	5,730,000
Operating expenses:		
Research and development	22,485,000	10,256,000
Selling, general and administrative	58,490,000	31,068,000
Total operating expenses	80,975,000	41,324,000
Loss from operations	(77,101,000)	(38,551,000)
Other expenses		
Interest income	236,000	—
Interest expense	(927,000)	(2,519,000)
Gain on forgiveness of Paycheck Protection Program Loan	1,775,000	—
Loss on debt extinguishment	(2,076,000)	—
Other income (expenses)	(59,000)	(7,000)
Total other income (expense)	(1,051,000)	(2,526,000)
Loss before income taxes	(78,152,000)	(41,077,000)
Benefit (provision) for income taxes	5,717,000	(29,000)
Net loss	$ (72,435,000)	$ (41,106,000)
Net loss per share, basic and diluted	$ (0.26)	$ (0.39)
Weighted-average common shares outstanding, basic and diluted	276,782,000	104,251,000

See accompanying notes to the consolidated financial statements.

BIONANO GENOMICS, INC.
Consolidated Statements of Comprehensive Loss

	Years Ended December 31,	
	2021	2020
Net Loss:	$ (72,435,000)	$ (41,106,000)
Unrealized (loss) on investment securities	(539,000)	—
Comprehensive Loss	$ (72,974,000)	$ (41,106,000)

See accompanying notes to the consolidated financial statements.

BIONANO GENOMICS, INC.

Consolidated Statements of Stockholders' Equity (Deficit)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance at January 1, 2020	34,274,000	$ 3,000	$ 106,188,000	$ (102,578,000)	$ —	$ 3,613,000
Stock option exercises	1,000	—	1,000	—	—	1,000
Stock-based compensation expense	—	—	1,554,000	—	—	1,554,000
Issue common stock, net of issuance costs	43,921,000	5,000	37,930,000	—	—	37,935,000
Issue stock for employee stock purchase plan	88,000	—	40,000	—	—	40,000
Issue stock for covenant waiver	873,000	—	300,000	—	—	300,000
Issue stock for warrant exercises	104,628,000	10,000	28,635,000	—	—	28,645,000
Issue stock for acquisition	6,168,000	1,000	4,099,000	—	—	4,100,000
Net loss	—	—	—	(41,106,000)	—	(41,106,000)
Balance at December 31, 2020	189,953,000	$ 19,000	$ 178,747,000	$ (143,684,000)	$ —	$ 35,082,000
Stock option exercises	479,000	—	602,000	—	—	602,000
Stock-based compensation expense	—	—	9,719,000	—	—	9,719,000
Issue common stock, net of issuance costs	80,178,000	8,000	341,015,000	—	—	341,023,000
Issue stock for warrant exercises	10,794,000	1,000	9,417,000	—	—	9,418,000
Issue stock for employee stock purchase plan	300,000	—	89,000	—	—	89,000
Issuance of common stock due to the vesting of restricted stock units, net of shares withheld to cover taxes	169,000	—	—	—	—	—
Issue stock for acquisition	7,729,000	1,000	14,158,000	—	—	14,159,000
Net loss	—	—	—	(72,435,000)	—	(72,435,000)
Other comprehensive loss	—	—	—	—	(539,000)	(539,000)
Balance at December 31, 2021	289,602,000	$ 29,000	$ 553,747,000	$ (216,119,000)	$ (539,000)	$ 337,118,000

See accompanying notes to the consolidated financial statements.

BIONANO GENOMICS, INC
Consolidated Statements of Cash Flows

	Years Ended December 31,	
	2021	2020
Operating activities:		
Net loss	$ (72,435,000)	$ (41,106,000)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization expense	3,351,000	1,479,000
Amortization of financing lease right-of-use asset	19,000	—
Amortization of interest on securities	329,000	—
Non-cash interest expense	205,000	1,264,000
Non-cash lease expense	671,000	—
Settlement of interest on debt	(1,235,000)	—
Benefit from deferred income taxes	(5,777,000)	—
Stock-based compensation	9,719,000	1,554,000
Provision for bad debt expense	—	1,809,000
Gain on forgiveness of PPP Loan	(1,775,000)	—
Inventory impairment	—	126,000
Loss on debt extinguishment	1,480,000	—
Cost of leased equipment sold to customer	568,000	—
Client warranty exchange of fixed asset	539,000	—
Change in fair value of contingent consideration	66,000	—
Changes in operating assets and liabilities (net of assets acquired and liabilities assumed in acquisition)		
Accounts receivable	(493,000)	2,087,000
Inventory	(15,928,000)	(4,201,000)
Prepaid expenses and other current assets	(1,971,000)	(999,000)
Accounts payable	6,781,000	(1,810,000)
Accrued expenses and contract liabilities	3,959,000	1,483,000
Net cash used in operating activities	(71,927,000)	(38,314,000)
Investing activities:		
Lineagen acquisition, net of cash acquired	—	(2,450,000)
BioDiscovery acquisition, net of cash acquired	(49,086,000)	—
Purchases of property and equipment	(822,000)	—
Construction in process	(638,000)	—
Payment of initial direct costs on lease	(607,000)	—
Purchase of available for sale securities	(313,392,000)	—
Sale and maturities of available for sale securities	86,483,000	—
Net cash used in investing activities	(278,062,000)	(2,450,000)
Financing activities:		
Repayment of term-loan debt	(15,000,000)	(5,000,000)
Principal payments of financing lease liability	(5,000)	—
Proceeds from PPP Loan	—	1,774,000
Proceeds from borrowing from line of credit	—	761,000
Repayments of borrowing from line of credit	—	(2,258,000)
Proceeds from sale of common stock	342,711,000	39,934,000
Offering expenses on sale of common stock	(1,704,000)	(2,000,000)
Proceeds from sale of common stock under employee stock purchase plan	89,000	40,000
Proceeds from warrant and option exercises	10,020,000	28,651,000
Net cash provided by financing activities	336,111,000	61,902,000
Net increase (decrease) in cash and cash equivalents	(13,878,000)	21,138,000
Cash and cash equivalents at beginning of period	38,449,000	17,311,000
Cash and cash equivalents at end of period	$ 24,571,000	$ 38,449,000

	Years Ended December 31,	
	2021	2020
Supplemental disclosure of cash flow information		
Cash paid for interest	$ 1,910,000	$ 1,252,000
Cash paid for operating lease liabilities	$ 447,000	$ —
Supplemental disclosure of non-cash financing and investing activity		
Fair value of common stock issued related to Lineagen acquisition	$ —	$ 4,100,000
Fair value of common stock issued related to BioDiscovery acquisition	$ 14,159,000	$ —
Contingent consideration related to BioDiscovery acquisition	$ 9,000,000	$ —
Operating lease liabilities resulting from obtaining and modifying right-of-use assets	$ 4,751,000	$ —
Transfer of instruments and servers from inventory into property and equipment, net	$ 6,857,000	$ 4,224,000
Forgiveness of PPP Loan	$ 1,775,000	$ —
Stock issued for services	$ 15,000	$ —
Issue stock for covenant waiver	$ —	$ 300,000
Warrant exercise pursuant to cashless exercise	$ 129,000	$ —

See accompanying notes to the consolidated financial statements.

BIONANO GENOMICS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Organization and Operations

Description of Business

Bionano Genomics, Inc. (collectively, with its consolidated subsidiaries, the "Company") is a provider of genome analysis solutions that can enable researchers and clinicians to reveal answers to challenging questions in biology and medicine. The Company's mission is to transform the way the world sees the genome through optical genome mapping ("OGM") solutions, diagnostic services and software. The Company offers OGM solutions for applications across basic, translational and clinical research. Through its Lineagen, Inc. ("Lineagen") business, the Company also provides diagnostic testing for patients with clinical presentations consistent with autism spectrum disorder and other neurodevelopmental disabilities. Through its BioDiscovery, LLC. ("BioDiscovery") business, the Company also offers an industry-leading, platform-agnostic software solution, which integrates next-generation sequencing and microarray data designed to provide analysis, visualization, interpretation and reporting of copy number variants, single-nucleotide variants and absence of heterozygosity across the genome in one consolidated view.

Liquidity

As of December 31, 2021, the Company had approximately $24.6 million in cash and cash equivalents, $226.0 million in short term investments, and working capital of $250.6 million as a result of common stock offerings executed in the quarters ended December 31, 2020, March 31, 2021, and September 30, 2021. In February 2021, we applied for forgiveness of our PPP Loan of approximately $1.8 million, and in March 2021, the PPP Loan, including all accrued interest, was forgiven in full. During the year ended December 31, 2021, the outstanding term loan under the Innovatus LSA was paid in full, including all accrued interest, an end of term fee, and a prepayment fee for a total of $17.0 million.

The Company believes its available cash, cash equivalents and available-for-sale securities will be sufficient to fund operations, obligations as they become due and capital investments for at least the next twelve months. However, the Company expects to continue to incur net losses for the foreseeable future. The Company plans to continue to fund its losses from operations and capital funding needs through a combination of equity offerings, debt financings or other sources, including potential collaborations, licenses and other similar arrangements. If the Company is not able to secure adequate additional funding, the Company may be forced to make reductions in spending, potentially harming the Company's business.

COVID-19

The Company is subject to additional risks and uncertainties as a result of the continued spread of COVID-19 and uncertain market conditions, which could continue to have a material impact on the Company's business and financial results. The Company closely monitors and complies with various applicable guidelines and legal requirements in the jurisdictions in which it operates, which may continue to result in reduced business operations in response to new or existing stay-at-home orders, travel restrictions and other social distancing measures. If restrictions related to COVID-19 persist, the Company could see supply chain disruptions that impact its ability to produce its products and may cause the Company to make strategic determinations regarding, among other things, the cost and quality of the components and supplies it acquires. The Company's manufacturing partners, suppliers, and customers, have implemented similar operational reductions. Despite reporting an increase in revenue for the year ended December 31, 2021 when compared to the same period in 2020, the Company believes travel restrictions and overall reduced activity had a continued negative impact on the Company's financial results. Given the continued evolution of the COVID-19 pandemic and the related complexities and uncertainties associated with the additional variants, the future effects of COVID-19 are unknown and the Company's financial results may continue to be negatively affected in the future.

There may be long-term negative effects of the COVID-19 pandemic, even after it has subsided. Specifically, product demand may be reduced due to an economic recession, a decrease in corporate capital expenditures, prolonged unemployment, reduction in consumer confidence, or any similar negative economic condition. These negative effects could have a material impact on the Company's operations, business, earnings, and liquidity.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles ("U.S. GAAP") requires management to make significant estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Significant estimates and assumptions used by management include estimates of selling prices for multiple performance obligation arrangements, expected future cash flows including growth rates, discount rates, terminal values and other assumptions and estimates used in purchase accounting and to evaluate the recoverability of long-

lived assets and goodwill, warranty reserves, certain accrued expenses, contingent liabilities, tax reserves, deferred tax rates and recoverability of the Company's net deferred tax assets, stock-based compensation expense, and related valuation allowances. Although the Company regularly assesses these estimates, actual results could differ materially from these estimates. Changes in estimates are recorded in the period in which they become known. The Company bases its estimates on historical experience and various other assumptions that it believes to be reasonable under the circumstances.

Basis of Presentation

The consolidated financial statements are prepared in accordance with U.S. GAAP and include the accounts of the Company's 100%-owned subsidiaries. All intercompany transactions and balances have been eliminated in consolidation.

Business Combinations

In August 2020, Alta Merger Sub, Inc., a wholly owned subsidiary of the Company ("Lineagen Merger Sub"), Lineagen, a Delaware corporation, and Michael S. Paul, Ph.D., solely in his capacity as exclusive agent and attorney-in-fact of the securityholders of Lineagen, entered into an Agreement and Plan of Merger (the "Lineagen Merger Agreement"). Pursuant to the terms and conditions of the Lineagen Merger Agreement, Lineagen Merger Sub merged with and into Lineagen (the "Lineagen Merger") whereupon the separate corporate existence of Lineagen Merger Sub ceased, with Lineagen continuing as the surviving corporation of the Lineagen Merger as a wholly owned subsidiary of the Company.

In October 2021, Starship Merger Sub I, Inc., a wholly owned subsidiary of the Company ("BioDiscovery Merger Sub I"), Starship Merger Sub II, LLC, a California limited liability company ("BioDiscovery Merger Sub II"), BioDiscovery, Inc., a California corporation ("Former BioDiscovery"), and Soheil Shams, solely in his capacity as the securityholders' representative, entered into an Agreement and Plan of Merger (the "BioDiscovery Merger Agreement"), pursuant to which the Company agreed to acquire Former BioDiscovery. Pursuant to the terms and conditions of the BioDiscovery Merger Agreement, BioDiscovery Merger Sub I merged with and into Former BioDiscovery ("BioDiscovery Merger I"), whereupon the separate corporate existence of BioDiscovery Merger Sub I ceased, with Former BioDiscovery continuing as the surviving corporation of BioDiscovery Merger I and a wholly owned subsidiary of the Company. Immediately after BioDiscovery Merger I, pursuant to the terms and conditions of the BioDiscovery Merger Agreement, Former BioDiscovery merged with and into BioDiscovery Merger Sub II ("BioDiscovery Merger II"), whereupon the separate corporate existence of Former BioDiscovery ceased, with BioDiscovery Merger Sub II continuing as the surviving company of BioDiscovery Merger II and a wholly owned subsidiary of the Company. Concurrent with BioDiscovery Merger II, BioDiscovery Merger Sub II changed its name to that of our current subsidiary, BioDiscovery, LLC.

The Company accounted for its acquisitions of Lineagen and BioDiscovery using the acquisition method of accounting pursuant to Accounting Standards Codification Topic 805, Business Combinations ("ASC 805"). Under ASC 805, the tangible and identifiable intangible assets acquired and liabilities assumed in a business combination are recorded based on their estimated fair values as of the acquisition date. Any excess purchase price over the estimated fair value assigned to the tangible and identifiable intangible assets acquired and liabilities assumed is recorded to goodwill.

The Company estimated the fair value of identifiable intangible assets acquired with the assistance of independent valuations that use information and assumptions provided by the Company's management.

Under ASC 805, acquisition-related transaction costs (such as advisory, legal, valuation, other professional fees) are expensed in the statements of operations in the periods incurred.

Cash and Cash Equivalents

The Company considers all highly liquid investments with an original maturity of three months or less at the date of purchase to be cash equivalents. Cash equivalents primarily represent funds invested in readily available money market accounts. The Company has not experienced any losses in such accounts. The Company believes that it is not exposed to any significant credit risk on cash and cash equivalents.

Fair Value Measurements

The Company measures certain financial assets and liabilities at fair value on a recurring basis. Fair value is the price the Company would receive to sell an asset or pay to transfer a liability in an orderly transaction with a market participant at the measurement date.

ASC 820, "Fair Value Measurements and Disclosures", defines and establishes a framework for measuring fair value and expands disclosures about fair value measurements. In accordance with ASC 820, the Company has categorized its financial assets and liabilities, based on the priority of the inputs to the valuation technique, into a three-level fair value hierarchy as set forth below.

> *Level 1* – Assets and liabilities whose values are based on unadjusted quoted prices for identical assets or liabilities in an active market that the company has the ability to access at the measurement date.

Level 2 – Assets and liabilities whose values are based on quoted prices for similar attributes in active markets; quoted prices in markets where trading occurs infrequently; and inputs other than quoted prices that are observable, either directly or indirectly, for substantially the full term of the asset or liability.

Level 3 – Assets and liabilities whose values are based on prices or valuation techniques that require inputs that are both unobservable and significant to the overall fair value measurement.

If the inputs used to measure the financial instruments fall within different levels of the hierarchy, the categorization is based on the lowest level input that is significant to the fair value measurement of the instrument.

Investment Securities

All investments have been classified as "available-for-sale" and are carried at fair value as determined based upon quoted market prices or pricing models for similar securities at period end. Investments with contractual maturities less than 12 months at the balance sheet date are considered short-term investments. Investments with contractual maturities beyond one year are also classified as short-term due to the Company's ability to liquidate the investment for use in operations within the next 12 months. Realized gains and losses on investment securities are included in earnings and are derived using the specific identification method for determining the cost of securities sold. The Company has not realized any significant gains or losses on sales of available-for-sale investment securities during any of the periods presented. As all the Company's investment holdings are in the form of debt securities, unrealized gains and losses that are determined to be temporary in nature are reported as a component of accumulated other comprehensive income (loss). A decline in the fair value of any security below cost that is deemed other than temporary results in a charge to earnings and the establishment of a new cost basis for the security. Interest income is recognized when earned, as are the amortization of purchase premiums and accretion of purchase discounts on investment securities.

Concentrations

Credit Risks

Financial instruments, which potentially subject the Company to significant concentration of credit risk, consist primarily of cash and cash equivalents and accounts receivable. The Company maintains deposits in federally insured major financial institutions in excess of federally insured limits. The Company has not experienced any losses in such accounts and management believes that the Company is not exposed to significant credit risk due to the financial position of the depository institution in which those deposits are held.

The Company's customers are located throughout the world. The Company generally does not require collateral from its customers. More information on accounts receivable is contained in the paragraph titled "Accounts Receivable" below.

Sources of Materials and Products

The materials and components for the Company's product offerings are currently obtained from single or limited sources. The Company competes with other companies for production capacity, therefore, the Company is exposed to a risk of inventory being unavailable at acceptable prices, or at all, if suppliers are unable (or decide) to provide sufficient levels of materials and components and the Company is unable to identify alternative suppliers.

Accounts Receivable

	December 31, 2021	December 31, 2020
Accounts receivable, net:		
Accounts receivable, trade	$ 5,624,000	$ 4,894,000
Less allowance for doubtful accounts	(690,000)	(2,119,000)
	$ 4,934,000	$ 2,775,000

The Company extends credit to its customers in the normal course of business. For diagnostic testing services, receivables are based on either contractual rates with third-party payors, plus the amounts expected to be collected for any patient-responsibility portion, or for non-contracted arrangements, using the amounts expected to be collected from third-party payors and/or the patient-customer based on historical collection experience. The Company does not perform credit evaluations and therefore subsequent adjustments to the amount expected to be collected are recorded to revenue.

For "OGM" products and services, credit is extended based upon an evaluation of each customer's credit history, financial condition, and other factors. Estimates of allowances for doubtful accounts are determined by evaluating individual customer circumstances, historical payment patterns, length of time past due, and economic and other factors. Bad debt expense is recorded as necessary to maintain an appropriate level of allowance for doubtful accounts in selling, general and administrative expense. During the year ended December 31, 2021, the Company recorded a recovery of bad debt expense of $108,000, which

is included in selling, general and administrative expenses. During the year ended December 31, 2020, the Company recorded bad debt expense of $1.8 million which was included in selling, general and administrative expenses. Amounts are charged to the allowance for doubtful accounts when collection efforts have been exhausted and are deemed uncollectible.

Accounts receivable is subject to concentration risk whenever a customer has a balance that meets or exceeds 10.0% of the Company's total accounts receivable balance. As of December 31, 2021, no customers met or exceeded 10% of the Company's total accounts receivable balance. As of December 31, 2020, two customer balances represented 27.4% of the Company's total accounts receivable balance.

Inventory

Inventory is stated at the lower of cost or net realizable value, on a first-in, first-out basis. Inventory includes raw materials and finished goods that may be used in the research and development process and such items are expensed as consumed or expired. Provisions for slow-moving, excess, and obsolete inventories are estimated based on product life cycles, historical experience, and usage forecasts.

The components of inventories, net of reserve, are as follows:

	December 31,	
	2021	2020
Raw materials	$ 745,000	$ 2,282,000
Finished goods	11,642,000	1,033,000
	$ 12,387,000	$ 3,315,000

Long-Lived Assets (including Finite-Lived Intangible Assets)

Long-lived assets consist of property and equipment and acquired finite-lived intangible assets. The Company records property and equipment at cost, and records acquired finite-lived intangible assets based on their fair values at the date of acquisition. Property and equipment generally consist of laboratory equipment, computer and office equipment, furniture and fixtures, and leasehold improvements. Property and equipment are recorded at cost and depreciated or amortized using the straight-line method over the estimated useful lives of the assets (generally three to five years, or the remaining term of the lease for leasehold improvements, whichever is shorter). Repairs and maintenance costs are charged to expense as incurred.

Intangible assets acquired in a business combination are recognized separately from goodwill and are initially recognized at their fair value at the acquisition date. Intangible assets are amortized over the estimated useful life of the asset on a basis that approximates the pattern of economic benefit. Intangible assets are reviewed for impairment if indicators of potential impairment exist. There was no indication of impairment of intangible assets for any of the periods presented.

As a result of the Lineagen and BioDiscovery acquisitions the Company recorded intangible assets, which consist of trade name intangibles, customer relationship intangibles, and a developed technology intangible, which are amortized on a straight-line basis over their estimated useful lives of five years. Straight-line amortization was determined to be materially consistent with the pattern of expected use of the intangible assets.

If the Company identifies a change in the circumstances related to its long-lived assets, such as property and equipment and intangible assets (other than goodwill), that indicates the carrying value of any such asset may not be recoverable, the Company will perform an impairment analysis. A long-lived asset (other than goodwill) is not recoverable when the undiscounted cash flows expected to be generated by the asset (or asset group) are less than the asset's carrying amount. Any required impairment loss would be measured as the amount by which the asset's carrying value exceeds its fair value, and would be recorded as a reduction in the carrying value of the related asset and a charge to operating expense.

During the years ended December 31, 2021 and 2020, the Company recognized no impairment losses on long-lived assets. Substantially all of the Company's long-lived assets are located in the U.S.

Contingent Consideration

We recorded contingent consideration resulting from a business combination at its fair value on the acquisition date. On a quarterly basis, we revalue this obligation and record any increase or decrease in fair value as an adjustment to the consolidated statement of operations. Changes to the fair value of the contingent consideration obligation may result from changes to the

discount rate, the passage of time, changes in our estimate of the likelihood, or timing of achieving the criteria for payment of the contingent consideration.

Goodwill

Goodwill arises when the purchase price of an acquired business exceeds the fair value of the identifiable net assets acquired, with such excess recorded as goodwill on the balance sheet. Goodwill is not subsequently amortized. Goodwill is reviewed for impairment annually (during the fourth quarter) or more frequently if indications of impairment exist. Goodwill is assigned to specific reporting units for purposes of impairment assessment. The Company has determined that it has a single operating segment and a single reporting unit.

In testing goodwill for impairment, the Company will first assess qualitative factors to determine whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount. If the qualitative assessment indicates that it is more likely than not that the fair value of the reporting unit is less than its carrying value, then the Company will perform a quantitative impairment analysis by comparing the fair value of the reporting unit to the carrying value of the reporting unit, including goodwill. An impairment charge for goodwill is recognized for the amount by which the carrying value of the reporting unit exceeds its fair value, not to exceed the total goodwill allocated to the reporting unit.

During the years ended December 31, 2021 and 2020, the Company recognized no impairment losses on goodwill.

Leases

Beginning in 2021, the Company determines if an arrangement is, or contains, a lease at the inception of the arrangement. Right-of-use (“ROU”) assets represent our right to use an underlying asset during the lease term, and lease liabilities represent our obligation to make lease payments arising from the lease. Operating leases are included in operating lease right-of-use assets and operating lease liabilities in the consolidated balance sheets, while finance leases are included in finance lease right-of-use assets and finance lease liabilities.

Lease assets and liabilities are recognized at commencement based on the present value of lease payments over the lease term. The Company generally uses its incremental borrowing rate based on the estimated rate of interest for collateralized borrowing over a similar term of the lease payments. The ROU assets also include any prepaid or accrued lease payments and is adjusted for lease incentives and initial direct costs.

Lease terms may include options to extend or terminate the lease which are recognized when it is reasonably certain that the Company will exercise that option. Leases with terms of 12 months or less are not recorded on the balance sheet. Lease expense is recognized on a straight-line basis over the lease terms, or in some cases, the useful life of the underlying asset. Variable lease payments are excluded from the measurement of ROU assets and lease liabilities and are recognized in the period in which the obligation for those payments is incurred. The Company accounts for the lease and non-lease components as a single lease component for all classes of underlying assets.

Deferred Rent

The Company’s operating leases include incentives in the form of rent abatements and leasehold improvement allowances, as well as fixed annual rent escalations. The Company recognizes the aggregate rental expense, after considering incentives and stipulated rent escalations, on a straight-line basis over the lease term. Prior to January 1, 2021, the difference between rent expense and amounts paid under the lease was recorded as deferred rent in the accompanying consolidated balance sheets.

Revenue Recognition

The Company generates revenue primarily from the sale of products and services. The Company considers revenue to be earned when all of the following criteria are met: the Company has a contract with a customer that creates enforceable rights and obligations; promised products or services are identified; the transaction price, or the amount the Company expects to receive, including an estimate of uncertain amounts subject to a constraint to ensure revenue is not recognized in an amount that would result in a significant reversal upon resolution of the uncertainty, is determinable; and the Company has transferred control of the promised items to the customer. A performance obligation is a promise in a contract to transfer a distinct good or service to the customer, and is the unit of account in the contract. The transaction price for the contract is measured as the amount of consideration the Company expects to receive in exchange for the goods and services expected to be transferred. A contract's transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, control of the distinct good or service is transferred.

The Company recognizes a receivable when we have an unconditional right to payment, which is generally at the time of delivery of software, consumables and instruments, including any extended warranties, or at the time services are rendered. Payment terms are typically 30 days for sales to customers in the United States but may be longer in international markets. The Company treats shipping and handling costs performed after a customer obtains control of the good as a fulfillment cost and records these costs within selling, general and administrative expenses, less any amounts reimbursed by the customer, when the corresponding revenue is recognized.

Revenue is recorded net of discounts and sales tax. The Company’s contracts typically do not provide for product returns or refunds. In general, estimates of variable consideration and constraints are not material to the Company’s financial statements. Employee sales commissions are recorded as selling, general and administrative expenses when incurred as the amortization period for such costs, if capitalized, would have been one year or less.

Product revenue recognition

Product revenue consists of sales of our Saphyr system and related consumables. These products are sold primarily through a direct sales force, and within international markets, there is more reliance on distributors. In addition, the Company provides the Saphyr system to certain customers under its reagent rental program, under which the Company provides Saphyr systems to customers at no cost and the customers agree to purchase minimum quantities of consumables.

Transfer of control for the Company's products is generally at shipment or delivery, depending on contractual terms, but occurs when title and risk of loss transfers to the customer which represents the point in time when the customer obtains control of the product. As such the Company's performance obligation related to product sales is satisfied at a point in time.

For transfers of instruments and consumables to customers under the Company's rental reagent program, the Company allocates the total contract consideration between the instrument and the consumables based on estimates of stand-alone selling prices, and recognizes the instrument revenue evenly over the rental period, and the consumables revenue when the consumables are delivered. Rental revenue related to the reagent rental program recognized over-time totaled $0.2 million and $0.1 million during the years ended December 31, 2021 and 2020, respectively.

Service and other revenue recognition

Service and other revenue primarily consist of revenue from diagnostic testing services, the sale of software, and license maintenance agreements, and support, repair and maintenance services and extended warranties on Saphyr systems.

Revenue from the completion of diagnostic testing services is initially recorded at the estimated consideration the Company expects to receive from contractual and non-contractual payors, and is subject to adjustment based on the amount actually collected. The Company performs its obligation under a contract with a customer by processing diagnostic tests and communicating the test results, which the Company has determined is the point at which control is transferred to the customer for revenue recognition purposes.

Revenue from the sale of software is recognized at the point-in-time the software license is transferred to the customer, or for hosting arrangements, on a usage basis as the customer processes the number of genetic samples purchased with the software. Revenue related to license maintenance agreements is recognized over-time based on the contract term. Revenue recognized over-time related to license maintenance agreements totaled $0.1 million during the year ended December 31, 2021. There was no revenue recognized related to license maintenance agreements during the year ended December 31, 2020.

Revenue from support and maintenance contracts and extended warranties is recognized over time based on the contract term, which represents a faithful depiction of the transfer of goods and services given the stand-ready nature of the performance obligations. Service revenue related to repairs and customer sample evaluations is recognized as the services are performed based on the specific nature of the service. Warranty and maintenance revenue recognized over-time totaled $0.6 million and $0.5 million during the years ended December 31, 2021 and 2020, respectively, which was included in service and other revenue.

Remaining Performance Obligations

As of December 31, 2021, the estimated revenue expected to be recognized in the future related to performance obligations that are unsatisfied was $0.8 million. These remaining performance obligations primarily relate to extended warranty and support and maintenance obligations, as well as obligations related to software under hosting arrangements. The Company expects to recognize approximately 82.4% of this amount as revenue in 2022, 13.8% in 2023, 2.3% in 2024 and 1.5% in 2025 and thereafter.

We periodically review the warranty reserve for adequacy and adjust the warranty accrual, if necessary, based on actual experience and estimated costs to be incurred. Warranty expense is recorded as a component of cost of product revenue. The Company's liability for product warranties provided under its agreements with customers was $0.2 million and $0.2 million as of December 31, 2021 and 2020, respectively. Warranty expense recorded in cost of goods sold totaled $0.5 million and $0.4 million during the years ended December 31, 2021 and 2020, respectively.

Contract Assets and Liabilities

Contract assets primarily relate to the Company’s conditional right to consideration for work completed but not billed at the reporting date. Contract assets at the beginning and end of the period, as well as the changes in the balance, were immaterial.

Contract liabilities primarily relate to payments received from customers in advance of performance under the contract. The Company records a contract liability, or deferred revenue, when it has an obligation to provide service, and to a much lesser

extent product, to the customer and payment is received or due in advance of performance. Deferred revenue primarily relates to support and maintenance contracts and extended warranty obligations. Contract liabilities are classified as other current liabilities and other long-term liabilities on the consolidated balance sheets. The Company recognized revenue of $0.4 million and $0.4 million during the years ended December 31, 2021 and 2020, respectively, which was included in the contract liability balance at the end of the previous year.

Distributor Transactions

In certain markets, the Company sells products and provides services to customers through distributors that specialize in life sciences products. In cases where the product is delivered to a distributor, revenue recognition generally occurs when the distributors obtains control of the product. The terms of sales transactions through distributors are generally consistent with the terms of direct sales to customers and do not contain return rights. Distributor sales transactions typically differ from direct customer sales as they do not require the Company's services to install the instrument at the end customer or perform the services for the customer that are beyond the standard warranty in the first year following the sale. These transactions are accounted for in accordance with the Company's revenue recognition policy described herein.

Cost of Revenue

Cost of revenue for products consists of the Company's raw material parts costs and associated freight, shipping and handling costs, contract manufacturing costs, royalties due to third parties, salaries and other personnel costs, equipment depreciation, overhead and other direct costs related to those sales recognized as product revenue in the period.

Cost of service and other revenue consists of salaries and other personnel costs, and facility costs associated with costs related to warranties and other costs of servicing equipment at customer sites, and performance of diagnostics services.

Research and Development Costs

Costs incurred for research and product development, including acquired technology and costs incurred for technology in the development stage, are expensed as incurred.

Patent Costs

Costs related to filing and pursuing patent applications are recorded as selling, general and administrative expense and expensed as incurred since recoverability of such expenditures is uncertain.

Stock-based Compensation

The Company issues stock-based awards as compensation to employees and directors. Stock-based awards may include stock options, stock appreciation rights, vesting stock awards and performance share awards. These awards are accounted for as equity awards. To-date, the Company recognizes stock-based compensation expense net of actual forfeitures on a straight-line basis over the underlying award's requisite service period, which is generally the vesting period, as measured using the award's grant date fair value.

Income Taxes

The Company accounts for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

The Company recognizes deferred tax assets to the extent that the Company believes these assets are more likely than not to be realized. In making such a determination, management considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. If management determines that the Company would be able to realize its deferred tax assets in the future in excess of their recorded amount, management would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes. Changes in the valuation allowance when they are recognized in the provision for income taxes may result in a change in the estimated annual effective tax rate.

The Company recognizes the impact of uncertain tax positions at the largest amount that is "more likely than not" to be sustained upon audit by the relevant taxing authority. An uncertain tax position will not be recognized if it does not have a greater than 50% likelihood of being sustained. The Company recognizes interest and penalties related to unrecognized tax benefits within income tax expense. Any accrued interest and penalties are included within the related tax liability.

Segment Reporting

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision-maker in making decisions regarding resource allocation and assessing performance. The Company chief operating decision-maker, the Chief Executive Officer, views the Company's operations and manages its business as one operating segment.

Net Loss Per Share

Basic net loss per share is calculated by dividing the net loss by the weighted-average number of common shares outstanding for the period. Diluted net loss per share is computed by dividing the net loss by the weighted average number of common shares and common share equivalents outstanding for the period. Common share equivalents are only included when their effect is dilutive. Pre-funded warrants from the Company's follow-on offering have been treated as if they were common shares outstanding on the date of issuance. The Company's potentially dilutive securities which include outstanding warrants to purchase stock and outstanding stock options under the Company's equity incentive plans have been excluded from the computation of diluted net loss per share as they would be anti-dilutive to the net loss per share. Restricted stock is treated as outstanding for accounting purposes. For all periods presented, there is no difference in the number of shares used to calculate basic and diluted shares outstanding due to the Company's net loss position.

Potentially dilutive securities not included in the calculation of diluted net loss per share because to do so would be anti-dilutive were as follows (in common stock equivalent shares):

	Years Ended December 31,	
	2021	2020
Common stock options	12,765,000	5,290,000
Common warrants	4,356,000	15,174,000
Unvested restricted stock	5,006,000	—
RSUs	361,000	—
PSUs	290,000	—
Total	22,778,000	20,464,000

Recently Issued But Not Yet Adopted Accounting Pronouncements

In June 2016, the FASB issued ASU No. 2016-13, Financial Instruments - Credit Losses: Measurement of Credit Losses on Financial Instruments (ASU 2016-13), which amends the impairment model by requiring entities to use a forward looking approach based on expected losses to estimate credit losses on certain types of financial instruments, including trade receivables and available-for-sale debt securities. The standard is effective for the company beginning in the first quarter of 2023, with early adoption permitted. The Company is currently evaluating the expected impact of ASU 2016-13 on its financial statements.

In May 2021, the FASB issued ASU No. 2021-04, *Issuer's Accounting for Certain Modifications or Exchanges for Freestanding Equity-Classified Written Call Options* to clarify the accounting for modifications or exchanges of equity-classified warrants. The standard is effective for fiscal years beginning after December 15, 2021. Early adoption is permitted. The Company is in the process of evaluating the expected impact of *ASU 2021-04* on its financial statements.

Recently Adopted Accounting Pronouncements

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 ("ASU 2020-06"), which simplifies accounting for convertible instruments by removing major separation models required under current U.S. GAAP. ASU 2020-06 removes certain settlement conditions that are required for equity contracts to qualify for the derivative scope exceptions and also simplifies the diluted earnings per share calculation in certain areas. The standard is effective for public business entities, excluding entities eligible to be smaller reporting companies as defined by the SEC, for fiscal years and interim periods within those fiscal years beginning after December 15, 2021. For all other entities, the standard will be effective for fiscal years beginning after December 15, 2023. Early adoption is permitted, but no earlier than fiscal years beginning after December 15, 2020, and adoption must be as of the beginning of the Company's annual fiscal year. The Company's early adoption of this accounting standard on January 1, 2021, did not have a material impact on the Company's consolidated financial statements and related disclosures. In February 2016, the Financial Accounting Standards Board issued Accounting Standards Update 2016-02, "Leases (Topic 842)" ("ASC 842") which requires lessees to recognize leases on the balance sheet and disclose key information about leasing arrangements. ASC 842 establishes a right-of-use model that requires a lessee to recognize a ROU asset and lease liability on the balance sheet for all leases with a term longer than 12 months. ASC 842 also requires disclosures to meet the objective of enabling users of financial statements to assess the amount, timing, and uncertainty of cash flows arising from leases. The standard was adopted

on January 1, 2021, as the Company lost its status as an Emerging Growth Company effective December 31, 2021, and therefore was required to adopt the standard for the year ending December 31, 2021, using the modified retrospective method. Under this transition method, the Company recognized and measured leases that existed at the adoption date in the consolidated balance sheet as of January 1, 2021. In connection with the adoption of ASC 842, the Company elected the package of practical expedients requiring no reassessment of whether any expired or existing contracts contain leases, the lease classification of any expired or existing leases, or initial direct costs for any existing leases. The Company also made accounting policy elections not to apply the recognition requirements under ASC 842 to any short-term leases and to account for each separate lease and associated non-lease components as a single lease component for all the Company's leases.

Adoption of ASC 842 resulted in recognition of operating lease assets and liabilities of approximately $2.1 million and $2.1 million, respectively, as of January 1, 2021, related to the lease of office and laboratory space. The comparative prior period information continues to be reported under ASC 840. The adoption of this new accounting standard resulted in increased qualitative and quantitative disclosures regarding the amount, timing, and uncertainty of cash flows arising from leases. For further details, see Note 11, Commitments and Contingencies. The adoption of the new standard did not materially impact the Company's consolidated results of operations or cash flows.

In October 2021, the FASB issued ASU 2021-08, Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities From Contracts With Customers. This ASU requires an acquirer to account for revenue contracts acquired in a business combination in accordance with ASC 606, Revenue from Contracts with Customers, as if it had originated the contracts. Prior to ASU 2021-08, an acquirer generally recognized assets acquired and liabilities assumed in a business combination, including contract assets and contract liabilities arising from revenue contracts with customers and other similar contracts, at fair value on the acquisition date. The guidance is effective for the Company for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years, and should be applied prospectively to business combinations occurring on or after the effective date. Early adoption is permitted. An entity that early adopts in an interim period should apply the amendments (1) retrospectively to all business combinations for which the acquisition date occurs on or after the beginning of the fiscal year that includes the interim period of early application and (2) prospectively to all business combinations that occur on or after the date of initial application. The Company adopted ASU 2021-08 on October 1, 2021, and applied the ASU prospectively to its acquisition that occurred in 2021.

3. Revenue from Contracts with Customers

Revenue by Source

	Years Ended December 31,	
	2021	2020
Instruments	$ 5,887,000	$ 3,085,000
Consumables	5,808,000	3,145,000
Total product revenue	11,695,000	6,230,000
Services and other	6,286,000	2,273,000
Total revenue	$ 17,981,000	$ 8,503,000

Revenue by Geographic Location

	Years Ended December 31,			
	2021		2020	
	$	%	$	%
North America	$ 9,329,000	52 %	$ 4,489,000	53 %
EMEIA	5,604,000	31 %	3,163,000	37 %
Asia Pacific	3,048,000	17 %	851,000	10 %
Total	$ 17,981,000	100 %	$ 8,503,000	100 %

The tables above provide revenue from contracts with customers by source and geographic location on a disaggregated basis. North America consists of the United States and Canada. EMEIA consists of Europe, the Middle East, India and Africa. Asia Pacific includes China, Japan, South Korea, Singapore and Australia. For the years ended December 31, 2021 and 2020, sales in the United States represented 46% and 42% of revenues, respectively. During the year ended December 31, 2021, sales in China accounted for 11% of total revenue. No other countries represented greater than 10% of revenue during the years ended December 31, 2021 and 2020.

4. Investments and Fair Value Measurements

The accounting guidance defines fair value, establishes a consistent framework for measuring fair value and expands disclosure for each major asset and liability category measured at fair value on either a recurring or nonrecurring basis. Fair value is defined as an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. As a basis for considering such assumptions, the accounting guidance establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value as follows:

Level 1: Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities.

Level 2: Quoted prices for similar assets and liabilities in active markets, quoted prices in markets that are not active, or inputs which are observable, either directly or indirectly, for substantially the full term of the asset or liability.

Level 3: Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable (i.e. supported by little or no market activity).

Financial instruments that are not re-measured at fair value include cash equivalents, accounts receivable, prepaid expenses and other current assets, accounts payable and accrued liabilities. The carrying value of the Company's long-term debt approximates its fair value due to the market rate of interest which was determined to be a Level 2 measurement. The carrying values of these financial instruments approximate their fair values.

The Company holds investment securities that consist of highly liquid, investment grade debt securities. The Company determines the fair value of its investment securities based upon one or more valuations reported by its investment accounting and reporting service provider. The investment service provider values the securities using a hierarchical security pricing model that relies primarily on valuations provided by an industry-recognized valuation service. Such valuations may be based on trade prices in active markets for identical assets or liabilities (Level 1 inputs) or valuation models using inputs that are observable either directly or indirectly (Level 2 inputs), such as quoted prices for similar assets or liabilities, yield curves, volatility factors, credit spreads, default rates, loss severity, current market and contractual prices for the underlying instruments or debt, and broker and dealer quotes, as well as other relevant economic measures.

The following table presents the Company's financial assets and liabilities measured at fair value on a recurring basis in the Consolidated Balance Sheets:

	December 31, 2021			
	Total Fair Value and Carrying Value on Balance Sheet	Fair Value Measurement Category		
		Level 1	Level 2	Level 3
Assets:				
Commercial Paper	$ 100,860,000	$ —	$ 100,860,000	$ —
Corporate Notes/Bonds	125,181,000	—	125,181,000	—
Total Investments:	$ 226,041,000	$ —	$ 226,041,000	$ —
Money Market Funds	$ 11,126,000	$ 11,126,000	$ —	$ —
Liabilities:				
Contingent consideration	$ 9,066,000	$ —	$ —	$ 9,066,000

Money Market Funds are classified as cash equivalents on the balance sheet.

The fair value of the contingent consideration liability is reassessed on a quarterly basis using the income approach. Assumptions used to estimate the acquisition date fair value of the contingent consideration include the probability of achieving certain milestones and a discount rate of 3.2%. The fair value measurement of the contingent consideration is based on significant inputs not observed in the market (Level 3 inputs). Significant inputs used in the measurement include probabilities of achieving the remaining milestones, which depend on the milestone risk profile. The change in fair value of the contingent consideration during the year ended December 31, 2021 was due to the passage of time.

Changes in estimated fair value of contingent consideration liability in the year ended December 31, 2021 is as follows:

	Contingent Consideration Liability (Level 3 Measurement)
Balance as of December 31, 2020	$ —
Liability recorded as a result of current period acquisition	9,000,000
Change in estimated fair value, recorded in selling, general and administrative expenses	66,000
Cash payments	—
Balance as of December 31, 2021	$ 9,066,000

The Company did not hold any investments as of December 31, 2020. As of December 31, 2021, the Company held 57 securities in an unrealized loss position for a period of less than 12 months resulting in an unrealized loss of $0.5 million included in other comprehensive income during the year ended December 31, 2021. None of the Company's available-for-sale investment securities were in a material unrealized loss position at December 31, 2021. As such, the Company has not recognized any impairment in its financial statements related to its available-for-sale investment securities.

During the year ended December 31, 2021, the Company received proceeds of $86.5 million relating to sales and maturities of its available for sale securities, and recognized a loss of $8,000 in other income relating to the sale of these securities. Amounts are reclassified out of accumulated other comprehensive income into earnings using the specific identification method.

As of December 31, 2021, the following table summarizes the amortized cost and the unrealized gains (losses) of the available for sale securities:

	Commercial Paper		Corporate Notes/Bonds	
	Amortized Cost	Unrealized loss	Amortized Cost	Unrealized loss
Less than 1 year	$ 100,929,000	$ (69,000)	$ 41,173,000	$ (61,000)
Due after one year through five years	—	—	84,478,000	(409,000)
Total	$ 100,929,000	$ (69,000)	$ 125,651,000	$ (470,000)

Included in interest income for the year ended December 31, 2021 was interest income related to the Company's available for sale securities of $0.4 million. All interest income related to the available for sale securities in 2021 related to year ended December 31, 2021. All available-for-sale securities are classified as current assets, even if the maturity when acquired by the Company is greater than one year due to the ability to liquidate within the next 12 months.

5. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consist of the following:

	December 31, 2021	December 31, 2020
Prepayment to supplier	$ 285,000	$ 1,146,000
Prepaid insurance	1,461,000	642,000
Interest receivable	387,000	—
Other current assets	2,348,000	462,000
Total	$ 4,481,000	$ 2,250,000

6. Property and Equipment, Net

Property and equipment, net consist of the following:

	December 31, 2021	December 31, 2020
Computer and office equipment	$ 819,000	$ 492,000
Lab equipment	9,341,000	6,718,000
Service equipment placed at customer sites	6,556,000	3,267,000
Leasehold improvements	2,674,000	1,889,000
	19,390,000	12,366,000
Less accumulated depreciation and amortization	(9,072,000)	(7,456,000)
	$ 10,318,000	$ 4,910,000

For the years ended December 31, 2021 and 2020, the Company recorded depreciation expense of $1.9 million and $1.4 million, respectively, which includes an allocation to cost of revenue of $0.9 million, $0.5 million, and $41,000 respectively.

7. Intangible Assets, Net

Intangible assets that are subject to amortization consisted of the following at December 31, 2021 and 2020:

	2021			2020		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Trade name	$ 1,630,000	$ (210,000)	$ 1,420,000	$ 630,000	$ (42,000)	$ 588,000
Customer relationships	3,950,000	(378,000)	3,572,000	950,000	(63,000)	887,000
Developed technology	22,800,000	(950,000)	21,850,000	—	—	—
Intangibles, net	$ 28,380,000	$ (1,538,000)	$ 26,842,000	$ 1,580,000	$ (105,000)	$ 1,475,000

The Company recorded amortization expense for intangible assets of $1.4 million and $0.1 million for the years ended December 31, 2021 and 2020 respectively, in selling, general and administrative expenses. The customer relationships and trade name intangibles from the Lineagen acquisition are both being amortized on a straight-line basis over their estimated useful lives of 5 years, and have remaining amortization periods of 3.6 years. The customer relationships, developed technology and trademark intangibles from the BioDiscovery acquisition are being amortized on a straight-line basis over their estimated useful lives of 5 years, and have remaining amortization periods of 4.8 years.

Future amortization expense of intangible assets is as follows:

2022	$ 5,676,000
2023	5,676,000
2024	5,676,000
2025	5,571,000
2026	4,243,000
Total	$ 26,842,000

8. Accrued Expenses

Accrued expenses consist of the following:

	December 31, 2021	December 31, 2020
Compensation expenses	$ 4,529,000	$ 3,251,000
Goods received not invoiced	1,073,000	567,000
Taxes payable	677,000	562,000
Insurance	1,011,000	358,000
Professional fees and royalties	288,000	247,000
Warranty liabilities	175,000	113,000
Interest	—	98,000
Other	1,941,000	403,000
Total	$ 9,694,000	$ 5,599,000

9. Long-Term Debt

Paycheck Protection Program

On April 17, 2020, the Company received the PPP Loan proceeds of approximately $1.8 million pursuant to the Paycheck Protection Program under the Coronavirus Aid, Relief, and Economic Security Act (the “CARES Act”) administered by the U.S. Small Business Administration (the “SBA”).

The PPP Loan accrued interest at a rate of 1% per annum and was subject to the standard terms and conditions applicable to loans administered by the SBA under the CARES Act. In February 2021, the Company applied for forgiveness of the PPP Loan, and in March 2021, the PPP Loan, including all accrued interest, was forgiven in full. A gain on forgiveness of Paycheck Protection Program loan of $1.8 million was recognized during the year ended December 31, 2021.

Innovatus LSA

In March 2019, the Company entered into a Loan and Security Agreement (the “LSA”) by and among Innovatus Life Sciences Lending Fund I, LP, a Delaware limited partnership (“Innovatus”), as collateral agent and the lenders listed on Schedule 1.1 thereto, including East West Bank. The LSA provided a first term loan of $17.5 million, a second term loan of $2.5 million and a third term loan of $5.0 million (collectively, the “Term Loans”) if the Company satisfied certain funding conditions. Interest on the Term Loans is due on the first of each month at a rate of 10.25% per annum in cash or a discounted rate of 7.25% in cash with 3.0% of the 10.25% per annum rate added to the principal of the loan and subject to accruing interest through the end of the interest only payment period, which ends March 1, 2022. At inception, the Company elected to pay interest in cash at a rate of 7.25% per annum and have 3.0% per annum of the interest added back to the outstanding principal. As of May 14, 2021 (the effective date of the loan payoff), the effective interest rate, including debt issuance costs, for the Term Loans was 16.7%.

The LSA provided for prepayment fees of 3.0% of the outstanding balance of the loan if the loan is repaid on or prior to March 14, 2020, 2.0% of the amount prepaid if the prepayment occurs after March 14, 2020 but prior to March 14, 2021, 1% of the amount prepaid after March 14, 2021 but prior to March 14, 2022 and 0% of the amount prepaid if the prepayment occurs thereafter. In addition, upon the final repayment of the total amounts borrowed, the Company is required to pay an end of term fee of $0.8 million. This end of term fee was being recognized as interest expense over the term of the LSA. As of December 31, 2021, the outstanding term loan with Innovatus was paid in full, including all accrued interest, the end of term fee, and a prepayment fee for a total of $17.0 million. The Company recorded a loss on debt extinguishment of $2.1 million.

The LSA also provided for a revolving line of credit in an amount not to exceed $5.0 million (the “Revolver”), which was terminated effectively upon payment in full of the above term loan.

The LSA was collateralized by substantially all of the Company’s assets, including its intellectual property. The LSA required the Company to comply with various affirmative and negative covenants, including: (1) a liquidity covenant requiring the Company to maintain a minimum cash balance at all times in a collateral account and (2) a revenue covenant requiring the Company to meet certain minimum revenue targets measured at the end of each calendar quarter. The LSA also included certain standard events of default, and a provision that Innovatus could declare an event of default upon the occurrence of any event that it interprets as having a material adverse impact to the Company's business, operations, or condition, a material impairment on the Company's ability to pay the secured obligations under the LSA, or upon a material adverse effect on the collateral under the agreement, thereby requiring the Company to repay the loans immediately, together with a prepayment fee and other applicable fees.

In March 2019, in connection with the receipt of $20.0 million in proceeds from the Term Loans, the Company issued to Innovatus a warrant to purchase up to 0.2 million shares of its common stock at an exercise price of $4.63 per share, which has a term of 10 years. These warrants were equity classified and their respective fair value was recorded as a discount to the debt. The warrants were exercised during the year end December 31, 2021.

In June 2019, the LSA was amended to among other things: (i) extend the deadline for the Company to maintain its domestic depository and operating accounts with the Bank, subject to a control agreement in favor of Innovatus, to July 31, 2019 and (ii) permit the Company to incur credit card indebtedness in an amount not to exceed $0.2 million. As of September 30, 2019, the Company did not achieve the revenue covenant under the Innovatus LSA. As a result, in October 2019, the Company obtained a waiver letter from Innovatus. Pursuant to the waiver letter, Innovatus agreed to allow the Company to cure its noncompliance with the revenue covenant as of September 30, 2019 so long as the Company (i) raised at least $10 million in gross proceeds from the sale of its securities in an underwritten public offering by October 31, 2019 and (ii) amended the warrant to purchase stock, issued by the Company to Innovatus in March 2019 to decrease the exercise price of the warrant from $4.63 per share to $0.48 per share. Also pursuant to the waiver letter, as consideration for the prospective breach of a liquidity covenant, the Company agreed to issue to Innovatus 0.6 million shares of the Company's common stock. As a result of the amendment and shares issued, the Company recognized $0.6 million as a debt discount, which is being amortized as interest expense over the remaining term of the LSA.

As of December 31, 2019, the Company did not achieve certain financial covenants under the Innovatus LSA. As a result, in March 2020, the Company and Innovatus entered into an amendment to the Innovatus LSA (the “Second Amendment”) to, among other things: (i) waive the events of default from not achieving the specific financial covenants for the December 31, 2019 measurement date, (ii) require an immediate partial repayment of $2.1 million, (iii) require an additional partial repayment of $2.9 million on the earlier of completion of an Equity Event (as defined in the Second Amendment), or April 30, 2020, (iv) modify the liquidity covenant, such that the Company’s minimum cash balance shall vary based on outstanding borrowing capacity under the Revolver (provided, however, that the Company shall maintain a minimum cash balance of $2 million at any given time), (v) reduce the dollar amount of certain minimum revenue covenants measured as of the end of each calendar quarter (each, a “Revenue Covenant”) and (vi) modify the terms of certain events of default. For example, the Second Amendment provides for a cure period in connection with the breach of certain minimum revenue financial covenants, as long as the Company submits an updated management plan and financial projections, which are subject to Innovatus approval, and completes a Qualified Financing Event (as defined in the Second Amendment) within 45 days of such breach.

In connection with the Second Amendment, the Company was obligated to pay Innovatus a waiver fee in the amount of $0.2 million and a prepayment fee of $0.1 million, payable in cash or in shares of the Company’s common stock at the Company's election, no later than following completion of the Equity Event, as defined in the Second Amendment. As described in Note 10 below, the Company completed a follow-on public offering in April 2020 that constituted an Equity Event under the Second Amendment. A portion of the proceeds from the follow-on offering were used to pay-down $2.9 million of principal balance outstanding under the Term Loans in accordance with the Second Amendment. In addition, the Company issued 0.9 million shares of its common stock to Innovatus to satisfy the $0.2 million waiver fee and the $0.1 million prepayment fee due under the Second Amendment. As a result of the amendment and shares issued, the Company recognized $0.3 million as a debt discount, which is being amortized as interest expense over the remaining term of the LSA. Also pursuant to the Second Amendment, the Company subsequently registered such shares for resale on a registration statement on Form S-3 (the “Registration Statement”) filed with the Securities and Exchange Commission on June 22, 2020 and declared effective on July 7, 2020. The Company has not and will not receive any of the proceeds from the offering described in the Registration Statement. In connection with the Merger, the Company and Lineagen entered into a Third Amendment (the “Third Amendment”) to the Innovatus LSA. Among other things, the Third Amendment adds Lineagen as a “Borrower” under the Innovatus LSA and updates certain financial covenants in light of Lineagen becoming a wholly owned subsidiary of the Company.

On December 31, 2020, the Company obtained a waiver from Innovatus of its previously disclosed noncompliance, as of September 30, 2020, with the revenue covenant contained in the LSA.

As of December 31, 2020, the Company was in compliance with the covenants under the Innovatus LSA. The Innovatus LSA was paid in full and terminated in 2021.

Summary of Debt Obligations

The Company had no debt as of December 31, 2021. The carrying value of the Company's debt as of December 31, 2020 was as follows:

	December 31, 2020
Term Loans	$ 15,981,000
Revolver	—
PPP Loan	1,775,000
Total principal	17,756,000
Less: unamortized debt issuance costs	(1,430,000)
Total carrying value of debt	$ 16,326,000

10. Stockholders' Equity and Stock-Based Compensation

Common Stock

The Company is currently authorized to issue up to 400 million shares of $0.0001 par value common stock. All issued shares of common stock are entitled to vote on a 1 share/1 vote basis.

Preferred Stock

The Company is currently authorized to issue up to 10 million shares of $0.0001 par value preferred stock. No preferred stock has been issued to date.

Sale of Common Stock

Follow-on Public Offerings

In April 2020, the Company completed an underwritten public offering of 16.9 million shares of its common stock and, to certain investors, pre-funded warrants to purchase 37.7 million shares of its common stock, and accompanying common warrants to purchase up to an aggregate of 54.5 million shares of its common stock. Each share of common stock and pre-funded warrant to purchase one share of common stock was sold together with a common warrant to purchase one share of common stock. The public offering price of each share of common stock and accompanying common warrant was $0.33 and $0.329 for each pre-funded warrant. The pre-funded warrants are immediately exercisable at a price of $0.001 per share of common stock. The common warrants are immediately exercisable at a price of $0.33 per share of common stock and will expire five years from the date of issuance. The shares of common stock and pre-funded warrants, and the accompanying common warrants, were issued separately and were immediately separable upon issuance. The gross proceeds to the Company, before deducting offering costs of $1.6 million, were $18.0 million.

On January 12, 2021, the Company completed an underwritten public offering of 33.4 million shares of common stock, including 4.4 million shares of common stock sold pursuant to the underwriters' exercise in full of their option to purchase additional shares. The price to the public in the offering was $3.05 per share and the underwriters purchased the shares from the Company pursuant to the underwriting agreement at a price of $2.867 per share. The gross proceeds were approximately $101.8 million before deducting underwriting discounts and commissions and other offering expenses of $0.3 million.

On January 25, 2021, the Company completed an underwritten public offering of 38.3 million shares of common stock, including 5.0 million shares of common stock sold pursuant to the underwriters' exercise in full of their option to purchase additional shares. The price to the public in the offering was $6.00 per share and the underwriters purchased the shares from the Company pursuant to the underwriting agreement at a price of $5.64 per share. The gross proceeds to us were approximately $230.0 million before deducting underwriting discounts and commissions and other offering expenses of $0.4 million.

Shelf Registration Statements; Ladenburg and Cowen At-the-Market Facilities

In August 2020, the Company filed a shelf registration statement on Form S-3 with the SEC covering the offering, issuance and sale of up to $125 million of the Company's securities, including up to $40 million of common stock pursuant to an At Market Issuance Sales Agreement, with Ladenburg Thalmann & Co. Inc. acting as sales agent (the "Ladenburg ATM"). During October through December 2020, the Company sold 27.0 million shares of common stock under the Ladenburg ATM at an average share price of $0.82, and received gross proceeds of approximately $22.1 million before deducting offering costs of $0.6 million. In January 2021, the Company sold an additional 6.3 million shares of common stock under the ATM at an average share price of $2.68, and received gross proceeds of approximately $16.9 million before deducting offering costs of $0.4 million. The Company terminated the Ladenburg ATM in March 2021.

On January 19, 2021, the Company filed an automatically effective shelf registration statement on Form S-3 with the SEC as a "well-known seasoned issuer," allowing for the Company to issue an indeterminate number or amount of its securities from time to time in one or more offerings. On March 23, 2021, the Company entered into a Sales Agreement with Cowen and Company, LLC ("Cowen") which provides for the sale, in the Company's sole discretion, of shares of common stock having an aggregate offering price of up to $350.0 million through or to Cowen, acting as sales agent or principal (the "Cowen ATM"). The Company agreed to pay Cowen a commission of up to 3.0% of the aggregate gross proceeds from each sale of shares, reimburse legal fees and disbursements and provide Cowen with customary indemnification and contribution rights. In August and September 2021, the Company sold 2.3 million shares of common stock under the Cowen ATM at an average share price of $6.15 per share, and received gross proceeds of approximately $13.9 million before deducting offering costs of $0.6 million.

Stock Warrants

A summary of the Company's warrant activity for the year ended December 31, 2021 was as follows:

	Shares of Stock under Warrants	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term	Aggregate Intrinsic Value
Outstanding at January 1, 2020	24,406,000	$ 1.76	4.82	$ 7,933,000
Granted	95,396,000	0.22	4.28	—
Exercised	(104,628,000)	0.28	—	56,780,000
Canceled	—	59.90	—	—
Outstanding at December 31, 2020	15,174,000	$ 2.34	3.76	$ 26,841,000
Granted	—	—	—	—
Exercised	(10,794,000)	0.88		58,191,000
Canceled	(24,000)	3.29	—	—
Outstanding at December 31, 2021	4,356,000	$ 5.96	1.76	$ 785,000

In March 2020, the Company entered into a Warrants Amendment and Agreement with certain holders of warrants that were exercisable for 3.2 million shares of common stock. The agreement reduced the exercise price of existing warrants from $0.86 per share to $0.75 per share, which were exercised following the amendment, in addition to issuing 3.2 million new warrants at an exercise price per share of $1.06 that were exercised in the year ended December 31, 2021.

2018 Equity Incentive Plan

In August 2018, the Company's board of directors (the "Board") and its stockholders adopted the 2018 Equity Incentive Plan (the "2018 Plan"), as a successor to and continuation of the Company's 2006 Equity Incentive Plan (the "2006 Plan"). Under the 2018 Plan, the Company may grant stock options, stock appreciation rights, restricted stock, restricted stock units and other awards to individuals who are then its employees, directors and consultants, including employees and consultants of its affiliates. The Company has initially reserved 1.5 million shares of common stock for issuance under the 2018 Plan, which is the sum of (1) 1.0 million new shares, plus (2) the number of shares that remained available for issuance under the 2006 Plan at the time the 2018 Plan became effective, and (3) any shares subject to outstanding stock options or other stock awards that were granted under the 2006 Plan that would have otherwise returned to the 2006 Plan. In addition, the number of shares of common stock reserved for issuance under the 2018 Plan will automatically increase on January 1 of each calendar year, starting on January 1, 2019 through January 1, 2028, in an amount equal to 5% of the total number of shares of the Company's capital stock outstanding on the last day of the calendar month before the date of each automatic increase, or a lesser number of shares determined by the Board. As of December 31, 2021, 6.2 million shares of common stock were authorized for future grants under the 2018 Plan.

2020 Inducement Plan

In August 2020, the Company's Board and its stockholders adopted the 2020 Inducement Plan and amended by the Board on October 6, 2021. Under the 2020 Plan, the Company may grant stock options, stock appreciation rights, restricted stock, restricted stock units and other awards to individuals who are then its employees, directors and consultants, including employees and consultants of its affiliates. The Company has initially reserved 2.1 million shares of common stock for issuance under the 2020 Plan. An additional 1.0 million of shares of common stock was reserved for issuance under the Inducement Plan for a total of 3.1 million shares pursuant to an amendment to the Inducement Plan approved by the board of directors on October 6, 2021. As of December 31, 2021, there were approximately 0.7 million shares of common stock authorized for future grants under the 2020 Plan.

Stock Options

A summary of the Company's stock option activity is as follows:

	Shares of Stock under Stock Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term	Aggregate Intrinsic Value
Outstanding at December 31, 2020	5,290,000	$ 1.91	8.7	$ 10,178,000
Granted	9,108,000	6.54		
Exercised	(471,000)	1.30		2,547,000
Canceled	(1,162,000)	4.90		
Outstanding at December 31, 2021	12,765,000	4.97	8.9	7,891,000
Vested and exercisable at December 31, 2021	3,389,000	$ 3.53	8.1	$ 4,428,000

The weighted-average grant date fair value of stock option grants during the years ended December 31, 2021 and 2020 was $4.35 and $0.44, respectively. The total intrinsic value of the stock options exercised during the years ended December 31, 2021 and 2020 were $2.5 million and $7,000, respectively. The contractual term of stock options granted to employees was 10 years, which is also the maximum contractual term permitted for stock options (and stock appreciation rights) issued under the 2018 Plan. Stock options generally vest or become exercisable monthly over a four-year period.

Restricted Stock

Restricted Stock

A restricted stock award in the amount of 5.0 million shares with a grant date fair value of $5.20 a share was granted as part of the acquisition of BioDiscovery. One-third of the Restricted Shares will vest on October 18, 2022 and one-twelfth of the Restricted Shares shall vest every three months following October 18, 2022, subject to continuous service of a key employee. The weighted average remaining contractual term for the restricted stock is 2.8 years as of December 31, 2021. The fair value of the restricted stock award is based on the market value of common stock as of the date of grant and is amortized to expense over the respective vesting period or the service period.

Restricted Stock Units and Performance Stock Units

The Company issues restricted stock units (RSU) and performance stock units (PSU). The Company grants restricted stock pursuant to the 2018 Stock Plan and satisfy such grants through the issuance of new shares. RSUs are share awards that, upon vesting, will deliver to the holder shares of our common stock. RSUs generally vest over a two-year period with equal vesting annually. We issue PSUs for which the number of shares issuable at the end of a four-year performance period is based on our performance relative to specified revenue targets and continued employment through the vesting period.

Restricted stock activity was as follows:

	Stock Units	Weighted- Average Grant Date Fair Value per Share
Outstanding at January 1, 2021	—	$ —
Granted	540,000	4.75
Released	(179,000)	4.76
Forfeited	—	—
Outstanding at December 31, 2021	361,000	$ 4.74

The total intrinsic value of the RSUs that vested was $0.9 million during fiscal 2021, determined as of the date of vesting. The weighted average remaining contractual term for the RSUs is 1.4 years as of December 31, 2021.

Performance stock activity was as follows:

	Stock Units	Weighted- Average Grant Date Fair Value per Share
Outstanding at January 1, 2021	—	$ —
Granted	290,000	4.74
Released	—	—
Forfeited	—	—
Outstanding at December 31, 2021	290,000	$ 4.74

The weighted average remaining contractual term for the PSUs is 3.4 years as of December 31, 2021

Stock-Based Compensation Expense

The Company recognized stock-based compensation expense for the years ended December 31, 2021 and 2020 was as follows:

	Years Ended December 31,	
	2021	2020
Research and development	$ 3,531,000	$ 375,000
General and administrative	6,188,000	1,179,000
Total stock-based compensation expense	$ 9,719,000	$ 1,554,000

The weighted-average assumptions used in the Black-Scholes-Merton option pricing model to determine the fair value of the employee stock option grants were as follows:

	Years Ended December 31,	
	2021	2020
Risk-free interest rate	1.1%	.6%
Expected volatility	76.2%	77.0%
Expected term (in years)	6.0	5.8
Expected dividend yield	0.0%	0.0%

Risk-free interest rate. The risk-free rate assumption is based on the U.S. Treasury instruments, the terms of which were consistent with the expected term of the Company's stock options.

Expected volatility. Due to the Company's limited operating history and lack of company-specific historical or implied volatility as a private company, the expected volatility assumption was determined by examining the historical volatilities of a group of industry peers whose share prices are publicly available.

Expected term. The expected term of stock options represents the weighted-average period the stock options are expected to be outstanding. The Company does not have sufficient historical exercise data to provide a reasonable basis upon which to estimate expected term due to the limited period of time its equity shares have been publicly traded. As a result, the Company uses the simplified method for estimating the expected term as provided by the Securities and Exchange Commission. The simplified method calculates the expected term as the average of the time-to-vesting and the contractual life of the options.

Expected dividend yield. The expected dividend assumption is based on the Company's history and expectation of dividend payouts. The Company has not paid and does not intend to pay dividends.

Forfeitures. The Company reduces stock-based compensation expense for actual forfeitures during the period.

Unrecognized Stock-Based Compensation Expense

As of December 31, 2021, the unrecognized compensation expense for all non-vested share-based awards was $59.2 million and is expected to be recognized as expense over a weighted-average period of 3.1 years.

Employee Stock Purchase Plan

In August 2018, the Board and the Company's stockholders adopted the 2018 Employee Stock Purchase Plan (the "ESPP"). A total of 0.2 million shares of common stock were initially reserved for issuance under the ESPP. In addition, the number shares of common stock reserved for issuance under the ESPP will automatically increase on January 1 of each calendar year, beginning on January 1, 2019, through January 1, 2028, by the lesser of (1) 1% of the total number of shares of the Company's common stock outstanding on the last day of the calendar month before the date of the automatic increase, (2) 220,000 shares,

or (3) a lesser number of shares as determined by the Board. As of December 31, 2021, 0.2 million shares of common stock were authorized for future grants under the ESPP.

Executive Option Grants

On February 15, 2022, the compensation committee of the Company's board of directors granted various executive officers stock options to purchase an aggregate of 4.3 million shares of common stock at an exercise price of $2.18 a share, in each case with an effective grant date and vesting commencement date of February 15, 2022 (the "Grant Date"). These stock option grants were issued from the 2018 Stock Plan. The shares subject to the option shall vest monthly over 48 months beginning on the one-month anniversary of the Grant Date, such that the option shall be fully vested and exercisable on the four-year anniversary of the Grant Date.

11. Commitments and Contingencies

Leases

Operating leases
The Company leases approximately 35,823 square feet of office, laboratory, and manufacturing space in two buildings at our headquarters in San Diego, California, with the lease for all rented space expiring December 31, 2025. In December 2021, the Company executed a new lease for approximately 11,978 additional square feet square feet of office and laboratory space in San Diego, California that expires in January 2026. In January 2022, the Company executed a new lease for an additional 5,278 square feet of office and laboratory space in San Diego, California that expires in January 2026. Rent payments for the additional space are $16,000 each month through December 2022, and increases annually according to the Company's lease agreement.

In August 2020, through the acquisition of Lineagen, the Company obtained a lease for approximately 9,710 square feet of office space in a Salt Lake City, Utah under a non-cancelable operating lease that expires in December 2026.

Finance lease

In October 2021, through the acquisition of BioDiscovery, the Company obtained a finance lease of 4,786 square feet of office space in El Segundo, California that expires in February 2041. The portion of the future payments designated as principal repayment and related interest was classified as a finance lease obligation on our consolidated balance sheets. Refer to Note 15. Related Party Transactions for additional information.

Supplemental information

For all leases, the Company has the ability to enter into renewal negotiations, prior to the lease end date, with no specific terms. At this time, it is not reasonably certain that we will extend the term of the lease and therefore the renewal period has been excluded from the aforementioned ROU asset and lease liability measurements. The leases are subject to variable charges for common area maintenance and other costs that are determined based on actual costs and includes certain lease incentives such as tenant improvement allowances. The base rent for the leases is subject to an annual increase each year. Rent expense is being recognized on a straight-line basis over the term of the lease. The Company's estimated incremental borrowing rate of 7.1% was used in its present value calculations as the operating and finance leases do not have a stated rate and the implicit rate was not readily determinable. In determining the incremental borrowing rate, the Company considered the interest rate of the Term Loans as well as publicly available data for discount rates used by peer companies.

Supplemental information pertaining to the Company's leases in which the Company is lessee for the year ended December 31, 2021 is as follows:

Cash payments included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$	447,000
Operating cash flows from finance leases	$	47,000
Financing cash flows from finance leases	$	5,000
Weighted-average remaining lease term:		
Operating leases		4.1 years
Finance leases		19.2 years
Weighted-average discount rate:		
Operating leases		7.1 %
Finance leases		7.1 %
Noncash lease liabilities resulting from obtaining right-of-use assets		
Operating leases	$	4,751,000

The following table provides the components of the Company's lease cost:

	Year Ended December 31,	
	2021	2020
Operating leases		
Operating lease costs[1]	$ 1,118,000	$ 887,000
Variable lease costs	386,000	—
Total rent expense	1,504,000	887,000
Finance lease		
Amortization of right of use assets	19,000	—
Interest on lease liabilities	47,000	—
Total finance lease costs	66,000	—
Gross sublease income	(18,000)	(422,000)
Total lease costs	$ 1,552,000	$ 465,000

[1] Rent expense and sublease income for the year ended December 31, 2020 reflects accounting treatment under ASC 840.

The future minimum payments under non-cancellable operating and finance leases as of December 31, 2021, are as follows:

	Operating Leases	Finance Lease
2022	$ 1,881,000	$ 314,000
2023	1,950,000	322,000
2024	2,011,000	330,000
2025	2,088,000	338,000
2026	232,000	346,000
Thereafter	—	5,949,000
Total future lease payments	8,162,000	7,599,000
Less: imputed interest	(1,407,000)	(3,658,000)
Total lease liabilities	$ 6,755,000	$ 3,941,000

Prior to the adoption of ASC Topic 842, future minimum rental payments under operating leases as of December 31, 2020, were as follows:

Year Ending December 31,	Total Payments
2021	$ 734,000
2022	639,000
2023	666,000
2024	696,000
2025 and thereafter	729,000
Total minimum lease payments	$ 3,464,000

Purchase Commitments

The Company has a contractual commitment with a supplier to purchase $0.3 million of products every month for an initial term of two years beginning in May 2021 until May 2023. The contract can be terminated with 90 days written notice by either party.

Litigation

From time to time, the Company may be subject to potential liabilities under various claims and legal actions that are pending or may be asserted. These matters arise in the ordinary course and conduct of the business. The Company regularly assesses contingencies to determine the degree of probability and range of possible loss for potential accrual in the financial statements. An estimated loss contingency is accrued in the financial statements if it is probable that a liability has been incurred and the

amount of the loss can be reasonably estimated. Based on the Company's assessment, it currently does not have any material loss exposure as it is not a defendant in any claims or legal actions.

Contingent Consideration

As part of the Merger Agreement related to the acquisition of BioDiscovery, the Company agreed to pay a milestone payment of $10.0 million in cash contingent on the achievement of a commercial milestone within eighteen months of the acquisition date. The Company determined the fair value of the milestone consideration using a scenario-based technique, as the trigger for payment is event driven. The outcome of the milestone consideration is binary, meaning the milestone is either achieved or not achieved, and the only other variable factor is the timing of when the milestone is achieved. The Company determined it is highly likely that the milestone will be achieved and therefore used a 95% probability factor which is applied to the $10.0 million milestone consideration. Based on these valuation assumptions, a contingent liability of $9.0 million was recognized on the acquisition date. As of December 31, 2021, the fair value of the milestone consideration was determined to be $9.1 million. The change in fair value of $0.1 million was recorded in selling, general and administrative expense in the consolidated statement of operations for the year ended December 31, 2021.

12. Income Taxes

The domestic and foreign components of income (loss) from continuing operations are as follows:

	Year Ended December 31,	
	2021	2020
Domestic	$ (78,356,000)	$ (41,191,000)
Foreign	204,000	114,000
Loss before provision for income taxes	$ (78,152,000)	$ (41,077,000)

The provision for domestic and foreign income taxes is as follows:

	Year Ended December 31,	
	2021	2020
Current:		
Federal	$ —	$ —
Foreign	39,000	24,000
State and local	21,000	5,000
Total current income tax provision (benefit)	$ 60,000	$ 29,000
Deferred:		
Federal	$ (4,055,000)	$ —
Foreign	—	—
State and local	(1,722,000)	—
Total deferred income tax provision (benefit)	(5,777,000)	—
Income tax provision (benefit)	$ (5,717,000)	$ 29,000

Reconciliations of the income tax computed at the federal statutory tax rate to the expense for income taxes are as follows:

	Year Ended December 31,	
	2021	2020
Income taxes at statutory rate	$ (16,413,000)	$ (8,626,000)
State income taxes, net of federal benefits	(2,030,000)	(522,000)
Change in valuation allowance	12,879,000	9,816,000
Section 162(m)	966,000	—
Other permanent differences	(165,000)	(67,000)
Research credits	(938,000)	(568,000)
Other	(16,000)	(4,000)
Income tax expense (benefit)	$ (5,717,000)	$ 29,000

Significant components of the Company’s deferred tax assets at December 31, 2021 and 2020 are as follows:

	December 31,	
	2021	2020
Deferred tax assets:		
Net operating loss carryforwards	$ 81,399,000	$ 62,354,000
Research and development credits	6,911,000	5,671,000
Stock-based compensation	849,000	450,000
ASC 842 - lease liability	2,517,000	—
Other	1,457,000	2,148,000
Total gross	93,133,000	70,623,000
Deferred tax liabilities:		
Amortization	(7,478,000)	(350,000)
ASC 842 - ROU asset	(2,504,000)	—
Other	—	—
Less: valuation allowance	(83,151,000)	(70,273,000)
Deferred tax assets, net of valuation allowance	$ —	$ —

As of December 31, 2021, the Company has federal and state tax net operating loss carryforwards of $341.1 million and $158.4 million, respectively. The federal tax loss carryforwards include $176.8 million that do not expire but utilization is limited to 80% of the Company's taxable income in any given tax year based on current federal tax laws. The remaining federal tax loss carryforwards of $164.3 million and state tax loss carryforwards begin to expire in 2027 and 2023, respectively, unless previously utilized. As of December 31, 2021, the Company also has federal and California research credit carryforwards of $6.7 million and $6.1 million, respectively. The federal research credit carryforwards begin to expire in 2027 unless previously utilized. The California research credits carry forward indefinitely.

Management assesses all available evidence to estimate if sufficient future taxable income will be generated to use the existing deferred tax assets. The Company has experienced net losses since inception, and the revenue and income potential of the Company’s business and market are unproven. Due to the Company’s continuing research and development ("R&D") activities, the Company expects to continue to incur net losses into the foreseeable future. As such, the Company cannot conclude that it is more likely than not that its deferred tax assets will be realized. A valuation allowance of $83.2 million, and $70.3 million as of December 31, 2021, and 2020, respectively, has been established to offset the deferred tax assets.

The Company acquired BioDiscovery, LLC. an entity designated for income tax purposes as a corporation in a plan of reorganization within the meaning of Section 368(a)(1)(A) on October 18, 2021. Under ASC 805-740, the Company recorded deferred tax liabilities of $5.8 million related to customer lists, patents/trademarks, developed technology, and fixed assets as part of the business combination. As the deferred tax liability recorded in the business combination constitutes a source of future taxable income, the Company recorded a decrease to its valuation allowance against its deferred tax assets of $5.8 million as a deferred income tax benefit.

Utilization of the net operating losses and R&D credit carryforwards are subject to annual limitations due to ownership changes that have occurred or that could occur in the future, as required by Sections 382 and 383 of the Internal Revenue Code of 1986,as amended (the "Code"), as well as similar state and foreign provisions. These ownership changes will limit the amount of net operating losses and R&D credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an "ownership change" as defined by Section 382 of the Code results from a transaction or series of

transactions over a three-year period resulting in an ownership change of more than 50 percentage points of outstanding stock of a company by certain stockholders. Due to the existence of the valuation allowance, limitations created by past or future ownership changes, if any, will not impact its effective tax rate.

The Company last performed a 382 study during 2013 and since this date there have been changes in ownership that will limit the Company's ability to utilize the net operating loss and R&D credit carryforwards. The Company is in the process of refreshing its 382 study but the results of that analysis are unknown as of the issuance date of these consolidated financial statements. The completion of the 382 study could result in material reductions to deferred tax assets and related valuation allowance disclosed above. However, the Company had not utilized any of the net operating losses and R&D credits during the years ended December 31, 2021 and 2020.

Reconciliations of the beginning and ending amount of unrecognized tax benefits, excluding interest and penalties, are as follows:

	December 31,	
	2021	2020
Balance at beginning of the year	$ 4,201,000	$ 3,708,000
Additions/(reductions) for tax positions - prior year	231,000	53,000
Increase related to current year positions	687,000	440,000
Balance at the end of the year	$ 5,119,000	$ 4,201,000

The Company recognizes the benefit of uncertain tax positions at the largest amount that is more likely than not to be sustained upon audit by the relevant taxing authority. An uncertain tax position will not be recognized if it has less than a 50% likelihood of being sustained. Due to the valuation allowance position, none of the unrecognized tax benefits, if recognized, will impact the Company`s effective tax rate. The Company does not anticipate a significant change in the unrecognized tax benefits during the next twelve months.

The Company’s practice is to recognize interest and penalties related to income tax matters in income tax expense. The Company had no accrual of interest and penalties on the Company’s balance sheets and has not recognized any interest and penalties in the statements of operations for the years ended December 31, 2021 and 2020.

The Company is subject to taxation in the United States, the United Kingdom and China. The Company's tax years from 2007 (inception) are subject to examination by the United States and state authorities due to the carry forward of unutilized net operating losses and R&D credits.

13. Employee Benefits

The Company has a defined contribution 401(k) plan available to eligible employees. Under the terms of the plan, employees may make voluntary contributions as a percent of compensation, limited to the maximum amount allowable under federal tax regulations. The Company, at its discretion, may make certain contributions to the 401(k) plan. The Company expensed matching contributions of $0.83 million and $0.46 million for the years ended December 31, 2021 and 2020, respectively.

14. Acquisitions

Lineagen Acquisition

In August 2020, the Company, Merger Sub, Lineagen, and Michael S. Paul, Ph.D., solely in his capacity as exclusive agent and attorney-in-fact of the security-holders of Lineagen, entered into the Lineagen Merger Agreement. Pursuant to the terms and conditions of the Lineagen Merger Agreement, Merger Sub merged with and into Lineagen whereupon the separate corporate existence of Merger Sub ceased, with Lineagen continuing as the surviving corporation of the Merger as a wholly owned subsidiary of the Company. Lineagen’s expertise in development, commercialization and reimbursement of laboratory-developed tests provides a platform for accelerating sales growth for the Company’s Saphyr system.

Pursuant to the terms of the Lineagen Merger Agreement, at the effective time of the Merger (the “Effective Time”), the shares of capital stock of Lineagen and all options of Lineagen that were issued and outstanding immediately prior to the Effective Time were automatically cancelled and extinguished without any payment with respect thereto. Certain holders of convertible notes and other indebtedness of Lineagen at the closing of the Merger (the “Closing”) received common stock of the Company. The total number of shares of the Company’s common stock issued or reserved for issuance as consideration for the Merger was 6,167,510 shares, subject to adjustment for cash, accounts receivable, unpaid indebtedness, unpaid transaction expenses and certain other liabilities of Lineagen (the “Merger Shares”). 925,126 of the Merger Shares (the “Escrowed Shares”) were held in an escrow fund for purposes of satisfying any post-closing purchase price adjustments and indemnification claims under the Lineagen Merger Agreement.

Also as consideration for the Merger, pursuant to the Lineagen Merger Agreement, the Company paid approximately $1.9 million in cash to certain creditors and assumed certain liabilities of Lineagen totaling approximately $2.9 million, reflective of the Company's preliminary estimate of the post-closing purchase price adjustment (which adjustment is subject to finalization pursuant to the terms of the Lineagen Merger Agreement). In addition, on August 21, 2020, concurrent with the Closing, the Company paid approximately $1.1 million to satisfy all outstanding principal and accrued interest amounts due pursuant to that certain Promissory Note, dated April 22, 2020, by and between Lineagen and Silicon Valley Bank (the "Lineagen PPP Loan"), issued pursuant to the CARES Act administered by the SBA. The Lineagen PPP Loan was repaid by the Company prior to maturity without penalty.

The Company accounted for its acquisition of Lineagen using the acquisition method of accounting pursuant to ASC 805. The tangible and identifiable intangible assets acquired and liabilities assumed were recorded at their estimated fair values as of the acquisition date, and the excess of the purchase price over the estimated fair value assigned to the tangible and identifiable intangible assets acquired and liabilities assumed was recorded to goodwill. Goodwill relates to the expected synergies from combining the operations of the companies. The acquisition was structured as a stock sale and therefore goodwill is non tax deductible.

As permitted under ASC 805, the Company is allowed a measurement period, which may not exceed one year, in which to complete its accounting for the acquisition. During the fourth quarter of 2020, the Company recorded a $0.2 million adjustment to the original purchase price allocation to reduce the estimated fair value of accounts receivable, with the offsetting amount recorded to goodwill. There were no additional purchase price adjustments made during 2021.

The following is the purchase price for the acquisition of Lineagen:

Cash (a)	$	1,940,000
Cash transferred for repayment of Lineage PPP Loan (b)	$	1,105,000
Shares common stock issued as consideration (c)		6,167,510
Shares of common stock returned to the Company (c)		(138,247)
Stock price per share on closing date	$	0.68
Value of common stock consideration (c)	$	4,100,000
Total purchase price (c)	$	7,144,000

(a) The Company paid approximately $1.9 million in cash to certain creditors of Lineagen.

(b) The Company paid approximately $1.1 million to satisfy all outstanding principal and accrued interest amounts due pursuant to the Lineagen PPP Loan.

(c) The total number of shares of the Company's common stock issued as consideration for the Merger was 6,167,510 shares. The total number of Merger Shares was subject to adjustment for cash, accounts receivable, unpaid indebtedness, unpaid transaction expenses and certain other liabilities of Lineagen. The value of the common stock consideration and the total purchase price incorporated the return of 138,247 Escrowed Shares to the Company.

The total purchase price was allocated to Lineagen's tangible and identifiable intangible assets acquired and liabilities assumed on based on their estimated fair values as of the acquisition date, with the excess recorded as goodwill, as follows:

Cash and cash equivalents	$	596,000
Accounts receivable		337,000
Other assets		209,000
Property and equipment		111,000
Intangible assets		1,580,000
Goodwill		7,173,000
Accounts payable and other accrued liabilities		(2,862,000)
Net assets acquired	$	7,144,000

The acquisition date fair values of identifiable intangible assets acquired are as following:

Customer relationships	$	950,000
Trade name		630,000
Fair value of identifiable intangible assets	$	1,580,000

The customer relationships and trade name intangibles are both being amortized on a straight-line basis over their estimated useful lives of five years. Straight-line amortization was determined to be materially consistent with the pattern of expected use of the intangible assets.

The Company recognized approximately $1.5 million of acquisition-related transaction costs, including financial advisor fees, legal expenses and accounting fees during the year ended December 31, 2020. These costs are included in the consolidated statement of operations in selling, general and administrative expense. Also, the Company reported approximately $1.5 million of service revenue generated by Lineagen in its consolidated statement of operations from the date of acquisition through December 31, 2020. As the Company began integrating Lineagen's operations with its existing operations during the fourth quarter of 2020, it is not practical or meaningful to distinguish Lineagen's expenses or net income or loss from that of the combined operations for 2020.

BioDiscovery Acquisition

In October 2021, the Company completed the acquisition of BioDiscovery, LLC., pursuant to the BioDiscovery Merger Agreement. BioDiscovery's solutions for analysis, interpretation and reporting of genomics data is expected to accelerate and broaden Bionano's market leadership in digital cytogenetics and comprehensive genome analysis.

Pursuant to BioDiscovery Merger Agreement, the Company paid upfront consideration consisting of a combination of approximately $52.3 million in cash and $40.0 million in shares of Company common stock. Approximately $26.0 million worth of the shares of the Company's common stock issued pursuant to the upfront consideration are subject to vesting based on continued service, subject to the terms and conditions of a stock restriction agreement. Accordingly, the restricted stock is being accounted for as compensation over the requisite service period, and is not included in the purchase price. The upfront consideration is subject to adjustment for, among other things, cash, unpaid indebtedness, unpaid transaction expenses and working capital relative to a target. Under the BioDiscovery Merger Agreement, the Company has also agreed to pay a milestone payment of $10.0 million in cash based on the achievement of certain commercial milestones. Cash of $2.5 million will be held in an escrow fund for purposes of satisfying any post-closing purchase price adjustments and indemnification claims under the BioDiscovery Merger Agreement.

The Company accounted for its acquisition of BioDiscovery using the acquisition method of accounting pursuant to ASC 805. The tangible and identifiable intangible assets acquired and liabilities assumed were recorded at their estimated fair values as of the acquisition date, and the excess of the purchase price over the estimated fair value assigned to the tangible and identifiable intangible assets acquired and liabilities assumed was recorded to goodwill. Goodwill relates to the expected synergies from combining the operations of the companies. The acquisition was structured as a stock sale and therefore goodwill is non-tax deductible.

The purchase price allocation for the acquisition of BioDiscovery is preliminary and subject to revision as additional information about the fair value of assets and liabilities becomes available. As permitted under ASC 805, the Company is allowed a measurement period, which may not exceed one year, in which to complete its accounting for the acquisition. Per the terms of the BioDiscovery Merger Agreement, the purchase price is still subject to adjustment for the final determination of cash, unpaid indebtedness, unpaid transaction expenses and working capital, as well for deferred and current tax assets and liabilities

The following is the estimated purchase price for the acquisition of BioDiscovery:

Cash	$	52,291,000
Estimated fair value of milestone consideration	$	9,000,000
Estimated return of cash to buyer from escrow	$	(694,000)
Shares common stock issued as consideration		2,723,000
Stock price per share on closing date	$	5.20
Value of estimated common stock consideration	$	14,159,000
Total estimated purchase price	$	74,756,000

The total estimated purchase price was allocated to BioDiscovery's tangible and identifiable intangible assets acquired and liabilities assumed based on their estimated fair values as of the acquisition date, with the excess recorded as goodwill, as follows:

Cash and cash equivalents	$	3,205,000
Accounts receivable		1,782,000
Right-of-use assets		3,987,000
Other assets		213,000
Intangible assets		26,800,000
Goodwill		48,987,000
Accounts payable and other accrued liabilities		(193,000)
Right-of-use liabilities (short-term and long-term)		(3,987,000)
Deferred tax liability		(5,777,000)
Contract liabilities		(261,000)
Net assets acquired	$	74,756,000

The acquisition date fair values of identifiable intangible assets acquired are as following:

Customer relationships	$	3,000,000
Developed technology		22,800,000
Tradename		1,000,000
Fair value of identifiable intangible assets	$	26,800,000

The Company uses the income approach to derive the fair value of the identified intangible assets acquired. This approach calculates fair value by estimating future cash flows attributable to the assets and then discounting these cash flows to a present value using a risk-adjusted discount rate.

The developed technology, customer relationships and trade name intangibles are both being amortized on a straight-line basis over their estimated useful lives of five years. Straight-line amortization was determined to be materially consistent with the pattern of expected use of the intangible assets.

The Company recognized approximately $-1.5 million of acquisition-related transaction costs, including financial advisor fees, legal expenses and accounting fees during the year ended December 31, 2021. These costs are included in the consolidated statement of operations in selling, general and administrative expense. The Company reported approximately $1.1 million of revenue generated by BioDiscovery in its consolidated statement of operations from the date of acquisition through December 31, 2021.

As the Company began integrating BioDiscovery's operations with its existing operations during the fourth quarter of 2021, it is not practical or meaningful to distinguish BioDiscovery's expenses or net income or loss from that of the combine operations.

Pro forma Financial Information

The unaudited pro forma financial information in the table below summarizes the combined results of operations for the Company, Lineagen, and BioDiscovery as if the companies had been combined as of the beginning of the year prior to the acquisition. These amounts have been calculated after applying the Company's accounting policies and adjusting the results of Lineagen and BioDiscovery to reflect the additional amortization that would have been charged assuming the fair value adjustments to intangible assets had been applied at the beginning of the year prior to the acquisition. The following unaudited pro forma financial information is for informational purposes only and is not necessarily indicative of the results of operations that would have been achieved as if the acquisitions had taken place as of January 1, 2019 and January 1, 2020, respectively.

	Years Ended December 31, (Unaudited)			
	2021		2020	
Revenue	$	23,076,000	$	15,927,000
Net loss		(80,065,000)		(47,228,000)
Basic and diluted net loss per share	$	(0.28)	$	(0.43)

15. Related Party Transactions

Through the acquisition of BioDiscovery in October 2021, the Company inherited a building lease with a landlord owned by BioDiscovery's former Director and Chief Executive Officer, who is now the Company's Chief Informatics Officer. The Company recorded $0.1 million in finance lease costs related to this lease for the year ended December 31, 2021. Refer to Note 11. Commitments and Contingencies for future commitments pertaining to this finance lease.

ITEM 9. CHANGES IN 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 principal executive and financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2021. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), means controls and other procedures of a company that are 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 recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. 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 the company's 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 judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2021 based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in its 2013 Internal Control — Integrated Framework. Based on this assessment, our management has concluded that our internal control over financial reporting was effective as of December 31, 2021. Pursuant to Section 404(c) of the Sarbanes-Oxley Act, our independent registered public accounting firm has issued an attestation report on the effectiveness of our internal control over financial reporting for the year ended December 31, 2021, which is included below.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as such term as defined in Exchange Act Rule 13a-15(f). Internal control over financial reporting is a process designed under the supervision and with the participation of our management, including our principal executive and financial officer, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America.

As the acquisition of BioDiscovery occurred in the fourth quarter of 2021, we excluded the internal control over financial reporting of BioDiscovery from the scope of our assessment of the effectiveness of the Company's internal controls. This exclusion is in accordance with the general guidance issued by the Staff of the SEC that an assessment of a recently-acquired business may be omitted from our scope in the year of acquisition, if specified conditions are satisfied. Goodwill and net intangibles assets acquired were not excluded from our assessment. BioDiscovery's total net assets excluded from our assessment constituted approximately 3% of the Company's total assets as of December 31, 2021, and BioDiscovery revenues excluded from our assessment represented approximately 6% of the Company's total revenue for the year ended December 31, 2021.

Remediation of Previously Disclosed Material Weakness

As disclosed in Item 9A in our Annual Report on Form 10-K for the year ended December 31, 2020 filed with the SEC on March 23, 2021, our management previously identified material weaknesses in our internal control environment over financial reporting related to an insufficient number of resources to support the growth and complexity of our financial reporting requirements. Specifically, the design of certain controls did not adequately provide appropriate segregation of duties. The failure to maintain appropriate segregation of duties had a pervasive impact and as such, this deficiency resulted in a risk that could have impacted all financial statement account balances and disclosures. The material weaknesses did not result in any identified material misstatements to our financial statements, and there were no changes to previously released financial results. During 2021, our management, with the oversight of the Audit Committee of our Board of Directors, engaged in efforts to remediate the material weaknesses identified and previously disclosed. We completed these remediation measures in the quarter ended December 31, 2021, including testing of the design and concluding on the operating effectiveness of the related controls.

Specifically, remediation efforts that we implemented during 2021 include the following:

- Management engaged external consultants to assist with our internal accounting functions and further enhance our internal controls, which increased the number of external personnel involved in financial reporting.

• We hired a new Chief Financial Officer, a Senior Manager SEC Reporting & Technical Accounting, a Senior Manager of Accounting, and a Senior Accountant, which has increased the number of qualified full-time employees involved in our financial reporting and the control environment.

Accordingly, we have determined that the material weaknesses are considered to be remediated. The financial statements and internal control over financial reporting have been audited by BDO USA LLP, an independent registered public accounting firm. BDO's reports with respect to fairness of the presentation of the financial statements, and the effectiveness of internal control over financial reporting, are included herein.

Changes in Internal Control over Financial Reporting

There were no changes to our internal control over financial reporting (as defined in Rules 13a-15(f) and 15-d-15(f) under the Exchange Act) that occurred during the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

Stockholders and Board of Directors

Bionano Genomics, Inc.

San Diego, CA

Opinion on Internal Control over Financial Reporting

We have audited Bionano Genomic, Inc's. (the "Company's") internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (the "COSO criteria"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of the Company as of December 31, 2021 and 2020, the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows for the years then ended, and the related notes and our report dated March 1, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Item 9A, Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit of internal control over financial reporting in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

As indicated in the accompanying Item 9A, Management's Annual Report on Internal Control over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of BioDiscovery, LLC., which was acquired during the fourth quarter of 2021, and which is included in the consolidated balance sheet of the Company as of December 31, 2021, and the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows for the year then ended. BioDiscovery, LLC. constituted approximately 3% of the Company's total assets as of December 31, 2021 and approximately 6% of revenues for the year then ended. Management did not assess the effectiveness of internal control over financial reporting of BioDiscovery, LLC. because of the timing of the acquisition. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of BioDiscovery, LLC.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and

dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ BDO USA, LLP

San Diego, CA

March 1, 2022

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

The information required by this item will be set forth under the captions "Election of Directors," "Delinquent Section 16(a) Reports," "Information Regarding the Board of Directors and Corporate Governance," in our definitive proxy statement to be filed with the Securities and Exchange Commission in connection with our 2022 Annual Meeting of Stockholders, or the Proxy Statement, which is expected to be filed not later than 120 days after the end of our fiscal year ended December 31, 2021, and is incorporated in this Annual Report by reference.

We have adopted a code of business conduct and ethics, or the Ethics Code, that applies to all our employees, officers and directors. This includes our principal executive officer, principal financial officer and principal accounting officer or controller, or persons performing similar functions. The full text of the Ethics Code is available on our website at www.bionanogenomics.com. If we make any substantive amendments to the Ethics Code or grant any waiver from a provision of the Ethics Code to any executive officer or director, we will promptly disclose the nature of the amendment or waiver on our website or in a Current Report on Form 8-K. Information contained in, or that can be accessed through, our website is not incorporated by reference herein, and you should not consider information on our website to be part of this Annual Report.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item will be set forth under the caption "Executive and Director Compensation" in the Proxy Statement and is incorporated in this Annual Report by reference.

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

The information required by this item will be set forth under the captions "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information" in the Proxy Statement and is incorporated in this Annual Report by reference.

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

The information required by this item will be set forth under the captions "Transaction With Related Persons and Indemnification" and "Information Regarding the Board of Directors and Corporate Governance" in the Proxy Statement and is incorporated in this Annual Report by reference.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this item will be set forth under the caption "Principal Accountant Fees and Services" in the Proxy Statement and is incorporated in this Annual Report by reference.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) List the following documents filed as a part of the report:

(1) Financial statements

The response to this portion of Item 15 is set forth under Item 8 above.

The following consolidated financial statements of Bionano Genomics, Inc are included in Item 8 of this report:

- Reports of Independent Registered Public Accounting Firm
- Consolidated Balance Sheets — December 31, 2021 and 2020
- Consolidated Statements of Operations — Years ended December 31, 2021 and 2020
- Consolidated Statements of Comprehensive Income — Years ended December 31, 2021 and 2020
- Consolidated Statements of Cash Flows — Years ended December 31, 2021 and 2020
- Notes to Consolidated Financial Statements

(2) Financial statement schedule.

All schedules have been omitted because they are not required or because the required information is given in the financial statements or notes thereto set forth under Item 8 above.

(3) Exhibits

A list of exhibits file with this Annual Report or incorporated herein by reference can be found in the Exhibit Index below.

Exhibit Index

Exhibit Number	Description
2.1^[1]	Agreement and Plan of Merger, dated August 21, 2020, by and among the Company, Alta Merger Sub, Inc., Lineagen, Inc. and Michael S. Paul, Ph.D.
2.2^€ [18]	Agreement and Plan of Merger, dated October 8, 2021, by and among the Company, Starship Merger Sub I, Inc., Starship Merger Sub II, LLC, BioDiscovery, Inc. and Soheil Shams.
3.1[14]	Amended and Restated Certificate of Incorporation, as amended.
3.2[2]	Amended and Restated Bylaws.
4.1[3]	Form of Common Stock Certificate.
4.2[3]	Form of Warrant to Purchase Series D-1 Preferred Stock issued to Midcap Financial Trust.
4.3[3]	Form of Warrant to Purchase Common Stock Issued to Underwriters.
4.4[3]	Form of Warrant Certificate (included in Exhibit 4.8).
4.5[3]	Form of Warrant Agent Agreement by and between the Registrant and American Stock Transfer & Trust Company LLC, as warrant agent.
4.6[4]	Form of Warrant to Purchase Common Stock for Service Providers.
4.7[5]	Registration Rights Agreement, dated March 14, 2019, by and among the Company and the Innovatus Investors.
4.8[6]	Form of Warrant to Purchase Common Stock issued to Investors in October 2019 Public Offering.
4.9[13]	Form of Warrant to Purchase Common Stock issued to Investors in April 2020 Public Offering.
4.10[15]	Underwriting Agreement, dated January 8, 2021, by and among Bionano Genomics, Inc. and Oppenheimer & Co. Inc., as representatives of the several underwriters named therein.
4.11[16]	Underwriting Agreement, dated January 20, 2021, by and among Bionano Genomics, Inc. and Oppenheimer & Co. Inc., as representatives of the several underwriters named therein.
4.12[14]	Description of the Company's Securities.
10.1+[3]	Bionano Genomics, Inc. Amended and Restated 2006 Equity Compensation Plan (the "2006 Plan").
10.2+[3]	Forms of grant notice, stock option agreement and notice of exercise under the 2006 Plan.
10.3+[7]	Bionano Genomics, Inc. 2018 Equity Incentive Plan, as amended (the "2018 Plan").
10.4+[3]	Forms of grant notice, stock option agreement and notice of exercise under the 2018 Plan.
10.5+[8]	Bionano Genomics, Inc. 2018 Employee Stock Purchase Plan.
10.6+[3]	Form of Indemnification Agreement by and between the Registrant and each director and executive officer.
10.7+	Bionano Genomics, Inc. Non-Employee Director Compensation Policy, as amended

Exhibit Number	Description
10.8+[3]	Employment Agreement by and between the Registrant and R. Erik Holmlin, Ph.D., dated November 7, 2017, as amended.
10.9+[1]	Employment Agreement, effective as of September 1, 2020, by and between Christopher Stewart and the Company.
10.10+[1]	Employment Agreement, effective as of August 31, 2020, by and between Alka Chaubey and the Company.
10.11+[3]	Employment Agreement by and between the Registrant and Mark Oldakowski, dated November 7, 2017.
10.12[3]	Lease by and between the Registrant and The Irvine Company LLC, dated January 16, 2012.
10.13[3]	First Amendment to the Lease by and between the Registrant and The Irvine Company LLC, dated September 10, 2013.
10.14[3]	Second Amendment to the Lease by and between the Registrant and The Irvine Company LLC, dated July 1, 2015.
10.15[14]	Third Amendment to the Lease by and between the Registrant and The Irvine Company LLC, dated December 19, 2019.
10.16[14]	Fourth Amendment to the Lease by and between the Registrant and The Irvine Company LLC, dated February 15, 2021.
10.17#[3]	Master Services Agreement by and between the Registrant and Skorpios Technologies, Inc. (f/k/a Novati Technologies, Inc. and f/k/a SVTC Technologies, LLC), dated March 2, 2009, as amended.
10.18#[3]	Manufacturing Services Agreement by and between the Registrant and Paramit Corporation, dated February 18, 2015.
10.19#[3]	License Agreement by and between Princeton University and the Registrant, dated January 7, 2004.
10.20#[3]	First Amendment to the License Agreement by and between Princeton University and the Registrant, dated December 17, 2004.
10.21#[3]	Second Amendment to the License Agreement by and between Princeton University and the Registrant, dated February 25, 2010.
10.22#[3]	Third Amendment to the License Agreement by and between Princeton University and the Registrant, dated October 17, 2011.
10.23#[3]	Fourth Amendment License Agreement by and between Princeton University and the Registrant, dated February 9, 2012.
10.24#[3]	License Agreement by and between the Registrant and Q Biotechnology CV dated May 1, 2014.
10.25#[3]	Amendment to Non-Exclusive Patent License Agreement by and between the Registrant and Q Biotechnology CV dated May 1, 2014.
10.26#[3]	License Agreement by and between the Registrant and New York University dated November 4, 2013.
10.27#[3]	Option and Sublicense Agreement by and between the Registrant and Pacific Biosciences of California, Inc. dated February 2, 2016.
10.28[5]	Common Stock Purchase Agreement, dated March 14, 2019, by and among the Company and the Innovatus Investors.
10.29[20]	Bionano Genomics, Inc. 2020 Inducement Plan, as amended.
10.30[12]	Form of Stock Option Grant Notice and Stock Option Agreement under the Bionano Genomics, Inc. 2020 Inducement Plan.
10.31[19]	Forms of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under the Bionano Genomics, Inc. 2018 Equity Incentive Plan.
10.32[17]	Sales Agreement, dated March 23, 2021, by and between the Company and Cowen and Company, LLC.
10.33	Standard Industrial/Commercial Single-Tenant Lease, made effective as of November 23, 2021, by and between the Company and 6777 Nancy Ridge LLC.
10.34^+	Employment Agreement, dated October 8, 2021 and effective October 18, 2021, by and between the Company and Soheil Shams.
10.35+	Stock Restriction Agreement, dated October 8, 2021 and effective October 18, 2021, by and between the Company and Soheil Shams.
10.36+	Employment Agreement, dated June 14, 2021, by and between the Company and Richard Shippy
10.37[5]	Common Stock Purchase Agreement, dated March 14, 2019, between the Company and Aspire Capital Fund, LLC
10.38	Commercial Single-Tenant Lease – Net, dated February 28, 2016, by and between Tesa Beach LLC and BioDiscovery, Inc.
10.39	Fifth Amendment to the Lease by and between the Registrant and The Irvine Company, LLC, dated January 12, 2022.
21.1	Subsidiaries of the Registrant.
23.1	Consent of BDO USA LLP, independent registered public accounting firm.
24.1	Power of Attorney (included on signature page).
31.1*	Certification of Principal Executive Officer pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended.
31.2*	Certification of Principal Financial Officer pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended.

Exhibit Number	Description
32.1*	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	Inline XBRL Instance Document—the instance document does not appear in the Interactive Data File as its XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104	Cover Page Interactive Data File (formatted in Inline XBRL and contained in Exhibit 101)
(1)	Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q, filed with the SEC on November 13, 2020.
(2)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on August 24, 2018.
(3)	Incorporated by reference to the Registrant's Registration Statement on Form S-1 (File No. 333-225970), as amended.
(4)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on November 21, 2018.
(5)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on March 14, 2019.
(6)	Incorporated by reference to the Registrant's Registration Statement on Form S-1 (File No. 333-233828), as amended.
(7)	Incorporated by reference to the Registrant's Registration Statement on Form S-8 (File No. 333-245764).
(8)	Incorporated by reference to the Registrant's Registration Statement on Form S-8 (File No. 333-227073).
(9)	Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q, filed with the SEC on August 8, 2019.
(10)	Incorporated by reference to the Registrant's Annual Report on Form 10-K, filed with the SEC on March 10, 2020.
(11)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on August 14, 2020.
(12)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on August 24, 2020.
(13)	Incorporated by reference to the Registrant's Registration Statement on Form S-1 (File No. 333-237074).
(14)	Incorporated by reference to the Registrant's Annual Report on Form 10-K, filed with the SEC on March 23, 2021.
(15)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on January 11, 2021.
(16)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on January 21, 2021.
(17)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on March 24, 2021.
(18)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on October 19, 2021.
(19)	Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q, filed with the SEC on August 4, 2021.
(20)	Incorporated by reference to the Registrant's Current Report on Form 8-K, filed with the SEC on October 12, 2021.
^	Certain exhibits and schedules have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The Registrant hereby undertakes to furnish supplementally a copy of any omitted exhibit or schedule upon request by the SEC.
+	Indicates management contract or compensatory plan.
#	Confidential treatment has been granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the SEC.
€	Pursuant to Item 601(b)(10) of Regulation S-K, certain portions of this exhibit have been omitted (indicated by "[***]") because the Company has determined that the information is not material and is the type that the Company treats as private or confidential.
*	This certification is deemed not filed for purpose of section 18 of the Exchange Act or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act or the Exchange Act.

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, as amended, the Registrant has duly caused this Annual Report to be signed on its behalf by the undersigned, thereunto duly authorized**.**

Company Name

Date: March 1, 2022

By: /s/ R. Erik Holmlin, Ph.D.
R. Erik Holmlin, Ph.D.
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints R. Erik Holmlin, Ph.D., as his or her true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign this Annual Report on Form 10-K of Bionano Genomics, Inc., and any or all amendments thereto, and 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 requisite or necessary to be done in and about the premises hereby ratifying and confirming all that said attorney-in-fact and agent, or his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

Signature	Title	Date
/s/ R. Erik Holmlin, Ph.D. R. Erik Holmlin, Ph.D.	Chief Executive Officer and Director *(Principal Executive Officer)*	March 1, 2022
/s/ Christopher Stewart Christopher Stewart	Chief Financial Officer *(Principal Financial and Accounting Officer)*	March 1, 2022
/s/ David L. Barker, Ph.D. David L. Barker, Ph.D.	Director	March 1, 2022
/s/ Albert A. Luderer, Ph.D. Albert A. Luderer, Ph.D.	Director	March 1, 2022
/s/ Yvonne Linney, Ph.D. Yvonne Linney, Ph.D.	Director	March 1, 2022
/s/ Hannah Mamuszka Hannah Mamuszka	Director	March 1, 2022
/s/ Aleksandar Rajkovic, M.D., Ph.D Aleksandar Rajkovic, M.D., Ph.D.	Director	March 1, 2022
/s/ Christopher Twomey Christopher Twomey	Director	March 1, 2022

/s/ Kristiina Vuori, M.D., Ph.D. Kristiina Vuori, M.D., Ph.D.	Director	March 1, 2022
/s/ Vincent Wong, J.D., M.B.A. Vincent Wong, J.D., M.B.A.	Director	March 1, 2022

BIONANO GENOMICS, INC.

NON-EMPLOYEE DIRECTOR COMPENSATION POLICY

Each member of the Board of Directors (the "***Board***") who is not also serving as an employee of or consultant to Bionano Genomics, Inc. (the "***Company***") or any of its subsidiaries (each such member, an "***Eligible Director***") will receive the compensation described in this policy for his or her Board service. An Eligible Director may decline all or any portion of his or her compensation by giving notice to the Company prior to the date cash may be paid or equity awards are to be granted, as the case may be. This policy may be amended at any time in the sole discretion of the Board or the Compensation Committee of the Board.

Annual Cash Compensation

The annual cash compensation amount set forth below is payable to Eligible Directors in equal quarterly installments, payable in arrears on the last day of each fiscal quarter in which the service occurred. If an Eligible Director joins the Board or a committee of the Board at a time other than effective as of the first day of a fiscal quarter, each annual retainer set forth below will be pro-rated based on days served in the applicable fiscal year, with the pro-rated amount paid for the first fiscal quarter in which the Eligible Director provides the service and regular full quarterly payments thereafter. All annual cash fees are vested upon payment.

1. Annual Board Service Retainer:

    a. All Eligible Directors: $40,000

    b. Chairman of the Board Service Retainer (in addition to Eligible Director Service Retainer): $20,000

2. Annual Committee Chair Service Retainer:

    a. Chairman of the Audit Committee: $20,000

    b. Chairman of the Compensation Committee: $15,000

    c. Chairman of the Nominating and Corporate Governance Committee: $10,000

    d. Chairman of the Science and Technology Committee: $10,000

3. Annual Committee Member Service Retainer (not applicable to Committee Chairs):

    a. Member of the Audit Committee: $10,000

    b. Member of the Compensation Committee: $7,500

c. Member of the Nominating and Corporate Governance Committee: $5,000

d. Member of the Science and Technology Committee: $5,000

Equity Compensation

The equity compensation set forth below will be granted under the Company's 2018 Equity Incentive Plan, as amended (the "***Plan***"), subject to the approval of the Plan by the Company's stockholders. All stock options granted under this policy will be nonstatutory stock options, with an exercise price per share equal to 100% of the Fair Market Value (as defined in the Plan) of the underlying common stock of the Company (the "***Common Stock***") on the date of grant, and a term of ten years from the date of grant (subject to earlier termination in connection with a termination of service as provided in the Plan, provided that upon a termination of service other than for death, disability or cause, the post-termination exercise period will be 12 months from the date of termination).

1. Initial Grant: For each Eligible Director who is first elected or appointed to the Board following the Effective Date, on the date of such Eligible Director's initial election or appointment to the Board (or, if such date is not a market trading day, the first market trading day thereafter), the Eligible Director will be automatically, and without further action by the Board or Compensation Committee of the Board, granted a stock option to purchase Common Stock with an aggregate Black-Scholes option value of $247,500 (the "***Initial Grant***"). The shares subject to each Initial Grant will vest in equal monthly installments over a three year period such that the option is fully vested on the third anniversary of the date of grant, subject to the Eligible Director's Continuous Service (as defined in the Plan) through each such vesting date and will vest in full upon a Change in Control (as defined in the Plan).

2. Annual Grant: On the date of each annual stockholder meeting of the Company held after the Effective Date, each Eligible Director who continues to serve as a non-employee member of the Board following such stockholder meeting will be automatically, and without further action by the Board or Compensation Committee of the Board, granted a stock option to purchase Common Stock with an aggregate Black-Scholes option value of $165,000 (the "***Annual Grant***"). The shares subject to the Annual Grant will vest in equal monthly installments over the 12 months following the date of grant, provided that the Annual Grant will in any case be fully vested on the date of Company's next annual stockholder meeting, subject to the Eligible Director's Continuous Service (as defined in the Plan) through such vesting date and will vest in full upon a Change in Control (as defined in the Plan).

Amended effective as of November 2, 2021

AIRCRE contracts

Exhibit 10.33

STANDARD INDUSTRIAL/COMMERCIAL SINGLE-TENANT LEASE - NET (DO NOT USE THIS FORM FOR MULTI-TENANT BUILDINGS)

1. Basic Provisions ("Basic Provisions").

1.1 **Parties.** This Lease ("**Lease**"), dated for reference purposes only November 23, 2021, is made by and between 6777 Nancy Ridge LLC ("**Lessor**") and Bionano Genomics ("**Lessee**"), (collectively the "**Parties**," or individually a "**Party**").

1.2 **Premises:** That certain real property, including all improvements therein or to be provided by Lessor under the terms of this Lease, commonly known as (street address, city, state, zip): 6777 Nancy Ridge Drive, San Diego, CA 92121 ("**Premises**"). The Premises are located in the County of San Diego, and are generally described as (describe briefly the nature of the property and , if applicable, the "**Project**," if the property is located within a Project): 11,978 square feet of lab/office space. (See also Paragraph 2)

1.3 **Term:** 4 years and 2 months ("**Original Term**") commencing December 1, 2021 ("**Commencement Date**") and ending January 31, 2026 ("**Expiration Date**"). (See also Paragraph 3)

1.4 **Early Possession:** If the Premises are available Lessee may have non-exclusive possession of the Premises commencing _____ ("**Early Possession Date**"). (See also Paragraphs 3.2 and 3.3)

1.5 **Base Rent:** $3.50 per month ("**Base Rent**"), payable on the first (1st) day of each month commencing January 1, 2022 . (See also Paragraph 4)

☑ If this box is checked, there are provisions in this Lease for the Base Rent to be adjusted. The base rent shall increase annually by three percent (3%) ~~See Paragraph~~ ____.

1.6 Base Rent and Other Monies Paid Upon Execution:

(a) **Base Rent:** $3.50 for the period January 1, 2022-January 31, 2022.

(b) **Security Deposit:** $41,923.00 ("**Security Deposit**"). (See also Paragraph 5)

(c) Building Expenses ~~Association Fees~~: $6,947.00 for the period December 1, 2021-December 31, 2021.

(d) Other: ____ for ____.

(e) **Total Due Upon Execution of this Lease:** $90,793.00.

1.7 **Agreed Use:** Lab/office. (See also Paragraph 6)

1.8 **Insuring Party.** Lessor is the "**Insuring Party**" unless otherwise stated herein. (See also Paragraph 8)

1.9 **Real Estate Brokers.** (See also Paragraph 15 and 25)

(a) **Representation**: Each Party acknowledges receiving a Disclosure Regarding Real Estate Agency Relationship, confirms and consents to the following agency relationships in this Lease with the following real estate brokers ("**Broker(s)**") and/or their agents ("Agent(s)"):

Lessor's Brokerage Firm N/A License No. N/A Is the broker of (check one): ☐ the Lessor; or both the Lessee and Lessor (dual agent).

Lessor's Agent N/A License No. N/A is (check one): ☐ the Lessor's Agent (salesperson or broker associate); or ☐ both the Lessee's Agent and the Lessor's Agent (dual agent).

Lessee's Brokerage Firm N/A License No. N/A Is the broker of (check one): ☐ the Lessee; or ☐ both the Lessee and Lessor (dual agent).

Lessee's Agent N/A License No. N/A is (check one): ☐ the Lessee's Agent (salesperson or broker associate); or ☐ both the Lessee's Agent and the Lessor's Agent (dual agent).

~~(b) **Payment to Brokers.** Upon execution and delivery of this Lease by both Parties, Lessor shall pay to the Brokers the brokerage fee agreed to in a separate written agreement (or if there is no such agreement, the sum of ___ or ___ % of the total Base Rent) for the brokerage services rendered by the Brokers.~~

1.10 **Guarantor.** The obligations of the Lessee under this Lease are to be guaranteed by N/A ("**Guarantor**"). (See also Paragraph 37)

1.11 **Attachments.** Attached hereto are the following, all of which constitute a part of this Lease:

☑ an Addendum consisting of Paragraphs 1 through 7 ;

☑ a plot plan depicting the Premises;

☐ a current set of the Rules and Regulations;

☐ a Work Letter;

☐ other (specify): _____.

2. Premises.

2.1 **Letting**. Lessor hereby leases to Lessee, and Lessee hereby leases from Lessor, the Premises, for the term, at the rental, and upon all of the terms, covenants and conditions set forth in this Lease. While the approximate square footage of the Premises may have been used in the marketing of the Premises for purposes of comparison, the Base Rent stated herein is NOT tied to square footage and is not subject to adjustment should the actual size be determined to be different. **NOTE: Lessee is advised to verify the actual size prior to executing this Lease.**

DS / CS

INITIALS INITIALS

2.2 **Condition**. Lessor shall deliver the Premises to Lessee broom clean and free of debris on the Commencement Date or the Early Possession Date, whichever first occurs ("**Start Date**"), and, so long as the required service contracts described in Paragraph 7.1(b) below are obtained by Lessee and in effect within thirty days following the Start Date, warrants that the existing electrical, plumbing, fire sprinkler, lighting, heating, ventilating and air conditioning systems ("**HVAC**"), loading doors, sump pumps, if any, and all other such elements in the Premises, other than those constructed by Lessee, shall be in good operating condition on said date, that the structural elements of the roof, bearing walls and foundation of any buildings on the Premises (the "**Building**") shall be free of material defects, and that the Premises do not contain hazardous levels of any mold or fungi defined as toxic under applicable state or federal law. If a non-compliance with said warranty exists as of the Start Date, or if one of such systems or elements should malfunction or fail within the appropriate warranty period, Lessor shall, as Lessor's sole obligation with respect to such matter, except as otherwise provided in this Lease, promptly after receipt of written notice from Lessee setting forth with specificity the nature and extent of such non-compliance, malfunction or failure, rectify same at Lessor's expense. The warranty periods shall be as follows: (i) 6 months as to the HVAC systems, and (ii) 30 days as to the remaining systems and other elements of the Building. If Lessee does not give Lessor the required notice within the appropriate warranty period, correction of any such non-compliance, malfunction or failure shall be the obligation of Lessee at Lessee's sole cost and expense. Lessor also warrants, that unless otherwise specified in writing, Lessor is unaware of (i) any recorded Notices of Default affecting the Premise; (ii) any delinquent amounts due under any loan secured by the Premises; and (iii) any bankruptcy proceeding affecting the Premises.

2.3 **Compliance**. Lessor warrants that to the best of its knowledge the improvements on the Premises comply with the building codes, applicable laws, covenants or restrictions of record, regulations, and ordinances ("**Applicable Requirements**") that were in effect at the time that each improvement, or portion thereof, was constructed. Said warranty does not apply to the use to which Lessee will put the Premises, modifications which may be required by the Americans with Disabilities Act or any similar laws as a result of Lessee's use (see Paragraph 50), or to any Alterations or Utility Installations (as defined in Paragraph 7.3(a)) made or to be made by Lessee. **NOTE: Lessee is responsible for determining whether or not the Applicable Requirements, and especially the zoning, are appropriate for Lessee's intended use, and acknowledges that past uses of the Premises may no longer be allowed.** If the Premises do not comply with said warranty, Lessor shall, except as otherwise provided, promptly after receipt of written notice from Lessee setting forth with specificity the nature and extent of such non-compliance, rectify the same at Lessor's expense. If Lessee does not give Lessor written notice of a non-compliance with this warranty within 6 months following the Start Date, correction of that non-compliance shall be the obligation of Lessee at Lessee's sole cost and expense. If the Applicable Requirements are hereafter changed so as to require during the term of this Lease the construction of an addition to or an alteration of the Premises and/or Building, the remediation of any Hazardous Substance, or the reinforcement or other physical modification of the Unit, Premises and/or Building ("**Capital Expenditure**"), Lessor and Lessee shall allocate the cost of such work as follows:

(a) Subject to Paragraph 2.3(c) below, if such Capital Expenditures are required as a result of the specific and unique use of the Premises by Lessee as compared with uses by tenants in general, Lessee shall be fully responsible for the cost thereof, provided, however, that if such Capital Expenditure is required during the last 2 years of this Lease and the cost thereof exceeds 6 months' Base Rent, Lessee may instead terminate this Lease unless Lessor notifies Lessee, in writing, within 10 days after receipt of Lessee's termination notice that Lessor has elected to pay the difference between the actual cost thereof and an amount equal to 6 months' Base Rent. If Lessee elects termination, Lessee shall immediately cease the use of the Premises which requires such Capital Expenditure and deliver to Lessor written notice specifying a termination date at least 90 days thereafter. Such termination date shall, however, in no event be earlier than the last day that Lessee could legally utilize the Premises without commencing such Capital Expenditure.

(b) If such Capital Expenditure is not the result of the specific and unique use of the Premises by Lessee (such as, governmentally mandated seismic modifications), then Lessor shall pay for such Capital Expenditure and Lessee shall only be obligated to pay, each month during the remainder of the term of this Lease or any extension thereof, on the date that on which the Base Rent is due, an amount equal to 1/144th of the portion of such costs reasonably attributable to the Premises. Lessee shall pay Interest on the balance but may prepay its obligation at any time. If, however, such Capital Expenditure is required during the last 2 years of this Lease or if Lessor reasonably determines that it is not economically feasible to pay its share thereof, Lessor shall have the option to terminate this Lease upon 90 days prior written notice to Lessee unless Lessee notifies Lessor, in writing, within 10 days after receipt of Lessor's termination notice that Lessee will pay for such Capital Expenditure. If Lessor does not elect to terminate, and fails to tender its share of any such Capital Expenditure, Lessee may advance such funds and deduct same, with Interest, from Rent until Lessor's share of such costs have been fully paid. If Lessee is unable to finance Lessor's share, or if the balance of the Rent due and payable for the remainder of this Lease is not sufficient to fully reimburse Lessee on an offset basis, Lessee shall have the right to terminate this Lease upon 30 days written notice to Lessor.

(c) Notwithstanding the above, the provisions concerning Capital Expenditures are intended to apply only to non-voluntary, unexpected, and new Applicable Requirements. If the Capital Expenditures are instead triggered by Lessee as a result of an actual or proposed change in use, change in intensity of use, or modification to the Premises then, and in that event, Lessee shall either: (i) immediately cease such changed use or intensity of use and/or take such other steps as may be necessary to eliminate the requirement for such Capital Expenditure, or (ii) complete such Capital Expenditure at its own expense. Lessee shall not, however, have any right to terminate this Lease.

2.4 **Acknowledgements**. Lessee acknowledges that: (a) it has been given an opportunity to inspect and measure the Premises, (b) it has been advised by Lessor and/or Brokers to satisfy itself with respect to the size and condition of the Premises (including but not limited to the electrical, HVAC and fire sprinkler systems, security, environmental aspects, and compliance with Applicable Requirements and the Americans with Disabilities Act), and their suitability for Lessee's intended use, (c) Lessee has made such investigation as it deems necessary with reference to such matters and assumes all responsibility therefor as the same relate to its occupancy of the Premises, (d) it is not relying on any representation as to the size of the Premises made by Brokers or Lessor, (e) the square footage of the Premises was not material to Lessee's decision to lease the Premises and pay the Rent stated herein, and (f) neither Lessor, Lessor's agents, nor Brokers have made any oral or written representations or warranties with respect to said matters other than as set forth in this Lease. In addition, Lessor acknowledges that: (i) Brokers have made no representations, promises or warranties concerning Lessee's ability to honor the Lease or suitability to occupy the Premises, and (ii) it is Lessor's sole responsibility to investigate the financial capability and/or suitability of all proposed tenants.

2.5 **Lessee as Prior Owner/Occupant**. The warranties made by Lessor in Paragraph 2 shall be of no force or effect if immediately prior to the Start Date Lessee was the owner or occupant of the Premises. In such event, Lessee shall be responsible for any necessary corrective work.

3. Term.

3.1 **Term**. The Commencement Date, Expiration Date and Original Term of this Lease are as specified in Paragraph 1.3.

3.2 **Early Possession**. Any provision herein granting Lessee Early Possession of the Premises is subject to and conditioned upon the Premises being available for such possession prior to the Commencement Date. Any grant of Early Possession only conveys a non-exclusive right to occupy the Premises. If Lessee totally or partially occupies the Premises prior to the Commencement Date, the obligation to pay Base Rent shall be abated for the period of such Early Possession. All other terms of this Lease (including but not limited to the obligations to pay Real Property Taxes and insurance premiums and to maintain the Premises) shall be in effect during such period. Any such Early Possession shall not affect the Expiration Date.

3.3 **Delay In Possession**. Lessor agrees to use commercially reasonable efforts to deliver exclusive possession of the Premises to Lessee by the Commencement Date. If, despite said efforts, Lessor is unable to deliver possession by such date, Lessor shall not be subject to any liability therefor, nor shall such failure affect the validity of this Lease or change the Expiration Date. Lessee shall not, however, be obligated to pay Rent or perform its other obligations until Lessor delivers possession of the Premises and any period of rent abatement that Lessee would otherwise have enjoyed shall run from the date of delivery of possession and continue for a period equal to what Lessee would otherwise have enjoyed under the terms hereof, but minus any days of delay caused by the acts or omissions of Lessee. If possession is not delivered within 60 days after the Commencement Date, as the same may be extended under the terms of any Work Letter executed by Parties, Lessee may, at its option, by notice in writing within 10 days after the end of such 60 day period, cancel this Lease, in which event the Parties shall be discharged from all obligations hereunder. If such written notice is not received by Lessor within said 10 day period, Lessee's right to cancel shall terminate. If possession of the Premises is not delivered within 120 days after the Commencement Date, this Lease shall terminate unless other agreements are reached between Lessor and Lessee, in writing.

3.4 **Lessee Compliance**. Lessor shall not be required to tender possession of the Premises to Lessee until Lessee complies with its obligation to provide evidence of insurance (Paragraph 8.5). Pending delivery of such evidence, Lessee shall be required to perform all of its obligations under this Lease from and after the Start Date, including the payment of Rent, notwithstanding Lessor's election to withhold possession pending receipt of such evidence of insurance. Further, if Lessee is required to perform any other conditions prior to or concurrent with the Start Date, the Start Date shall occur but Lessor may elect to withhold possession until such conditions are satisfied.

4. Rent.

4.1 **Rent Defined**. All monetary obligations of Lessee to Lessor under the terms of this Lease (except for the Security Deposit) are deemed to be rent ("**Rent**").

4.2 **Payment**. Lessee shall cause payment of Rent to be received by Lessor in lawful money of the United States, without offset or deduction (except as specifically permitted in this Lease), on or before the day on which it is due. All monetary amounts shall be rounded to the nearest whole dollar. In the event that any invoice prepared by Lessor is inaccurate such inaccuracy shall not constitute a waiver and Lessee shall be obligated to pay the amount set forth in this Lease. Rent for any period during the term hereof which is for less than one full calendar month shall be prorated based upon the actual number of days of said month. Payment of Rent shall be made to Lessor at its address stated herein or to such other persons or place as Lessor may from time to time designate in writing. Acceptance of a payment which is less than the amount then due shall not be a waiver of Lessor's rights to the balance of such Rent, regardless of Lessor's endorsement of any check so stating. In the event that any check, draft, or other instrument of payment given by Lessee to Lessor is dishonored for any reason, Lessee agrees to pay to Lessor the sum of $25 in addition to any Late Charge and Lessor, at its option, may require all future Rent be paid by cashier's check. Payments will be applied first to accrued late charges and attorney's fees, second to accrued interest, then to Base Rent, Insurance and Real Property Taxes, and any remaining amount to any other outstanding charges or costs.

4.3 **Association Fees**. In addition to the Base Rent, Lessee shall pay to Lessor each month an amount equal to any owner's association or condominium fees levied or assessed against the Premises. Said monies shall be paid at the same time and in the same manner as the Base Rent.

5. Security Deposit. Lessee shall deposit with Lessor upon execution hereof the Security Deposit as security for Lessee's faithful performance of its obligations under this Lease. If Lessee fails to pay Rent, or otherwise Defaults under this Lease, Lessor may use, apply or retain all or any portion of said Security Deposit for the payment of any amount already due Lessor, for Rents which will be due in the future, and/ or to reimburse or compensate Lessor for any liability, expense, loss or damage which Lessor may suffer or incur by reason thereof. If Lessor uses or applies all or any portion of the Security Deposit, Lessee shall within 10 days after written request therefor deposit monies with Lessor sufficient to restore said Security Deposit to the full amount required by this Lease. If the Base Rent increases during the term of this Lease, Lessee shall, upon written request from Lessor, deposit additional monies with Lessor so that the total amount of the Security Deposit shall at all times bear the same proportion to the increased Base Rent as the initial Security Deposit bore to the initial Base Rent. Should the Agreed Use be amended to accommodate a material change in the business of Lessee or to accommodate a sublessee or assignee, Lessor shall have the right to increase the Security Deposit to the extent necessary, in Lessor's reasonable judgment, to account for any increased wear and tear that the Premises may suffer as a result thereof. If a change in control of Lessee occurs during this Lease and following such change the financial condition of Lessee is, in Lessor's reasonable judgment, significantly reduced, Lessee shall deposit such additional monies with Lessor as shall be sufficient to cause the Security Deposit to be at a commercially reasonable level based on such change in financial condition. Lessor shall not be required to keep the Security Deposit separate from its general accounts. Within 90 days after the expiration or termination of this Lease, Lessor shall return that portion of the Security Deposit not used or applied by Lessor. Lessor shall upon written request provide Lessee with an accounting showing how that portion of the Security Deposit that was not returned was applied. No part of the Security Deposit shall be considered to be held in trust, to bear interest or to be prepayment for any monies to be paid by Lessee under this Lease. THE SECURITY DEPOSIT SHALL NOT BE USED BY LESSEE IN LIEU OF PAYMENT OF THE LAST MONTH'S RENT.

6. Use.

6.1 **Use**. Lessee shall use and occupy the Premises only for the Agreed Use, or any other legal use which is reasonably comparable thereto, and for no other purpose. Lessee shall not use or permit the use of the Premises in a manner that is unlawful, creates damage, waste or a nuisance, or that disturbs occupants of or causes damage to neighboring premises or properties. Other than guide, signal and seeing eye dogs, Lessee shall not keep or allow in the Premises any pets, animals, birds, fish, or reptiles. Lessor shall not unreasonably withhold or delay its consent to any written request for a modification of the Agreed Use, so long as the same will not impair the structural integrity of the improvements on the Premises or the mechanical or electrical systems therein, and/or is not significantly more burdensome to the Premises. If Lessor elects to withhold consent, Lessor shall within 7 days after such request give written notification of same, which notice shall include an explanation of Lessor's objections to the change in the Agreed Use.

6.2 **Hazardous Substances**.

(a) **Reportable Uses Require Consent**. The term "**Hazardous Substance**" as used in this Lease shall mean any product, substance, or waste whose presence, use, manufacture, disposal, transportation, or release, either by itself or in combination with other materials expected to be on the Premises, is either: (i) potentially injurious to the public health, safety or welfare, the environment or the Premises, (ii) regulated or monitored by any governmental authority, or (iii) a basis for potential liability of Lessor to any governmental agency or third party under any applicable statute or common law theory. Hazardous Substances shall include, but not be limited to, hydrocarbons, petroleum, gasoline, and/or crude oil or any products, by-products or fractions thereof. Lessee shall not engage in any activity in or on the Premises which constitutes a Reportable Use of Hazardous Substances without the express prior written consent of Lessor and timely compliance (at Lessee's expense) with all Applicable Requirements. "**Reportable Use**" shall mean (i) the installation or use of any above or below ground storage tank, (ii) the generation, possession, storage, use, transportation, or disposal of a Hazardous Substance that requires a permit from, or with respect to which a report, notice, registration or business plan is required to be filed with, any governmental authority, and/or (iii) the presence at the Premises of a Hazardous Substance with respect to which any Applicable Requirements requires that a notice be given to persons entering or occupying the Premises or neighboring properties. Notwithstanding the foregoing, Lessee may use any ordinary and customary materials reasonably required to be used in the normal course of the Agreed Use, ordinary office supplies (copier toner, liquid paper, glue, etc.) and common household cleaning materials, so long as such use is in compliance with all Applicable Requirements, is not a Reportable Use, and does not expose the Premises or neighboring property to any meaningful risk of contamination or damage or expose Lessor to any liability therefor. In addition, Lessor may condition its consent to any Reportable Use upon receiving such additional assurances as Lessor reasonably deems necessary to protect itself, the public, the Premises and/or the environment against damage, contamination, injury and/or liability, including, but not limited to, the installation (and removal on or before Lease expiration or termination) of protective modifications (such as concrete encasements) and/or increasing the Security Deposit.

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(b) **Duty to Inform Lessor**. If Lessee knows, or has reasonable cause to believe, that a Hazardous Substance has come to be located in, on, under or about the Premises, other than as previously consented to by Lessor, Lessee shall immediately give written notice of such fact to Lessor, and provide Lessor with a copy of any report, notice, claim or other documentation which it has concerning the presence of such Hazardous Substance.

(c) **Lessee Remediation**. Lessee shall not cause or permit any Hazardous Substance to be spilled or released in, on, under, or about the Premises (including through the plumbing or sanitary sewer system) and shall promptly, at Lessee's expense, comply with all Applicable Requirements and take all investigatory and/or remedial action reasonably recommended, whether or not formally ordered or required, for the cleanup of any contamination of, and for the maintenance, security and/or monitoring of the Premises or neighboring properties, that was caused or materially contributed to by Lessee, or pertaining to or involving any Hazardous Substance brought onto the Premises during the term of this Lease, by or for Lessee, or any third party.

(d) **Lessee Indemnification**. Lessee shall indemnify, defend and hold Lessor, its agents, employees, lenders and ground lessor, if any, harmless from and against any and all loss of rents and/or damages, liabilities, judgments, claims, expenses, penalties, and attorneys' and consultants' fees arising out of or involving any Hazardous Substance brought onto the Premises by or for Lessee, ~~or any third party~~ (provided, however, that Lessee shall have no liability under this Lease with respect to underground migration of any Hazardous Substance under the Premises from adjacent properties not caused or contributed to by Lessee). Lessee's obligations shall include, but not be limited to, the effects of any contamination or injury to person, property or the environment created or suffered by Lessee, and the cost of investigation, removal, remediation, restoration and/or abatement, and shall survive the expiration or termination of this Lease. **No termination, cancellation or release agreement entered into by Lessor and Lessee shall release Lessee from its obligations under this Lease with respect to Hazardous Substances, unless specifically so agreed by Lessor in writing at the time of such agreement.** Notwithstanding anything to the contrary contained in Paragraph 6.2 of the Lease, Lessee shall not indemnify Lessor or be liable or responsible in any way for any Hazardous Substance brought onto the Premises or the Building by any party other than Lessee or its employees, agents or contractors.

(e) **Lessor Indemnification**. Except as otherwise provided in paragraph 8.7, Lessor and its successors and assigns shall indemnify, defend, reimburse and hold Lessee, its employees and lenders, harmless from and against any and all environmental damages, including the cost of remediation, which result from Hazardous Substances which existed on the Premises prior to Lessee's occupancy or which are caused by the gross negligence or willful misconduct of Lessor, its agents or employees. Lessor's obligations, as and when required by the Applicable Requirements, shall include, but not be limited to, the cost of investigation, removal, remediation, restoration and/or abatement, and shall survive the expiration or termination of this Lease.

(f) **Investigations and Remediations**. Lessor shall retain the responsibility and pay for any investigations or remediation measures required by governmental entities having jurisdiction with respect to the existence of Hazardous Substances on the Premises prior to Lessee's occupancy, unless such remediation measure is required as a result of Lessee's use (including "Alterations", as defined in paragraph 7.3(a) below) of the Premises, in which event Lessee shall be responsible for such payment. Lessee shall cooperate fully in any such activities at the request of Lessor, including allowing Lessor and Lessor's agents to have reasonable access to the Premises at reasonable times in order to carry out Lessor's investigative and remedial responsibilities.

(g) **Lessor Termination Option**. If a Hazardous Substance Condition (see Paragraph 9.1(e)) occurs during the term of this Lease, unless Lessee is legally responsible therefor (in which case Lessee shall make the investigation and remediation thereof required by the Applicable Requirements and this Lease shall continue in full force and effect, but subject to Lessor's rights under Paragraph 6.2(d) and Paragraph 13), Lessor may, at Lessor's option, either (i) investigate and remediate such Hazardous Substance Condition, if required, as soon as reasonably possible at Lessor's expense, in which event this Lease shall continue in full force and effect, or (ii) if the estimated cost to remediate such condition exceeds 12 times the then monthly Base Rent or $100,000, whichever is greater, give written notice to Lessee, within 30 days after receipt by Lessor of knowledge of the occurrence of such Hazardous Substance Condition, of Lessor's desire to terminate this Lease as of the date 60 days following the date of such notice. In the event Lessor elects to give a termination notice, Lessee may, within 10 days thereafter, give written notice to Lessor of Lessee's commitment to pay the amount by which the cost of the remediation of such Hazardous Substance Condition exceeds an amount equal to 12 times the then monthly Base Rent or $100,000, whichever is greater. Lessee shall provide Lessor with said funds or satisfactory assurance thereof within 30 days following such commitment. In such event, this Lease shall continue in full force and effect, and Lessor shall proceed to make such remediation as soon as reasonably possible after the required funds are available. If Lessee does not give such notice and provide the required funds or assurance thereof within the time provided, this Lease shall terminate as of the date specified in Lessor's notice of termination.

6.3 **Lessee's Compliance with Applicable Requirements**. Except as otherwise provided in this Lease, Lessee shall, at Lessee's sole expense, fully, diligently and in a timely manner, materially comply with all Applicable Requirements, the requirements of any applicable fire insurance underwriter or rating bureau, and the recommendations of Lessor's engineers and/or consultants which relate in any manner to the Premises, without regard to whether said Applicable Requirements are now in effect or become effective after the Start Date. Lessee shall, within 10 days after receipt of Lessor's written request, provide Lessor with copies of all permits and other documents, and other information evidencing Lessee's compliance with any Applicable Requirements specified by Lessor, and shall immediately upon receipt, notify Lessor in writing (with copies of any documents involved) of any threatened or actual claim, notice, citation, warning, complaint or report pertaining to or involving the failure of Lessee or the Premises to comply with any Applicable Requirements. Likewise, Lessee shall immediately give written notice to Lessor of: (i) any water damage to the Premises and any suspected seepage, pooling, dampness or other condition conducive to the production of mold; or (ii) any mustiness or other odors that might indicate the presence of mold in the Premises. In addition, Lessee shall provide copies of all relevant material safety data sheets (**MSDS**) to Lessor within 10 days of the receipt of a written request therefor. In addition, Lessee shall provide Lessor with copies of its business license, certificate of occupancy and/or any similar document within 10 days of the receipt of a written request therefor.

6.4 **Inspection; Compliance**. Lessor and Lessor's "**Lender**" (as defined in Paragraph 30) and consultants authorized by Lessor shall have the right to enter into Premises at any time in the case of an emergency, and otherwise at reasonable times after reasonable notice, for the purpose of inspecting and/or testing the condition of the Premises and/or for verifying compliance by Lessee with this Lease. The cost of any such inspections shall be paid by Lessor, unless a violation of Applicable Requirements, or a Hazardous Substance Condition (see paragraph 9.1(e)) is found to exist or be imminent, or the inspection is requested or ordered by a governmental authority. In such case, Lessee shall upon request reimburse Lessor for the cost of such inspection, so long as such inspection is reasonably related to the violation or contamination. In addition, Lessee shall provide copies of all relevant material safety data sheets (**MSDS**) to Lessor within 10 days of the receipt of a written request therefor. Lessee acknowledges that any failure on its part to allow such inspections or testing will expose Lessor to risks and potentially cause Lessor to incur costs not contemplated by this Lease, the extent of which will be extremely difficult to ascertain. Accordingly, should the Lessee fail to allow such inspections and/or testing in a timely fashion the Base Rent shall be automatically increased, without any requirement for notice to Lessee, by an amount equal to 10% of the then existing Base Rent or $100, whichever is greater for the remainder to the Lease. The Parties agree that such increase in Base Rent represents fair and reasonable compensation for the additional risk/costs that Lessor will incur by reason of Lessee's failure to allow such inspection and/or testing. Such increase in Base Rent shall in no event constitute a waiver of Lessee's Default or Breach with respect to such failure nor prevent the exercise of any of the other rights and remedies granted hereunder.

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7. Maintenance; Repairs; Utility Installations; Trade Fixtures and Alterations.

7.1 **Lessee's Obligations**.

(a) **In General**. Subject to the provisions of Paragraph 2.2 (Condition), 2.3 (Compliance), 6.3 (Lessee's Compliance with Applicable Requirements), 7.2 (Lessor's Obligations), 9 (Damage or Destruction), and 14 (Condemnation), Lessee shall, at Lessee's sole expense, keep the Premises, Utility Installations (intended for Lessee's exclusive use, no matter where located), and Alterations in good order, condition and repair (whether or not the portion of the Premises requiring repairs, or the means of repairing the same, are reasonably or readily accessible to Lessee, and whether or not the need for such repairs occurs as a result of Lessee's use, any prior use, the elements or the age of such portion of the Premises), including, but not limited to, all equipment or facilities, such as plumbing, HVAC equipment, electrical, lighting facilities, boilers, pressure vessels, fire protection system, fixtures, walls (interior and exterior), foundations, ceilings, roofs, roof drainage systems, floors, windows, doors, plate glass, skylights, landscaping, driveways, parking lots, fences, retaining walls, signs, sidewalks and parkways located in, on, or adjacent to the Premises. Lessee, in keeping the Premises in good order, condition and repair, shall exercise and perform good maintenance practices, specifically including the procurement and maintenance of the service contracts required by Paragraph 7.1(b) below. Lessee's obligations shall include restorations, replacements or renewals when necessary to keep the Premises and all improvements thereon or a part thereof in good order, condition and state of repair. Lessee shall, during the term of this Lease, keep the exterior appearance of the Building in a first-class condition (including, e.g. graffiti removal) consistent with the exterior appearance of other similar facilities of comparable age and size in the vicinity, including, when necessary, the exterior repainting of the Building.

(b) **Service Contracts**. Lessee shall, at Lessee's sole expense, procure and maintain contracts, with copies to Lessor, in customary form and substance for, and with contractors specializing and experienced in the maintenance of the following equipment and improvements, if any, if and when installed on the Premises: (i) HVAC equipment, (ii) boiler, and pressure vessels, (iii) fire extinguishing systems, including fire alarm and/or smoke detection, (iv) landscaping and irrigation systems, (v) roof covering and drains, and (vi) clarifiers. However, Lessor reserves the right, upon notice to Lessee, to procure and maintain any or all of such service contracts, and Lessee shall reimburse Lessor, upon demand, for the cost thereof.

(c) **Failure to Perform**. If Lessee fails to perform Lessee's obligations under this Paragraph 7.1, Lessor may enter upon the Premises after 10 days' prior written notice to Lessee (except in the case of an emergency, in which case no notice shall be required), perform such obligations on Lessee's behalf, and put the Premises in good order, condition and repair, and Lessee shall promptly pay to Lessor a sum equal to 115% of the cost thereof.

(d) **Replacement**. Subject to Lessee's indemnification of Lessor as set forth in Paragraph 8.7 below, and without relieving Lessee of liability resulting from Lessee's failure to exercise and perform good maintenance practices, if an item described in Paragraph 7.1(b) cannot be repaired other than at a cost which is in excess of 50% of the cost of replacing such item, then such item shall be replaced by Lessor, and the cost thereof shall be prorated between the Parties and Lessee shall only be obligated to pay, each month during the remainder of the term of this Lease or any extension thereof, on the date on which Base Rent is due, an amount equal to the product of multiplying the cost of such replacement by a fraction, the numerator of which is one, and the denominator of which is 144 (i.e. 1/144th of the cost per month). Lessee shall pay Interest on the unamortized balance but may prepay its obligation at any time.

7.2 **Lessor's Obligations**. Subject to the provisions of Paragraphs 2.2 (Condition), 2.3 (Compliance), 9 (Damage or Destruction) and 14 (Condemnation), it is intended by the Parties hereto that Lessor have no obligation, in any manner whatsoever, to repair and maintain the Premises, or the equipment therein, all of which obligations are intended to be that of the Lessee. It is the intention of the Parties that the terms of this Lease govern the respective obligations of the Parties as to maintenance and repair of the Premises.

7.3 **Utility Installations; Trade Fixtures; Alterations**.

(a) **Definitions**. The term "**Utility Installations**" refers to all floor and window coverings, air and/or vacuum lines, power panels, electrical distribution, security and fire protection systems, communication cabling, lighting fixtures, HVAC equipment, plumbing, and fencing in or on the Premises. The term "**Trade Fixtures**" shall mean Lessee's machinery and equipment that can be removed without doing material damage to the Premises. The term "Alterations" shall mean any modification of the improvements, other than Utility Installations or Trade Fixtures, whether by addition or deletion. "**Lessee Owned Alterations and/or Utility Installations**" are defined as Alterations and/or Utility Installations made by Lessee that are not yet owned by Lessor pursuant to Paragraph 7.4(a).

(b) **Consent**. Lessee shall not make any Alterations or Utility Installations to the Premises without Lessor's prior written consent. Lessee may, however, make non-structural Alterations or Utility Installations to the interior of the Premises (excluding the roof) without such consent but upon notice to Lessor, as long as they are not visible from the outside, do not involve puncturing, relocating or removing the roof or any existing walls, will not affect the electrical, plumbing, HVAC, and/or life safety systems, do not trigger the requirement for additional modifications and/or improvements to the Premises resulting from Applicable Requirements, such as compliance with Title 24, and the cumulative cost thereof during this Lease as extended does not exceed a sum equal to 3 month's Base Rent in the aggregate or a sum equal to one month's Base Rent in any one year. Notwithstanding the foregoing, Lessee shall not make or permit any roof penetrations and/or install anything on the roof without the prior written approval of Lessor. Lessor may, as a precondition to granting such approval, require Lessee to utilize a contractor chosen and/or approved by Lessor. Any Alterations or Utility Installations that Lessee shall desire to make and which require the consent of the Lessor shall be presented to Lessor in written form with detailed plans. Consent shall be deemed conditioned upon Lessee's: (i) acquiring all applicable governmental permits, (ii) furnishing Lessor with copies of both the permits and the plans and specifications prior to commencement of the work, and (iii) compliance with all conditions of said permits and other Applicable Requirements in a prompt and expeditious manner. Any Alterations or Utility Installations shall be performed in a workmanlike manner with good and sufficient materials. Lessee shall promptly upon completion furnish Lessor with as-built plans and specifications. For work which costs an amount in excess of one month's Base Rent, Lessor may condition its consent upon Lessee providing a lien and completion bond in an amount equal to 150% of the estimated cost of such Alteration or Utility Installation and/or upon Lessee's posting an additional Security Deposit with Lessor.

(c) **Liens; Bonds**. Lessee shall pay, when due, all claims for labor or materials furnished or alleged to have been furnished to or for Lessee at or for use on the Premises, which claims are or may be secured by any mechanic's or materialmen's lien against the Premises or any interest therein. Lessee shall give Lessor not less than 10 days notice prior to the commencement of any work in, on or about the Premises, and Lessor shall have the right to post notices of non-responsibility. If Lessee shall contest the validity of any such lien, claim or demand, then Lessee shall, at its sole expense defend and protect itself, Lessor and the Premises against the same and shall pay and satisfy any such adverse judgment that may be rendered thereon before the enforcement thereof. If Lessor shall require, Lessee shall furnish a surety bond in an amount equal to 150% of the amount of such contested lien, claim or demand, indemnifying Lessor against liability for the same. If Lessor elects to participate in any such action, Lessee shall pay Lessor's attorneys' fees and costs.

7.4 **Ownership; Removal; Surrender; and Restoration**.

(a) **Ownership**. Subject to Lessor's right to require removal or elect ownership as hereinafter provided, all Alterations and Utility Installations made by Lessee shall be the property of Lessee, but considered a part of the Premises. Lessor may, at any time, elect in writing to be the owner of all or any specified part of the Lessee Owned Alterations and Utility Installations. Unless otherwise instructed per paragraph 7.4(b) hereof, all Lessee Owned Alterations and Utility Installations shall, at the expiration or termination of this Lease, become the property of Lessor and be surrendered by Lessee with the Premises.

(b) **Removal**. By delivery to Lessee of written notice from Lessor not earlier than 90 and not later than 30 days prior to the end of the term of this Lease, Lessor may require that any or all Lessee Owned Alterations or Utility Installations be removed by the expiration or termination of this Lease. Lessor may require the removal at any time of all or any part of any Lessee Owned Alterations or Utility Installations made without the required consent.

(c) **Surrender; Restoration**. Lessee shall surrender the Premises by the Expiration Date or any earlier termination date, with all of the improvements, parts and surfaces thereof broom clean and free of debris, and in good operating order, condition and state of repair, ordinary wear and tear excepted. "Ordinary wear and tear" shall not include any damage or deterioration that would have been prevented by good maintenance practice. Notwithstanding the foregoing and the provisions of Paragraph 7.1(a), if the Lessee occupies the Premises for 12 months or less, then Lessee shall surrender the Premises in the same condition as delivered to Lessee on the Start Date with NO allowance for ordinary wear and tear. Lessee shall repair any damage occasioned by the installation, maintenance or removal of Trade Fixtures, Lessee owned Alterations and/or Utility Installations, furnishings, and equipment as well as the removal of any storage tank installed by or for Lessee. Lessee shall also completely remove from the Premises any and all Hazardous Substances brought onto the Premises by or for Lessee, or any third party (except Hazardous Substances which were deposited via underground migration from areas outside of the Premises) to the level specified in Applicable Requirements. Trade Fixtures shall remain the property of Lessee and shall be removed by Lessee. Any personal property of Lessee not removed on or before the Expiration Date or any earlier termination date shall be deemed to have been abandoned by Lessee and may be disposed of or retained by Lessor as Lessor may desire. The failure by Lessee to timely vacate the Premises pursuant to this Paragraph 7.4(c) without the express written consent of Lessor shall constitute a holdover under the provisions of Paragraph 26 below.

8. Insurance; Indemnity.

8.1 **Payment For Insurance**. Lessee shall pay for all insurance required under Paragraph 8 except to the extent of the cost attributable to liability insurance carried by Lessor under Paragraph 8.2(b) in excess of $2,000,000 per occurrence. Premiums for policy periods commencing prior to or extending beyond the Lease term shall be prorated to correspond to the Lease term. Payment shall be made by Lessee to Lessor within 10 days following receipt of an invoice.

8.2 **Liability Insurance**.

(a) **Carried by Lessee**. Lessee shall obtain and keep in force a Commercial General Liability policy of insurance protecting Lessee and Lessor as an additional insured against claims for bodily injury, personal injury and property damage based upon or arising out of the ownership, use, occupancy or maintenance of the Premises and all areas appurtenant thereto. Such insurance shall be on an occurrence basis providing single limit coverage in an amount not less than $1,000,000 per occurrence with an annual aggregate of not less than $2,000,000. Lessee shall add Lessor as an additional insured by means of an endorsement at least as broad as the Insurance Service Organization's "Additional Insured-Managers or Lessors of Premises" Endorsement. The policy shall not contain any intra-insured exclusions as between insured persons or organizations, but shall include coverage for liability assumed under this Lease as an "**insured contract**" for the performance of Lessee's indemnity obligations under this Lease. The limits of said insurance shall not, however, limit the liability of Lessee nor relieve Lessee of any obligation hereunder. Lessee shall provide an endorsement on its liability policy(ies) which provides that its insurance shall be primary to and not contributory with any similar insurance carried by Lessor, whose insurance shall be considered excess insurance only.

(b) **Carried by Lessor**. Lessor shall maintain liability insurance as described in Paragraph 8.2(a), in addition to, and not in lieu of, the insurance required to be maintained by Lessee. Lessee shall not be named as an additional insured therein.

8.3 **Property Insurance - Building, Improvements and Rental Value**.

(a) **Building and Improvements**. The Insuring Party shall obtain and keep in force a policy or policies in the name of Lessor, with loss payable to Lessor, any ground-lessor, and to any Lender insuring loss or damage to the Premises. The amount of such insurance shall be equal to the full insurable replacement cost of the Premises, as the same shall exist from time to time, or the amount required by any Lender, but in no event more than the commercially reasonable and available insurable value thereof. Lessee Owned Alterations and Utility Installations, Trade Fixtures, and Lessee's personal property shall be insured by Lessee not by Lessor. If the coverage is available and commercially appropriate, such policy or policies shall insure against all risks of direct physical loss or damage (except the perils of flood and/or earthquake unless required by a Lender), including coverage for debris removal and the enforcement of any Applicable Requirements requiring the upgrading, demolition, reconstruction or replacement of any portion of the Premises as the result of a covered loss. Said policy or policies shall also contain an agreed valuation provision in lieu of any coinsurance clause, waiver of subrogation, and inflation guard protection causing an increase in the annual property insurance coverage amount by a factor of not less than the adjusted U.S. Department of Labor Consumer Price Index for All Urban Consumers for the city nearest to where the Premises are located. If such insurance coverage has a deductible clause, the deductible amount shall not exceed $5,000 per occurrence, and Lessee shall be liable for such deductible amount in the event of an Insured Loss.

(b) **Rental Value**. The Insuring Party shall obtain and keep in force a policy or policies in the name of Lessor with loss payable to Lessor and any Lender, insuring the loss of the full Rent for one year with an extended period of indemnity for an additional 180 days ("Rental Value insurance"). Said insurance shall contain an agreed valuation provision in lieu of any coinsurance clause, and the amount of coverage shall be adjusted annually to reflect the projected Rent otherwise payable by Lessee, for the next 12 month period. Lessee shall be liable for any deductible amount in the event of such loss.

(c) **Adjacent Premises**. If the Premises are part of a larger building, or of a group of buildings owned by Lessor which are adjacent to the Premises, the Lessee shall pay for any increase in the premiums for the property insurance of such building or buildings if said increase is caused by Lessee's acts, omissions, use or occupancy of the Premises.

8.4 **Lessee's Property; Business Interruption Insurance; Worker's Compensation Insurance**.

(a) **Property Damage**. Lessee shall obtain and maintain insurance coverage on all of Lessee's personal property, Trade Fixtures, and Lessee Owned Alterations and Utility Installations. Such insurance shall be full replacement cost coverage with a deductible of not to exceed $1,000 per occurrence. The proceeds from any such insurance shall be used by Lessee for the replacement of personal property, Trade Fixtures and Lessee Owned Alterations and Utility Installations.

(b) **Business Interruption**. Lessee shall obtain and maintain loss of income and extra expense insurance in amounts as will reimburse Lessee for direct or indirect loss of earnings attributable to all perils commonly insured against by prudent lessees in the business of Lessee or attributable to prevention of access to the Premises as a result of such perils.

(c) **Worker's Compensation Insurance**. Lessee shall obtain and maintain Worker's Compensation Insurance in such amount as may be required by Applicable Requirements. Such policy shall include a 'Waiver of Subrogation' endorsement. Lessee shall provide Lessor with a copy of such endorsement along with the certificate of insurance or copy of the policy required by paragraph 8.5.

(d) **No Representation of Adequate Coverage**. Lessor makes no representation that the limits or forms of coverage of insurance specified herein are adequate to cover Lessee's property, business operations or obligations under this Lease.

8.5 **Insurance Policies**. Insurance required herein shall be by companies maintaining during the policy term a "General Policyholders Rating" of at least A-, VII, as set forth in the most current issue of "Best's Insurance Guide", or such other rating as may be required by a Lender. Lessee shall not do or permit to be done anything which invalidates the required insurance policies. Lessee shall, prior to the Start Date, deliver to Lessor certified copies of policies of such insurance or certificates with copies of the required endorsements evidencing the existence and amounts of the required insurance. No such policy shall be cancelable or subject to modification except after 30 days prior written notice to Lessor. Lessee shall, at least 10 days prior to the expiration of such policies, furnish Lessor with evidence of renewals or "insurance binders" evidencing renewal thereof, or Lessor may increase his liability insurance coverage and charge the cost thereof to Lessee, which amount shall be payable by Lessee to Lessor upon demand. Such policies shall be for a term of at least one year, or the length of the remaining term of this Lease, whichever is less. If either Party shall fail to procure and maintain the insurance required to be carried by it, the other Party may, but shall not be required to, procure and maintain the same.

8.6 **Waiver of Subrogation**. Without affecting any other rights or remedies, Lessee and Lessor each hereby release and relieve the other, and waive their entire right to recover damages against the other, for loss of or damage to its property arising out of or incident to the perils required to be insured against herein. The effect of such releases and waivers is not limited by the amount of insurance carried or required, or by any deductibles applicable hereto. The Parties agree to have their respective property damage insurance carriers waive any right to subrogation that such companies may have against Lessor or Lessee, as the case may be, so long as the insurance is not invalidated thereby.

8.7 **Indemnity**. Except for Lessor's gross negligence or willful misconduct, Lessee shall indemnify, protect, defend and hold harmless the Premises, Lessor and its agents, Lessor's master or ground lessor, partners and Lenders, from and against any and all claims, loss of rents and/or damages, liens, judgments, penalties, attorneys' and consultants' fees, expenses and/or liabilities arising out of, involving, or in connection with, a Breach of the Lease by Lessee and/or the use and/or occupancy of the Premises and/or Project by Lessee and/or by Lessee's employees, contractors or invitees. If any action or proceeding is brought against Lessor by reason of any of the foregoing matters, Lessee shall upon notice defend the same at Lessee's expense by counsel reasonably satisfactory to Lessor and Lessor shall cooperate with Lessee in such defense. Lessor need not have first paid any such claim in order to be defended or indemnified.

8.8 **Exemption of Lessor and its Agents from Liability**. Notwithstanding the negligence or breach of this Lease by Lessor or its agents, neither Lessor nor its agents shall be liable under any circumstances for: (i) injury or damage to the person or goods, wares, merchandise or other property of Lessee, Lessee's employees, contractors, invitees, customers, or any other person in or about the Premises, whether such damage or injury is caused by or results from fire, steam, electricity, gas, water or rain, indoor air quality, the presence of mold or from the breakage, leakage, obstruction or other defects of pipes, fire sprinklers, wires, appliances, plumbing, HVAC or lighting fixtures, or from any other cause, whether the said injury or damage results from conditions arising upon the Premises or upon other portions of the building of which the Premises are a part, or from other sources or places, (ii) any damages arising from any act or neglect of any other tenant of Lessor or from the failure of Lessor or its agents to enforce the provisions of any other lease in the Project, or (iii) injury to Lessee's business or for any loss of income or profit therefrom. Instead, it is intended that Lessee's sole recourse in the event of such damages or injury be to file a claim on the insurance policy(ies) that Lessee is required to maintain pursuant to the provisions of paragraph 8.

8.9 **Failure to Provide Insurance**. Lessee acknowledges that any failure on its part to obtain or maintain the insurance required herein will expose Lessor to risks and potentially cause Lessor to incur costs not contemplated by this Lease, the extent of which will be extremely difficult to ascertain. Accordingly, for any month or portion thereof that Lessee does not maintain the required insurance and/or does not provide Lessor with the required binders or certificates evidencing the existence of the required insurance, the Base Rent shall be automatically increased, without any requirement for notice to Lessee, by an amount equal to 10% of the then existing Base Rent or $100, whichever is greater. The parties agree that such increase in Base Rent represents fair and reasonable compensation for the additional risk/costs that Lessor will incur by reason of Lessee's failure to maintain the required insurance. Such increase in Base Rent shall in no event constitute a waiver of Lessee's Default or Breach with respect to the failure to maintain such insurance, prevent the exercise of any of the other rights and remedies granted hereunder, nor relieve Lessee of its obligation to maintain the insurance specified in this Lease.

9. Damage or Destruction.

9.1 **Definitions**.

(a) "**Premises Partial Damage**" shall mean damage or destruction to the improvements on the Premises, other than Lessee Owned Alterations and Utility Installations, which can reasonably be repaired in 6 months or less from the date of the damage or destruction. Lessor shall notify Lessee in writing within 30 days from the date of the damage or destruction as to whether or not the damage is Partial or Total.

(b) "**Premises Total Destruction**" shall mean damage or destruction to the Premises, other than Lessee Owned Alterations and Utility Installations and Trade Fixtures, which cannot reasonably be repaired in 6 months or less from the date of the damage or destruction. Lessor shall notify Lessee in writing within 30 days from the date of the damage or destruction as to whether or not the damage is Partial or Total.

(c) "**Insured Loss**" shall mean damage or destruction to improvements on the Premises, other than Lessee Owned Alterations and Utility Installations and Trade Fixtures, which was caused by an event required to be covered by the insurance described in Paragraph 8.3(a), irrespective of any deductible amounts or coverage limits involved.

(d) "**Replacement Cost**" shall mean the cost to repair or rebuild the improvements owned by Lessor at the time of the occurrence to their condition existing immediately prior thereto, including demolition, debris removal and upgrading required by the operation of Applicable Requirements, and without deduction for depreciation.

(e) "**Hazardous Substance Condition**" shall mean the occurrence or discovery of a condition involving the presence of, or a contamination by, a Hazardous Substance, in, on, or under the Premises which requires restoration.

9.2 **Partial Damage - Insured Loss**. If a Premises Partial Damage that is an Insured Loss occurs, then Lessor shall, at Lessor's expense, repair such damage (but not Lessee's Trade Fixtures or Lessee Owned Alterations and Utility Installations) as soon as reasonably possible and this Lease shall continue in full force and effect; provided, however, that Lessee shall, at Lessor's election, make the repair of any damage or destruction the total cost to repair of which is $10,000 or less, and, in such event, Lessor shall make any applicable insurance proceeds available to Lessee on a reasonable basis for that purpose. Notwithstanding the foregoing, if the required insurance was not in force or the insurance proceeds are not sufficient to effect such repair, the Insuring Party shall promptly contribute the shortage in proceeds (except as to the deductible which is Lessee's responsibility) as and when required to complete said repairs. In the event, however, such shortage was due to the fact that, by reason of the unique nature of the improvements, full replacement cost insurance coverage was not commercially reasonable and available, Lessor shall have no obligation to pay for the shortage in insurance proceeds or to fully restore the unique aspects of the Premises unless Lessee provides Lessor with the funds to cover same, or adequate assurance thereof, within 10 days following receipt of written notice of such shortage and request therefor. If Lessor receives said funds or adequate assurance thereof within said 10 day period, the party responsible for making the repairs shall complete them as soon as reasonably possible and this Lease shall remain in full force and effect. If such funds or assurance are not received, Lessor may nevertheless elect by written notice to Lessee within 10 days thereafter to: (i) make such restoration and repair as is commercially reasonable with Lessor paying any shortage in proceeds, in which case this Lease shall remain in full force and effect, or (ii) have this Lease terminate 30 days thereafter. Lessee shall not be entitled to reimbursement of any funds contributed by Lessee to repair any such damage or destruction. Premises Partial Damage due to flood or earthquake shall be subject to Paragraph 9.3, notwithstanding that there may be some insurance coverage, but the net proceeds of any such insurance shall be made available for the repairs if made by either Party.

9.3 **Partial Damage - Uninsured Loss**. If a Premises Partial Damage that is not an Insured Loss occurs, unless caused by a negligent or willful act of Lessee (in which event Lessee shall make the repairs at Lessee's expense), Lessor may either: (i) repair such damage as soon as reasonably possible at Lessor's expense, in which event this Lease shall continue in full force and effect, or (ii) terminate this Lease by giving written notice to Lessee within 30 days after receipt by Lessor of knowledge of the occurrence of such damage. Such termination shall be effective 60 days following the date of such notice. In the event Lessor elects to terminate this Lease, Lessee shall have the right within 10 days after receipt of the termination notice to give written notice to Lessor of Lessee's commitment to pay for the repair of such damage without reimbursement from Lessor. Lessee shall provide Lessor with said funds or satisfactory assurance thereof within 30 days after making such commitment. In such event this Lease shall continue in full force and effect, and Lessor shall proceed to make such repairs as soon as reasonably possible after the required funds are available. If Lessee does not make the required commitment, this Lease shall terminate as of the date specified in the termination notice.

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9.4 **Total Destruction**. Notwithstanding any other provision hereof, if a Premises Total Destruction occurs, this Lease shall terminate 60 days following such Destruction. If the damage or destruction was caused by the gross negligence or willful misconduct of Lessee, Lessor shall have the right to recover Lessor's damages from Lessee, except as provided in Paragraph 8.6.

9.5 **Damage Near End of Term**. If at any time during the last 6 months of this Lease there is damage for which the cost to repair exceeds one month's Base Rent, whether or not an Insured Loss, Lessor may terminate this Lease effective 60 days following the date of occurrence of such damage by giving a written termination notice to Lessee within 30 days after the date of occurrence of such damage. Notwithstanding the foregoing, if Lessee at that time has an exercisable option to extend this Lease or to purchase the Premises, then Lessee may preserve this Lease by, (a) exercising such option and (b) providing Lessor with any shortage in insurance proceeds (or adequate assurance thereof) needed to make the repairs on or before the earlier of (i) the date which is 10 days after Lessee's receipt of Lessor's written notice purporting to terminate this Lease, or (ii) the day prior to the date upon which such option expires. If Lessee duly exercises such option during such period and provides Lessor with funds (or adequate assurance thereof) to cover any shortage in insurance proceeds, Lessor shall, at Lessor's commercially reasonable expense, repair such damage as soon as reasonably possible and this Lease shall continue in full force and effect. If Lessee fails to exercise such option and provide such funds or assurance during such period, then this Lease shall terminate on the date specified in the termination notice and Lessee's option shall be extinguished.

9.6 **Abatement of Rent; Lessee's Remedies**.

(a) **Abatement**. In the event of Premises Partial Damage or Premises Total Destruction or a Hazardous Substance Condition for which Lessee is not responsible under this Lease, the Rent payable by Lessee for the period required for the repair, remediation or restoration of such damage shall be abated in proportion to the degree to which Lessee's use of the Premises is impaired, but not to exceed the proceeds received from the Rental Value insurance. All other obligations of Lessee hereunder shall be performed by Lessee, and Lessor shall have no liability for any such damage, destruction, remediation, repair or restoration except as provided herein.

(b) **Remedies**. If Lessor is obligated to repair or restore the Premises and does not commence, in a substantial and meaningful way, such repair or restoration within 90 days after such obligation shall accrue, Lessee may, at any time prior to the commencement of such repair or restoration, give written notice to Lessor and to any Lenders of which Lessee has actual notice, of Lessee's election to terminate this Lease on a date not less than 60 days following the giving of such notice. If Lessee gives such notice and such repair or restoration is not commenced within 30 days thereafter, this Lease shall terminate as of the date specified in said notice. If the repair or restoration is commenced within such 30 days, this Lease shall continue in full force and effect. "Commence" shall mean either the unconditional authorization of the preparation of the required plans, or the beginning of the actual work on the Premises, whichever first occurs.

9.7 **Termination; Advance Payments**. Upon termination of this Lease pursuant to Paragraph 6.2(g) or Paragraph 9, an equitable adjustment shall be made concerning advance Base Rent and any other advance payments made by Lessee to Lessor. Lessor shall, in addition, return to Lessee so much of Lessee's Security Deposit as has not been, or is not then required to be, used by Lessor.

10. Real Property Taxes.

10.1 **Definition**. As used herein, the term "**Real Property Taxes**" shall include any form of assessment; real estate, general, special, ordinary or extraordinary, or rental levy or tax (other than inheritance, personal income or estate taxes); improvement bond; and/or license fee imposed upon or levied against any legal or equitable interest of Lessor in the Premises or the Project, Lessor's right to other income therefrom, and/or Lessor's business of leasing, by any authority having the direct or indirect power to tax and where the funds are generated with reference to the Building address. Real Property Taxes shall also include any tax, fee, levy, assessment or charge, or any increase therein: (i) imposed by reason of events occurring during the term of this Lease, including but not limited to, a change in the ownership of the Premises, and (ii) levied or assessed on machinery or equipment provided by Lessor to Lessee pursuant to this Lease.

10.2 **Payment of Taxes**. In addition to Base Rent, Lessee shall pay to Lessor an amount equal to the Real Property Tax installment due at least 20 days prior to the applicable delinquency date. If any such installment shall cover any period of time prior to or after the expiration or termination of this Lease, Lessee's share of such installment shall be prorated. In the event Lessee incurs a late charge on any Rent payment, Lessor may estimate the current Real Property Taxes, and require that such taxes be paid in advance to Lessor by Lessee monthly in advance with the payment of the Base Rent. Such monthly payments shall be an amount equal to the amount of the estimated installment of taxes divided by the number of months remaining before the month in which said installment becomes delinquent. When the actual amount of the applicable tax bill is known, the amount of such equal monthly advance payments shall be adjusted as required to provide the funds needed to pay the applicable taxes. If the amount collected by Lessor is insufficient to pay such Real Property Taxes when due, Lessee shall pay Lessor, upon demand, such additional sum as is necessary. Advance payments may be intermingled with other moneys of Lessor and shall not bear interest. In the event of a Breach by Lessee in the performance of its obligations under this Lease, then any such advance payments may be treated by Lessor as an additional Security Deposit.

10.3 **Joint Assessment**. If the Premises are not separately assessed, Lessee's liability shall be an equitable proportion of the Real Property Taxes for all of the land and improvements included within the tax parcel assessed, such proportion to be conclusively determined by Lessor from the respective valuations assigned in the assessor's work sheets or such other information as may be reasonably available.

10.4 **Personal Property Taxes**. Lessee shall pay, prior to delinquency, all taxes assessed against and levied upon Lessee Owned Alterations, Utility Installations, Trade Fixtures, furnishings, equipment and all personal property of Lessee. When possible, Lessee shall cause its Lessee Owned Alterations and Utility Installations, Trade Fixtures, furnishings, equipment and all other personal property to be assessed and billed separately from the real property of Lessor. If any of Lessee's said property shall be assessed with Lessor's real property, Lessee shall pay Lessor the taxes attributable to Lessee's property within 10 days after receipt of a written statement setting forth the taxes applicable to Lessee's property.

11. Utilities and Services.

11.1 Lessee shall pay for all water, gas, heat, light, power, telephone, trash disposal and other utilities and services supplied to the Premises, together with any taxes thereon. If any such services are not separately metered or billed to Lessee, Lessee shall pay a reasonable proportion, to be determined by Lessor, of all charges jointly metered or billed. There shall be no abatement of rent and Lessor shall not be liable in any respect whatsoever for the inadequacy, stoppage, interruption or discontinuance of any utility or service due to riot, strike, labor dispute, breakdown, accident, repair or other cause beyond Lessor's reasonable control or in cooperation with governmental request or directions.

11.2 Within fifteen days of Lessor's written request, Lessee agrees to deliver to Lessor such information, documents and/or authorization as Lessor needs in order for Lessor to comply with new or existing Applicable Requirements relating to commercial building energy usage, ratings, and/or the reporting thereof.

12. Assignment and Subletting.

12.1 **Lessor's Consent Required**.

(a) Lessee shall not voluntarily or by operation of law assign, transfer, mortgage or encumber (collectively, "**assign or assignment**") or sublet all or any part of Lessee's interest in this Lease or in the Premises without Lessor's prior written consent.

(b) Unless Lessee is a corporation and its stock is publicly traded on a national stock exchange, a change in the control of Lessee shall constitute an assignment requiring consent. The transfer, on a cumulative basis, of 25% or more of the voting control of Lessee shall constitute a change in control for this purpose.

(c) The involvement of Lessee or its assets in any transaction, or series of transactions (by way of merger, sale, acquisition, financing, transfer, leveraged buy-out or otherwise), whether or not a formal assignment or hypothecation of this Lease or Lessee's assets occurs, which results or will result in a reduction of the Net Worth of Lessee by an amount greater than 25% of such Net Worth as it was represented at the time of the execution of this Lease or at the time of the most recent assignment to which Lessor has consented, or as it exists immediately prior to said transaction or transactions constituting such reduction, whichever was or is greater, shall be considered an assignment of this Lease to which Lessor may withhold its consent. "**Net Worth of Lessee**" shall mean the net worth of Lessee (excluding any guarantors) established under generally accepted accounting principles.

(d) An assignment or subletting without consent shall, at Lessor's option, be a Default curable after notice per Paragraph 13.1(d), or a noncurable Breach without the necessity of any notice and grace period. If Lessor elects to treat such unapproved assignment or subletting as a noncurable Breach, Lessor may either: (i) terminate this Lease, or (ii) upon 30 days written notice, increase the monthly Base Rent to 110% of the Base Rent then in effect. Further, in the event of such Breach and rental adjustment, (i) the purchase price of any option to purchase the Premises held by Lessee shall be subject to similar adjustment to 110% of the price previously in effect, and (ii) all fixed and non-fixed rental adjustments scheduled during the remainder of the Lease term shall be increased to 110% of the scheduled adjusted rent.

(e) Lessee's remedy for any breach of Paragraph 12.1 by Lessor shall be limited to compensatory damages and/or injunctive relief.

(f) Lessor may reasonably withhold consent to a proposed assignment or subletting if Lessee is in Default at the time consent is requested.

(g) Notwithstanding the foregoing, allowing a de minimis portion of the Premises, ie. 20 square feet or less, to be used by a third party vendor in connection with the installation of a vending machine or payphone shall not constitute a subletting.

12.2 **Terms and Conditions Applicable to Assignment and Subletting**.

(a) Regardless of Lessor's consent, no assignment or subletting shall : (i) be effective without the express written assumption by such assignee or sublessee of the obligations of Lessee under this Lease, (ii) release Lessee of any obligations hereunder, or (iii) alter the primary liability of Lessee for the payment of Rent or for the performance of any other obligations to be performed by Lessee.

(b) Lessor may accept Rent or performance of Lessee's obligations from any person other than Lessee pending approval or disapproval of an assignment. Neither a delay in the approval or disapproval of such assignment nor the acceptance of Rent or performance shall constitute a waiver or estoppel of Lessor's right to exercise its remedies for Lessee's Default or Breach.

(c) Lessor's consent to any assignment or subletting shall not constitute a consent to any subsequent assignment or subletting.

(d) In the event of any Default or Breach by Lessee, Lessor may proceed directly against Lessee, any Guarantors or anyone else responsible for the performance of Lessee's obligations under this Lease, including any assignee or sublessee, without first exhausting Lessor's remedies against any other person or entity responsible therefor to Lessor, or any security held by Lessor.

(e) Each request for consent to an assignment or subletting shall be in writing, accompanied by information relevant to Lessor's determination as to the financial and operational responsibility and appropriateness of the proposed assignee or sublessee, including but not limited to the intended use and/or required modification of the Premises, if any, together with a fee of $500 as consideration for Lessor's considering and processing said request. Lessee agrees to provide Lessor with such other or additional information and/or documentation as may be reasonably requested. (See also Paragraph 36)

(f) Any assignee of, or sublessee under, this Lease shall, by reason of accepting such assignment, entering into such sublease, or entering into possession of the Premises or any portion thereof, be deemed to have assumed and agreed to conform and comply with each and every term, covenant, condition and obligation herein to be observed or performed by Lessee during the term of said assignment or sublease, other than such obligations as are contrary to or inconsistent with provisions of an assignment or sublease to which Lessor has specifically consented to in writing.

(g) Lessor's consent to any assignment or subletting shall not transfer to the assignee or sublessee any Option granted to the original Lessee by this Lease unless such transfer is specifically consented to by Lessor in writing. (See Paragraph 39.2)

12.3 **Additional Terms and Conditions Applicable to Subletting**. The following terms and conditions shall apply to any subletting by Lessee of all or any part of the Premises and shall be deemed included in all subleases under this Lease whether or not expressly incorporated therein:

(a) Lessee hereby assigns and transfers to Lessor all of Lessee's interest in all Rent payable on any sublease, and Lessor may collect such Rent and apply same toward Lessee's obligations under this Lease; provided, however, that until a Breach shall occur in the performance of Lessee's obligations, Lessee may collect said Rent. In the event that the amount collected by Lessor exceeds Lessee's then outstanding obligations any such excess shall be refunded to Lessee. Lessor shall not, by reason of the foregoing or any assignment of such sublease, nor by reason of the collection of Rent, be deemed liable to the sublessee for any failure of Lessee to perform and comply with any of Lessee's obligations to such sublessee. Lessee hereby irrevocably authorizes and directs any such sublessee, upon receipt of a written notice from Lessor stating that a Breach exists in the performance of Lessee's obligations under this Lease, to pay to Lessor all Rent due and to become due under the sublease. Sublessee shall rely upon any such notice from Lessor and shall pay all Rents to Lessor without any obligation or right to inquire as to whether such Breach exists, notwithstanding any claim from Lessee to the contrary.

(b) In the event of a Breach by Lessee, Lessor may, at its option, require sublessee to attorn to Lessor, in which event Lessor shall undertake the obligations of the sublessor under such sublease from the time of the exercise of said option to the expiration of such sublease; provided, however, Lessor shall not be liable for any prepaid rents or security deposit paid by such sublessee to such sublessor or for any prior Defaults or Breaches of such sublessor.

(c) Any matter requiring the consent of the sublessor under a sublease shall also require the consent of Lessor.

(d) No sublessee shall further assign or sublet all or any part of the Premises without Lessor's prior written consent.

(e) Lessor shall deliver a copy of any notice of Default or Breach by Lessee to the sublessee, who shall have the right to cure the Default of Lessee within the grace period, if any, specified in such notice. The sublessee shall have a right of reimbursement and offset from and against Lessee for any such Defaults cured by the sublessee.

13. Default; Breach; Remedies.

13.1 **Default; Breach**. A "**Default**" is defined as a failure by the Lessee to comply with or perform any of the terms, covenants, conditions or Rules and Regulations under this Lease. A "**Breach**" is defined as the occurrence of one or more of the following Defaults, and the failure of Lessee to cure such Default within any applicable grace period:

(a) The abandonment of the Premises; the vacating of the Premises prior to the expiration or termination of this Lease without providing a commercially reasonable level of security, or where the coverage of the property insurance described in Paragraph 8.3 is jeopardized as a result thereof, or without providing reasonable assurances to minimize potential vandalism; or failure to deliver to Lessor exclusive possession of the entire Premises in accordance herewith prior to the expiration or termination of this Lease.

(b) The failure of Lessee to make any payment of Rent or any Security Deposit required to be made by Lessee hereunder, whether to Lessor or to a third party, when due, to provide reasonable evidence of insurance or surety bond, or to fulfill any obligation under this Lease which endangers or threatens life or property, where such failure continues for a period of 3 business days following written notice to Lessee. THE ACCEPTANCE BY LESSOR OF A PARTIAL PAYMENT OF RENT OR SECURITY DEPOSIT SHALL NOT CONSTITUTE A WAIVER OF ANY OF LESSOR'S RIGHTS, INCLUDING LESSOR'S RIGHT TO RECOVER POSSESSION OF THE PREMISES.

(c) The failure of Lessee to allow Lessor and/or its agents access to the Premises or the commission of waste, act or acts constituting public or private nuisance, and/or an illegal activity on the Premises by Lessee, where such actions continue for a period of 3 business days following written notice to Lessee. In the event that Lessee commits waste, a nuisance or an illegal activity a second time then, the Lessor may elect to treat such conduct as a non-curable Breach rather than a Default.

(d) The failure by Lessee to provide (i) reasonable written evidence of compliance with Applicable Requirements, (ii) the service contracts, (iii) the rescission of an unauthorized assignment or subletting, (iv) an Estoppel Certificate or financial statements, (v) a requested subordination, (vi) evidence concerning any guaranty and/or Guarantor, (vii) any document requested under Paragraph 42, (viii) material safety data sheets (MSDS), or (ix) any other documentation or information which Lessor may reasonably require of Lessee under the terms of this Lease, where any such failure continues for a period of 10 days following written notice to Lessee.

(e) A Default by Lessee as to the terms, covenants, conditions or provisions of this Lease, or of the rules adopted under Paragraph 40 hereof, other than those described in subparagraphs 13.1(a), (b), (c) or (d), above, where such Default continues for a period of 30 days after written notice; provided, however, that if the nature of Lessee's Default is such that more than 30 days are reasonably required for its cure, then it shall not be deemed to be a Breach if Lessee commences such cure within said 30 day period and thereafter diligently prosecutes such cure to completion.

(f) The occurrence of any of the following events: (i) the making of any general arrangement or assignment for the benefit of creditors; (ii) becoming a "**debtor**" as defined in 11 U.S.C. § 101 or any successor statute thereto (unless, in the case of a petition filed against Lessee, the same is dismissed within 60 days); (iii) the appointment of a trustee or receiver to take possession of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease, where possession is not restored to Lessee within 30 days; or (iv) the attachment, execution or other judicial seizure of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease, where such seizure is not discharged within 30 days; provided, however, in the event that any provision of this subparagraph is contrary to any applicable law, such provision shall be of no force or effect, and not affect the validity of the remaining provisions.

(g) The discovery that any financial statement of Lessee or of any Guarantor given to Lessor was materially false.

(h) If the performance of Lessee's obligations under this Lease is guaranteed: (i) the death of a Guarantor, (ii) the termination of a Guarantor's liability with respect to this Lease other than in accordance with the terms of such guaranty, (iii) a Guarantor's becoming insolvent or the subject of a bankruptcy filing, (iv) a Guarantor's refusal to honor the guaranty, or (v) a Guarantor's breach of its guaranty obligation on an anticipatory basis, and Lessee's failure, within 60 days following written notice of any such event, to provide written alternative assurance or security, which, when coupled with the then existing resources of Lessee, equals or exceeds the combined financial resources of Lessee and the Guarantors that existed at the time of execution of this Lease.

13.2 **Remedies**. If Lessee fails to perform any of its affirmative duties or obligations, within 10 days after written notice (or in case of an emergency, without notice), Lessor may, at its option, perform such duty or obligation on Lessee's behalf, including but not limited to the obtaining of reasonably required bonds, insurance policies, or governmental licenses, permits or approvals. Lessee shall pay to Lessor an amount equal to 115% of the costs and expenses incurred by Lessor in such performance upon receipt of an invoice therefor. In the event of a Breach, Lessor may, with or without further notice or demand, and without limiting Lessor in the exercise of any right or remedy which Lessor may have by reason of such Breach:

(a) Terminate Lessee's right to possession of the Premises by any lawful means, in which case this Lease shall terminate and Lessee shall immediately surrender possession to Lessor. In such event Lessor shall be entitled to recover from Lessee: (i) the unpaid Rent which had been earned at the time of termination; (ii) the worth at the time of award of the amount by which the unpaid rent which would have been earned after termination until the time of award exceeds the amount of such rental loss that the Lessee proves could have been reasonably avoided; (iii) the worth at the time of award of the amount by which the unpaid rent for the balance of the term after the time of award exceeds the amount of such rental loss that the Lessee proves could be reasonably avoided; and (iv) any other amount necessary to compensate Lessor for all the detriment proximately caused by the Lessee's failure to perform its obligations under this Lease or which in the ordinary course of things would be likely to result therefrom, including but not limited to the cost of recovering possession of the Premises, expenses of reletting, including necessary renovation and alteration of the Premises, reasonable attorneys' fees, and that portion of any leasing commission paid by Lessor in connection with this Lease applicable to the unexpired term of this Lease. The worth at the time of award of the amount referred to in provision (iii) of the immediately preceding sentence shall be computed by discounting such amount at the discount rate of the Federal Reserve Bank of the District within which the Premises are located at the time of award plus one percent. Efforts by Lessor to mitigate damages caused by Lessee's Breach of this Lease shall not waive Lessor's right to recover any damages to which Lessor is otherwise entitled. If termination of this Lease is obtained through the provisional remedy of unlawful detainer, Lessor shall have the right to recover in such proceeding any unpaid Rent and damages as are recoverable therein, or Lessor may reserve the right to recover all or any part thereof in a separate suit. If a notice and grace period required under Paragraph 13.1 was not previously given, a notice to pay rent or quit, or to perform or quit given to Lessee under the unlawful detainer statute shall also constitute the notice required by Paragraph 13.1. In such case, the applicable grace period required by Paragraph 13.1 and the unlawful detainer statute shall run concurrently, and the failure of Lessee to cure the Default within the greater of the two such grace periods shall constitute both an unlawful detainer and a Breach of this Lease entitling Lessor to the remedies provided for in this Lease and/or by said statute.

(b) Continue the Lease and Lessee's right to possession and recover the Rent as it becomes due, in which event Lessee may sublet or assign, subject only to reasonable limitations. Acts of maintenance, efforts to relet, and/or the appointment of a receiver to protect the Lessor's interests, shall not constitute a termination of the Lessee's right to possession.

(c) Pursue any other remedy now or hereafter available under the laws or judicial decisions of the state wherein the Premises are located. The expiration or termination of this Lease and/or the termination of Lessee's right to possession shall not relieve Lessee from liability under any indemnity provisions of this Lease as to matters occurring or accruing during the term hereof or by reason of Lessee's occupancy of the Premises.

13.3 **Inducement Recapture.** Any agreement for free or abated rent or other charges, the cost of tenant improvements for Lessee paid for or performed by Lessor, or for the giving or paying by Lessor to or for Lessee of any cash or other bonus, inducement or consideration for Lessee's entering into this Lease, all of which concessions are hereinafter referred to as "**Inducement Provisions**," shall be deemed conditioned upon Lessee's full and faithful performance of all of the terms, covenants and conditions of this Lease. Upon Breach of this Lease by Lessee, any such Inducement Provision shall automatically be deemed deleted from this Lease and of no further force or effect, and any rent, other charge, bonus, inducement or consideration theretofore abated, given or paid by Lessor under such an Inducement Provision shall be immediately due and payable by Lessee to Lessor, notwithstanding any subsequent cure of said Breach by Lessee. The acceptance by Lessor of rent or the cure of the Breach which initiated the operation of this paragraph shall not be deemed a waiver by Lessor of the provisions of this paragraph unless specifically so stated in writing by Lessor at the time of such acceptance.

13.4 **Late Charges**. Lessee hereby acknowledges that late payment by Lessee of Rent will cause Lessor to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult to ascertain. Such costs include, but are not limited to, processing and accounting charges, and late charges which may be imposed upon Lessor by any Lender. Accordingly, if any Rent shall not be received by Lessor within 5 days after such amount shall be due, then, without any requirement for notice to Lessee, Lessee shall immediately pay to Lessor a one-time late charge equal to 10% of each such overdue amount or $100, whichever is greater. The Parties hereby agree that such late charge represents a fair and reasonable estimate of the costs Lessor will incur by reason of such late payment. Acceptance of such late charge by Lessor shall in no event constitute a waiver of Lessee's Default or Breach with respect to such overdue amount, nor prevent the exercise of any of the other rights and remedies granted hereunder. In the event that a late charge is payable hereunder, whether or not collected, for 3 consecutive installments of Base Rent, then notwithstanding any provision of this Lease to the contrary, Base Rent shall, at Lessor's option, become due and payable quarterly in advance.

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13.5 **Interest**. Any monetary payment due Lessor hereunder, other than late charges, not received by Lessor, when due shall bear interest from the 31st day after it was due. The interest ("**Interest**") charged shall be computed at the rate of 10% per annum but shall not exceed the maximum rate allowed by law. Interest is payable in addition to the potential late charge provided for in Paragraph 13.4.

13.6 **Breach by Lessor**.

(a) **Notice of Breach**. Lessor shall not be deemed in breach of this Lease unless Lessor fails within a reasonable time to perform an obligation required to be performed by Lessor. For purposes of this Paragraph, a reasonable time shall in no event be less than 30 days after receipt by Lessor, and any Lender whose name and address shall have been furnished to Lessee in writing for such purpose, of written notice specifying wherein such obligation of Lessor has not been performed; provided, however, that if the nature of Lessor's obligation is such that more than 30 days are reasonably required for its performance, then Lessor shall not be in breach if performance is commenced within such 30 day period and thereafter diligently pursued to completion.

(b) **Performance by Lessee on Behalf of Lessor**. In the event that neither Lessor nor Lender cures said breach within 30 days after receipt of said notice, or if having commenced said cure they do not diligently pursue it to completion, then Lessee may elect to cure said breach at Lessee's expense and offset from Rent the actual and reasonable cost to perform such cure, provided however, that such offset shall not exceed an amount equal to the greater of one month's Base Rent or the Security Deposit, reserving Lessee's right to seek reimbursement from Lessor for any such expense in excess of such offset. Lessee shall document the cost of said cure and supply said documentation to Lessor.

14. Condemnation. If the Premises or any portion thereof are taken under the power of eminent domain or sold under the threat of the exercise of said power (collectively "**Condemnation**"), this Lease shall terminate as to the part taken as of the date the condemning authority takes title or possession, whichever first occurs. If more than 10% of the Building, or more than 25% of that portion of the Premises not occupied by any building, is taken by Condemnation, Lessee may, at Lessee's option, to be exercised in writing within 10 days after Lessor shall have given Lessee written notice of such taking (or in the absence of such notice, within 10 days after the condemning authority shall have taken possession) terminate this Lease as of the date the condemning authority takes such possession. If Lessee does not terminate this Lease in accordance with the foregoing, this Lease shall remain in full force and effect as to the portion of the Premises remaining, except that the Base Rent shall be reduced in proportion to the reduction in utility of the Premises caused by such Condemnation. Condemnation awards and/or payments shall be the property of Lessor, whether such award shall be made as compensation for diminution in value of the leasehold, the value of the part taken, or for severance damages; provided, however, that Lessee shall be entitled to any compensation paid by the condemnor for Lessee's relocation expenses, loss of business goodwill and/or Trade Fixtures, without regard to whether or not this Lease is terminated pursuant to the provisions of this Paragraph. All Alterations and Utility Installations made to the Premises by Lessee, for purposes of Condemnation only, shall be considered the property of the Lessee and Lessee shall be entitled to any and all compensation which is payable therefor. In the event that this Lease is not terminated by reason of the Condemnation, Lessor shall repair any damage to the Premises caused by such Condemnation.

15. Brokerage Fees.

15.1 **Additional Commission**. In addition to the payments owed pursuant to Paragraph 1.9 above, Lessor agrees that: (a) if Lessee exercises any Option, (b) if Lessee or anyone affiliated with Lessee acquires any rights to the Premises or other premises owned by Lessor and located within the same Project, if any, within which the Premises is located, (c) if Lessee remains in possession of the Premises, with the consent of Lessor, after the expiration of this Lease, or (d) if Base Rent is increased, whether by agreement or operation of an escalation clause herein, then, Lessor shall pay Brokers a fee in accordance with the fee schedule of the Brokers in effect at the time the Lease was executed. The provisions of this paragraph are intended to supersede the provisions of any earlier agreement to the contrary.

15.2 **Assumption of Obligations**. Any buyer or transferee of Lessor's interest in this Lease shall be deemed to have assumed Lessor's obligation hereunder. Brokers shall be third party beneficiaries of the provisions of Paragraphs 1.9, 15, 22 and 31. If Lessor fails to pay to Brokers any amounts due as and for brokerage fees pertaining to this Lease when due, then such amounts shall accrue Interest. In addition, if Lessor fails to pay any amounts to Lessee's Broker when due, Lessee's Broker may send written notice to Lessor and Lessee of such failure and if Lessor fails to pay such amounts within 10 days after said notice, Lessee shall pay said monies to its Broker and offset such amounts against Rent. In addition, Lessee's Broker shall be deemed to be a third party beneficiary of any commission agreement entered into by and/or between Lessor and Lessor's Broker for the limited purpose of collecting any brokerage fee owed.

15.3 **Representations and Indemnities of Broker Relationships**. Lessee and Lessor each represent and warrant to the other that it has had no dealings with any person, firm, broker, agent or finder (other than the Brokers and Agents, if any) in connection with this Lease, and that no one other than said named Brokers and Agents is entitled to any commission or finder's fee in connection herewith. Lessee and Lessor do each hereby agree to indemnify, protect, defend and hold the other harmless from and against liability for compensation or charges which may be claimed by any such unnamed broker, finder or other similar party by reason of any dealings or actions of the indemnifying Party, including any costs, expenses, attorneys' fees reasonably incurred with respect thereto.

16. Estoppel Certificates.

(a) Each Party (as "**Responding Party**") shall within 10 days after written notice from the other Party (the "**Requesting Party**") execute, acknowledge and deliver to the Requesting Party a statement in writing in form similar to the then most current "**Estoppel Certificate**" form published by AIR CRE, plus such additional information, confirmation and/or statements as may be reasonably requested by the Requesting Party.

(b) If the Responding Party shall fail to execute or deliver the Estoppel Certificate within such 10 day period, the Requesting Party may execute an Estoppel Certificate stating that: (i) the Lease is in full force and effect without modification except as may be represented by the Requesting Party, (ii) there are no uncured defaults in the Requesting Party's performance, and (iii) if Lessor is the Requesting Party, not more than one month's rent has been paid in advance. Prospective purchasers and encumbrancers may rely upon the Requesting Party's Estoppel Certificate, and the Responding Party shall be estopped from denying the truth of the facts contained in said Certificate. In addition, Lessee acknowledges that any failure on its part to provide such an Estoppel Certificate will expose Lessor to risks and potentially cause Lessor to incur costs not contemplated by this Lease, the extent of which will be extremely difficult to ascertain. Accordingly, should the Lessee fail to execute and/or deliver a requested Estoppel Certificate in a timely fashion the monthly Base Rent shall be automatically increased, without any requirement for notice to Lessee, by an amount equal to 10% of the then existing Base Rent or $100, whichever is greater for remainder of the Lease. The Parties agree that such increase in Base Rent represents fair and reasonable compensation for the additional risk/costs that Lessor will incur by reason of Lessee's failure to provide the Estoppel Certificate. Such increase in Base Rent shall in no event constitute a waiver of Lessee's Default or Breach with respect to the failure to provide the Estoppel Certificate nor prevent the exercise of any of the other rights and remedies granted hereunder.

(c) If Lessor desires to finance, refinance, or sell the Premises, or any part thereof, Lessee and all Guarantors shall within 10 days after written notice from Lessor deliver to any potential lender or purchaser designated by Lessor such financial statements as may be reasonably required by such lender or purchaser, including but not limited to Lessee's financial statements for the past 3 years. All such financial statements shall be received by Lessor and such lender or purchaser in confidence and shall be used only for the purposes herein set forth.

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17. Definition of Lessor. The term "**Lessor**" as used herein shall mean the owner or owners at the time in question of the fee title to the Premises, or, if this is a sublease, of the Lessee's interest in the prior lease. In the event of a transfer of Lessor's title or interest in the Premises or this Lease, Lessor shall deliver to the transferee or assignee (in cash or by credit) any unused Security Deposit held by Lessor. Upon such transfer or assignment and delivery of the Security Deposit, as aforesaid, the prior Lessor shall be relieved of all liability with respect to the obligations and/or covenants under this Lease thereafter to be performed by the Lessor. Subject to the foregoing, the obligations and/or covenants in this Lease to be performed by the Lessor shall be binding only upon the Lessor as hereinabove defined.

18. Severability. The invalidity of any provision of this Lease, as determined by a court of competent jurisdiction, shall in no way affect the validity of any other provision hereof.

19. Days. Unless otherwise specifically indicated to the contrary, the word "**days**" as used in this Lease shall mean and refer to calendar days.

20. Limitation on Liability. The obligations of Lessor under this Lease shall not constitute personal obligations of Lessor, or its partners, members, directors, officers or shareholders, and Lessee shall look to the Premises, and to no other assets of Lessor, for the satisfaction of any liability of Lessor with respect to this Lease, and shall not seek recourse against Lessor's partners, members, directors, officers or shareholders, or any of their personal assets for such satisfaction.

21. Time of Essence. Time is of the essence with respect to the performance of all obligations to be performed or observed by the Parties under this Lease.

22. No Prior or Other Agreements; Broker Disclaimer. This Lease contains all agreements between the Parties with respect to any matter mentioned herein, and no other prior or contemporaneous agreement or understanding shall be effective. Lessor and Lessee each represents and warrants to the Brokers that it has made, and is relying solely upon, its own investigation as to the nature, quality, character and financial responsibility of the other Party to this Lease and as to the use, nature, quality and character of the Premises. Brokers have no responsibility with respect thereto or with respect to any default or breach hereof by either Party.

23. Notices.

23.1 **Notice Requirements**. All notices required or permitted by this Lease or applicable law shall be in writing and may be delivered in person (by hand or by courier) or may be sent by regular, certified or registered mail or U.S. Postal Service Express Mail, with postage prepaid, or by facsimile transmission, or by email, and shall be deemed sufficiently given if served in a manner specified in this Paragraph 23. The addresses noted adjacent to a Party's signature on this Lease shall be that Party's address for delivery or mailing of notices. Either Party may by written notice to the other specify a different address for notice, except that upon Lessee's taking possession of the Premises, the Premises shall constitute Lessee's address for notice. A copy of all notices to Lessor shall be concurrently transmitted to such party or parties at such addresses as Lessor may from time to time hereafter designate in writing.

23.2 **Date of Notice**. Any notice sent by registered or certified mail, return receipt requested, shall be deemed given on the date of delivery shown on the receipt card, or if no delivery date is shown, the postmark thereon. If sent by regular mail the notice shall be deemed given 72 hours after the same is addressed as required herein and mailed with postage prepaid. Notices delivered by United States Express Mail or overnight courier that guarantees next day delivery shall be deemed given 24 hours after delivery of the same to the Postal Service or courier. Notices delivered by hand, or transmitted by facsimile transmission or by email shall be deemed delivered upon actual receipt. If notice is received on a Saturday, Sunday or legal holiday, it shall be deemed received on the next business day.

23.3 **Options.** Notwithstanding the foregoing, in order to exercise any Options (see paragraph 39), the Notice must be sent by Certified Mail (return receipt requested), Express Mail (signature required), courier (signature required) or some other methodology that provides a receipt establishing the date the notice was received by the Lessor.

24. Waivers.

(a) No waiver by Lessor of the Default or Breach of any term, covenant or condition hereof by Lessee, shall be deemed a waiver of any other term, covenant or condition hereof, or of any subsequent Default or Breach by Lessee of the same or of any other term, covenant or condition hereof. Lessor's consent to, or approval of, any act shall not be deemed to render unnecessary the obtaining of Lessor's consent to, or approval of, any subsequent or similar act by Lessee, or be construed as the basis of an estoppel to enforce the provision or provisions of this Lease requiring such consent.

(b) The acceptance of Rent by Lessor shall not be a waiver of any Default or Breach by Lessee. Any payment by Lessee may be accepted by Lessor on account of monies or damages due Lessor, notwithstanding any qualifying statements or conditions made by Lessee in connection therewith, which such statements and/or conditions shall be of no force or effect whatsoever unless specifically agreed to in writing by Lessor at or before the time of deposit of such payment.

(c) THE PARTIES AGREE THAT THE TERMS OF THIS LEASE SHALL GOVERN WITH REGARD TO ALL MATTERS RELATED THERETO AND HEREBY WAIVE THE PROVISIONS OF ANY PRESENT OR FUTURE STATUTE TO THE EXTENT THAT SUCH STATUTE IS INCONSISTENT WITH THIS LEASE.

25. Disclosures Regarding The Nature of a Real Estate Agency Relationship.

(a) When entering into a discussion with a real estate agent regarding a real estate transaction, a Lessor or Lessee should from the outset understand what type of agency relationship or representation it has with the agent or agents in the transaction. Lessor and Lessee acknowledge being advised by the Brokers in this transaction, as follows:

(i) *Lessor's Agent*. A Lessor's agent under a listing agreement with the Lessor acts as the agent for the Lessor only. A Lessor's agent or subagent has the following affirmative obligations: *To the Lessor*: A fiduciary duty of utmost care, integrity, honesty, and loyalty in dealings with the Lessor. *To the Lessee and the Lessor*: (a) Diligent exercise of reasonable skills and care in performance of the agent's duties. (b) A duty of honest and fair dealing and good faith. (c) A duty to disclose all facts known to the agent materially affecting the value or desirability of the property that are not known to, or within the diligent attention and observation of, the Parties. An agent is not obligated to reveal to either Party any confidential information obtained from the other Party which does not involve the affirmative duties set forth above.

(ii) *Lessee's Agent*. An agent can agree to act as agent for the Lessee only. In these situations, the agent is not the Lessor's agent, even if by agreement the agent may receive compensation for services rendered, either in full or in part from the Lessor. An agent acting only for a Lessee has the following affirmative obligations. *To the Lessee*: A fiduciary duty of utmost care, integrity, honesty, and loyalty in dealings with the Lessee. *To the Lessee and the Lessor*: (a) Diligent exercise of reasonable skills and care in performance of the agent's duties. (b) A duty of honest and fair dealing and good faith. (c) A duty to disclose all facts known to the agent materially affecting the value or desirability of the property that are not known to, or within the diligent attention and observation of, the Parties. An agent is not obligated to reveal to either Party any confidential information obtained from the other Party which does not involve the affirmative duties set forth above.

(iii) *Agent Representing Both Lessor and Lessee*. A real estate agent, either acting directly or through one or more associate licensees, can legally be the agent of both the Lessor and the Lessee in a transaction, but only with the knowledge and consent of both the Lessor and the Lessee. In a dual agency situation, the agent has the following affirmative obligations to both the Lessor and the Lessee: (a) A fiduciary duty of utmost care, integrity, honesty and loyalty in the dealings with either Lessor or the Lessee. (b) Other duties to the Lessor and the Lessee as stated above in subparagraphs (i) or (ii). In representing both Lessor and Lessee, the agent may not, without the express permission of the respective Party, disclose to the other Party confidential information, including, but not limited to, facts relating to either Lessee's or Lessor's financial position, motivations, bargaining position, or other personal information that may impact rent, including Lessor's willingness to accept a rent less than the listing rent or Lessee's willingness to pay rent greater than the rent offered. The above duties of the agent in a real estate transaction do not relieve a Lessor or Lessee from the responsibility to protect their own interests. Lessor and Lessee should carefully read all agreements to assure that they adequately express their understanding of the transaction. A real estate agent is a person qualified to advise about real estate. If legal or tax advice is desired, consult a competent professional. Both Lessor and Lessee should strongly consider obtaining tax advice from a competent professional because the federal and state tax consequences of a transaction can be complex and subject to change.

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(b) Brokers have no responsibility with respect to any default or breach hereof by either Party. The Parties agree that no lawsuit or other legal proceeding involving any breach of duty, error or omission relating to this Lease may be brought against Broker more than one year after the Start Date and that the liability (including court costs and attorneys' fees), of any Broker with respect to any such lawsuit and/or legal proceeding shall not exceed the fee received by such Broker pursuant to this Lease; provided, however, that the foregoing limitation on each Broker's liability shall not be applicable to any gross negligence or willful misconduct of such Broker.

(c) Lessor and Lessee agree to identify to Brokers as "Confidential" any communication or information given Brokers that is considered by such Party to be confidential.

26. No Right To Holdover. Lessee has no right to retain possession of the Premises or any part thereof beyond the expiration or termination of this Lease. At or prior to the expiration or termination of this Lease Lessee shall deliver exclusive possession of the Premises to Lessor. For purposes of this provision and Paragraph 13.1(a), exclusive possession shall mean that Lessee shall have vacated the Premises, removed all of its personal property therefrom and that the Premises have been returned in the condition specified in this Lease. In the event that Lessee does not deliver exclusive possession to Lessor as specified above, then Lessor's damages during any holdover period shall be computed at the amount of the Rent (as defined in Paragraph 4.1) due during the last full month before the expiration or termination of this Lease (disregarding any temporary abatement of Rent that may have been in effect), but with Base Rent being 150% of the Base Rent payable during such last full month. Nothing contained herein shall be construed as consent by Lessor to any holding over by Lessee.

27. Cumulative Remedies. No remedy or election hereunder shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies at law or in equity.

28. Covenants and Conditions; Construction of Agreement. All provisions of this Lease to be observed or performed by Lessee are both covenants and conditions. In construing this Lease, all headings and titles are for the convenience of the Parties only and shall not be considered a part of this Lease. Whenever required by the context, the singular shall include the plural and vice versa. This Lease shall not be construed as if prepared by one of the Parties, but rather according to its fair meaning as a whole, as if both Parties had prepared it.

29. Binding Effect; Choice of Law. This Lease shall be binding upon the Parties, their personal representatives, successors and assigns and be governed by the laws of the State in which the Premises are located. Any litigation between the Parties hereto concerning this Lease shall be initiated in the county in which the Premises are located. Signatures to this Lease accomplished by means of electronic signature or similar technology shall be legal and binding.

30. Subordination; Attornment; Non-Disturbance.

30.1 **Subordination**. This Lease and any Option granted hereby shall be subject and subordinate to any ground lease, mortgage, deed of trust, or other hypothecation or security device (collectively, "**Security Device**"), now or hereafter placed upon the Premises, to any and all advances made on the security thereof, and to all renewals, modifications, and extensions thereof. Lessee agrees that the holders of any such Security Devices (in this Lease together referred to as "**Lender**") shall have no liability or obligation to perform any of the obligations of Lessor under this Lease. Any Lender may elect to have this Lease and/or any Option granted hereby superior to the lien of its Security Device by giving written notice thereof to Lessee, whereupon this Lease and such Options shall be deemed prior to such Security Device, notwithstanding the relative dates of the documentation or recordation thereof.

30.2 **Attornment**. In the event that Lessor transfers title to the Premises, or the Premises are acquired by another upon the foreclosure or termination of a Security Device to which this Lease is subordinated (i) Lessee shall, subject to the non-disturbance provisions of Paragraph 30.3, attorn to such new owner, and upon request, enter into a new lease, containing all of the terms and provisions of this Lease, with such new owner for the remainder of the term hereof, or, at the election of the new owner, this Lease will automatically become a new lease between Lessee and such new owner, and (ii) Lessor shall thereafter be relieved of any further obligations hereunder and such new owner shall assume all of Lessor's obligations, except that such new owner shall not: (a) be liable for any act or omission of any prior lessor or with respect to events occurring prior to acquisition of ownership; (b) be subject to any offsets or defenses which Lessee might have against any prior lessor, (c) be bound by prepayment of more than one month's rent, or (d) be liable for the return of any security deposit paid to any prior lessor which was not paid or credited to such new owner.

30.3 **Non-Disturbance**. With respect to Security Devices entered into by Lessor after the execution of this Lease, Lessee's subordination of this Lease shall be subject to receiving a commercially reasonable non-disturbance agreement (a "**Non-Disturbance Agreement**") from the Lender which Non-Disturbance Agreement provides that Lessee's possession of the Premises, and this Lease, including any options to extend the term hereof, will not be disturbed so long as Lessee is not in Breach hereof and attorns to the record owner of the Premises. Further, within 60 days after the execution of this Lease, Lessor shall, if requested by Lessee, use its commercially reasonable efforts to obtain a Non-Disturbance Agreement from the holder of any pre-existing Security Device which is secured by the Premises. In the event that Lessor is unable to provide the Non-Disturbance Agreement within said 60 days, then Lessee may, at Lessee's option, directly contact Lender and attempt to negotiate for the execution and delivery of a Non-Disturbance Agreement.

30.4 **Self-Executing**. The agreements contained in this Paragraph 30 shall be effective without the execution of any further documents; provided, however, that, upon written request from Lessor or a Lender in connection with a sale, financing or refinancing of the Premises, Lessee and Lessor shall execute such further writings as may be reasonably required to separately document any subordination, attornment and/or Non-Disturbance Agreement provided for herein.

31. Attorneys' Fees. If any Party or Broker brings an action or proceeding involving the Premises whether founded in tort, contract or equity, or to declare rights hereunder, the Prevailing Party (as hereafter defined) in any such proceeding, action, or appeal thereon, shall be entitled to reasonable attorneys' fees. Such fees may be awarded in the same suit or recovered in a separate suit, whether or not such action or proceeding is pursued to decision or judgment. The term, "**Prevailing Party**" shall include, without limitation, a Party or Broker who substantially obtains or defeats the relief sought, as the case may be, whether by compromise, settlement, judgment, or the abandonment by the other Party or Broker of its claim or defense. The attorneys' fees award shall not be computed in accordance with any court fee schedule, but shall be such as to fully reimburse all attorneys' fees reasonably incurred. In addition, Lessor shall be entitled to attorneys' fees, costs and expenses incurred in the preparation and service of notices of Default and consultations in connection therewith, whether or not a legal action is subsequently commenced in connection with such Default or resulting Breach ($200 is a reasonable minimum per occurrence for such services and consultation).

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32. Lessor's Access; Showing Premises; Repairs. Lessor and Lessor's agents shall have the right to enter the Premises at any time, in the case of an emergency, and otherwise at reasonable times after reasonable prior notice for the purpose of showing the same to prospective purchasers, lenders, or tenants, and making such alterations, repairs, improvements or additions to the Premises as Lessor may deem necessary or desirable and the erecting, using and maintaining of utilities, services, pipes and conduits through the Premises and/or other premises as long as there is no material adverse effect on Lessee's use of the Premises. All such activities shall be without abatement of rent or liability to Lessee.

33. Auctions. Lessee shall not conduct, nor permit to be conducted, any auction upon the Premises without Lessor's prior written consent. Lessor shall not be obligated to exercise any standard of reasonableness in determining whether to permit an auction.

34. Signs. Lessor may place on the Premises ordinary "For Sale" signs at any time and ordinary "For Lease" signs during the last 6 months of the term hereof. Except for ordinary "for sublease" signs, Lessee shall not place any sign upon the Premises without Lessor's prior written consent. All signs must comply with all Applicable Requirements.

35. Termination; Merger. Unless specifically stated otherwise in writing by Lessor, the voluntary or other surrender of this Lease by Lessee, the mutual termination or cancellation hereof, or a termination hereof by Lessor for Breach by Lessee, shall automatically terminate any sublease or lesser estate in the Premises; provided, however, that Lessor may elect to continue any one or all existing subtenancies. Lessor's failure within 10 days following any such event to elect to the contrary by written notice to the holder of any such lesser interest, shall constitute Lessor's election to have such event constitute the termination of such interest.

36. Consents. All requests for consent shall be in writing. Except as otherwise provided herein, wherever in this Lease the consent of a Party is required to an act by or for the other Party, such consent shall not be unreasonably withheld or delayed. Lessor's actual reasonable costs and expenses (including but not limited to architects', attorneys', engineers' and other consultants' fees) incurred in the consideration of, or response to, a request by Lessee for any Lessor consent, including but not limited to consents to an assignment, a subletting or the presence or use of a Hazardous Substance, shall be paid by Lessee upon receipt of an invoice and supporting documentation therefor. Lessor's consent to any act, assignment or subletting shall not constitute an acknowledgment that no Default or Breach by Lessee of this Lease exists, nor shall such consent be deemed a waiver of any then existing Default or Breach, except as may be otherwise specifically stated in writing by Lessor at the time of such consent. The failure to specify herein any particular condition to Lessor's consent shall not preclude the imposition by Lessor at the time of consent of such further or other conditions as are then reasonable with reference to the particular matter for which consent is being given. In the event that either Party disagrees with any determination made by the other hereunder and reasonably requests the reasons for such determination, the determining party shall furnish its reasons in writing and in reasonable detail within 10 business days following such request.

37. Guarantor.

37.1 **Execution**. The Guarantors, if any, shall each execute a guaranty in the form most recently published by AIR CRE, and each such Guarantor shall have the same obligations as Lessee under this Lease.

37.2 **Default**. It shall constitute a Default of the Lessee if any Guarantor fails or refuses, upon request to provide: (a) evidence of the execution of the guaranty, including the authority of the party signing on Guarantor's behalf to obligate Guarantor, and in the case of a corporate Guarantor, a certified copy of a resolution of its board of directors authorizing the making of such guaranty, (b) current financial statements, (c) an Estoppel Certificate, or (d) written confirmation that the guaranty is still in effect.

38. Quiet Possession. Subject to payment by Lessee of the Rent and performance of all of the covenants, conditions and provisions on Lessee's part to be observed and performed under this Lease, Lessee shall have quiet possession and quiet enjoyment of the Premises during the term hereof.

39. Options. If Lessee is granted any Option, as defined below, then the following provisions shall apply.

39.1 **Definition.** "**Option**" shall mean: (a) the right to extend or reduce the term of or renew this Lease or to extend or reduce the term of or renew any lease that Lessee has on other property of Lessor; (b) the right of first refusal or first offer to lease either the Premises or other property of Lessor; (c) the right to purchase, the right of first offer to purchase or the right of first refusal to purchase the Premises or other property of Lessor.

39.2 **Options Personal To Original Lessee**. Any Option granted to Lessee in this Lease is personal to the original Lessee, and cannot be assigned or exercised by anyone other than said original Lessee and only while the original Lessee is in full possession of the Premises and, if requested by Lessor, with Lessee certifying that Lessee has no intention of thereafter assigning or subletting.

39.3 **Multiple Options**. In the event that Lessee has any multiple Options to extend or renew this Lease, a later Option cannot be exercised unless the prior Options have been validly exercised.

39.4 **Effect of Default on Options**.

(a) Lessee shall have no right to exercise an Option: (i) during the period commencing with the giving of any notice of Default and continuing until said Default is cured, (ii) during the period of time any Rent is unpaid (without regard to whether notice thereof is given Lessee), (iii) during the time Lessee is in Breach of this Lease, or (iv) in the event that Lessee has been given 3 or more notices of separate Default, whether or not the Defaults are cured, during the 12 month period immediately preceding the exercise of the Option.

(b) The period of time within which an Option may be exercised shall not be extended or enlarged by reason of Lessee's inability to exercise an Option because of the provisions of Paragraph 39.4(a).

(c) An Option shall terminate and be of no further force or effect, notwithstanding Lessee's due and timely exercise of the Option, if, after such exercise and prior to the commencement of the extended term or completion of the purchase, (i) Lessee fails to pay Rent for a period of 30 days after such Rent becomes due (without any necessity of Lessor to give notice thereof), or (ii) if Lessee commits a Breach of this Lease.

40. Multiple Buildings. If the Premises are a part of a group of buildings controlled by Lessor, Lessee agrees that it will abide by and conform to all reasonable rules and regulations which Lessor may make from time to time for the management, safety, and care of said properties, including the care and cleanliness of the grounds and including the parking, loading and unloading of vehicles, and to cause its employees, suppliers, shippers, customers, contractors and invitees to so abide and conform. Lessee also agrees to pay its fair share of common expenses incurred in connection with such rules and regulations.

41. Security Measures. Lessee hereby acknowledges that the Rent payable to Lessor hereunder does not include the cost of guard service or other security measures, and that Lessor shall have no obligation whatsoever to provide same. Lessee assumes all responsibility for the protection of the Premises, Lessee, its agents and invitees and their property from the acts of third parties.

42. Reservations. Lessor reserves to itself the right, from time to time, to grant, without the consent or joinder of Lessee, such easements, rights and dedications that Lessor deems necessary, and to cause the recordation of parcel maps and restrictions, so long as such easements, rights, dedications, maps and restrictions do not unreasonably interfere with the use of the Premises by Lessee. Lessee agrees to sign any documents reasonably requested by Lessor to effectuate any such easement rights, dedication, map or restrictions.

43. Performance Under Protest. If at any time a dispute shall arise as to any amount or sum of money to be paid by one Party to the other under the provisions hereof, the Party against whom the obligation to pay the money is asserted shall have the right to make payment "under protest" and such payment shall not be regarded as a voluntary payment and there shall survive the right on the part of said Party to institute suit for recovery of such sum. If it shall be adjudged that there was no legal obligation on the part of said Party to pay such sum or any part thereof, said Party shall be entitled to recover such sum or so much thereof as it was not legally required to pay. A Party who does not initiate suit for the recovery of sums paid "under protest" within 6 months shall be deemed to have waived its right to protest such payment.

44. Authority; Multiple Parties; Execution.

(a) If either Party hereto is a corporation, trust, limited liability company, partnership, or similar entity, each individual executing this Lease on behalf of such entity represents and warrants that he or she is duly authorized to execute and deliver this Lease on its behalf. Each Party shall, within 30 days after request, deliver to the other Party satisfactory evidence of such authority.

(b) If this Lease is executed by more than one person or entity as "Lessee", each such person or entity shall be jointly and severally liable hereunder. It is agreed that any one of the named Lessees shall be empowered to execute any amendment to this Lease, or other document ancillary thereto and bind all of the named Lessees, and Lessor may rely on the same as if all of the named Lessees had executed such document.

(c) This Lease may be executed by the Parties in counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument.

45. Conflict. Any conflict between the printed provisions of this Lease and the typewritten or handwritten provisions shall be controlled by the typewritten or handwritten provisions.

46. Offer. Preparation of this Lease by either Party or their agent and submission of same to the other Party shall not be deemed an offer to lease to the other Party. This Lease is not intended to be binding until executed and delivered by all Parties hereto.

47. Amendments. This Lease may be modified only in writing, signed by the Parties in interest at the time of the modification. As long as they do not materially change Lessee's obligations hereunder, Lessee agrees to make such reasonable non-monetary modifications to this Lease as may be reasonably required by a Lender in connection with the obtaining of normal financing or refinancing of the Premises.

48. Waiver of Jury Trial. THE PARTIES HEREBY WAIVE THEIR RESPECTIVE RIGHTS TO TRIAL BY JURY IN ANY ACTION OR PROCEEDING INVOLVING THE PROPERTY OR ARISING OUT OF THIS LEASE.

49. Arbitration of Disputes. An Addendum requiring the Arbitration of all disputes between the Parties and/or Brokers arising out of this Lease ___ is ___is not attached to this Lease.

50. Accessibility; Americans with Disabilities Act.

(a) The Premises:

☐ have not undergone an inspection by a Certified Access Specialist (CASp). Note: A Certified Access Specialist (CASp) can inspect the subject premises and determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of the CASp inspection, the payment of the fee for the CASp inspection, and the cost of making any repairs necessary to correct violations of construction-related accessibility standards within the premises.

~~☐ have undergone an inspection by a Certified Access Specialist (CASp) and it was determined that the Premises met all applicable construction-related accessibility standards pursuant to California Civil Code §55.51 et seq. Lessee acknowledges that it received a copy of the inspection report at least 48 hours prior to executing this Lease and agrees to keep such report confidential.~~

~~☐ have undergone an inspection by a Certified Access Specialist (CASp) and it was determined that the Premises did not meet all applicable construction-related accessibility standards pursuant to California Civil Code §55.51 et seq. Lessee acknowledges that it received a copy of the inspection report at least 48 hours prior to executing this Lease and agrees to keep such report confidential except as necessary to complete repairs and corrections of violations of construction related accessibility standards.~~

In the event that the Premises have been issued an inspection report by a CASp the Lessor shall provide a copy of the disability access inspection certificate to Lessee within 7 days of the execution of this Lease.

(b) Since compliance with the Americans with Disabilities Act (ADA) and other state and local accessibility statutes are dependent upon Lessee's specific use of the Premises, Lessor makes no warranty or representation as to whether or not the Premises comply with ADA or any similar legislation. In the event that Lessee's use of the Premises requires modifications or additions to the Premises in order to be in compliance with ADA or other accessibility statutes, Lessee agrees to make any such necessary modifications and/or additions at Lessee's expense.

LESSOR AND LESSEE HAVE CAREFULLY READ AND REVIEWED THIS LEASE AND EACH TERM AND PROVISION CONTAINED HEREIN, AND BY THE EXECUTION OF THIS LEASE SHOW THEIR INFORMED AND VOLUNTARY CONSENT THERETO. THE PARTIES HEREBY AGREE THAT, AT THE TIME THIS LEASE IS EXECUTED, THE TERMS OF THIS LEASE ARE COMMERCIALLY REASONABLE AND EFFECTUATE THE INTENT AND PURPOSE OF LESSOR AND LESSEE WITH RESPECT TO THE PREMISES.

ATTENTION: NO REPRESENTATION OR RECOMMENDATION IS MADE BY AIR CRE OR BY ANY BROKER AS TO THE LEGAL SUFFICIENCY, LEGAL EFFECT, OR TAX CONSEQUENCES OF THIS LEASE OR THE TRANSACTION TO WHICH IT RELATES. THE PARTIES ARE URGED TO:

1. SEEK ADVICE OF COUNSEL AS TO THE LEGAL AND TAX CONSEQUENCES OF THIS LEASE.

2. RETAIN APPROPRIATE CONSULTANTS TO REVIEW AND INVESTIGATE THE CONDITION OF THE PREMISES. SAID INVESTIGATION SHOULD INCLUDE BUT NOT BE

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LIMITED TO: THE POSSIBLE PRESENCE OF HAZARDOUS SUBSTANCES, THE ZONING OF THE PREMISES, THE STRUCTURAL INTEGRITY, THE CONDITION OF THE ROOF AND OPERATING SYSTEMS, AND THE SUITABILITY OF THE PREMISES FOR LESSEE'S INTENDED USE.

WARNING: IF THE PREMISES ARE LOCATED IN A STATE OTHER THAN CALIFORNIA, CERTAIN PROVISIONS OF THE LEASE MAY NEED TO BE REVISED TO COMPLY WITH THE LAWS OF THE STATE IN WHICH THE PREMISES ARE LOCATED.

The parties hereto have executed this Lease at the place and on the dates specified above their respective signatures.

Executed at: 11:00 AM
On: 12/30/2021

By LESSOR:
6777 Nancy Ridge LLC

By: /s/ David Odmark
Name Printed: David Odmark
Title: Managing Director
Phone: _____
Fax: _____
Email: _____

By: _____
Name Printed: _____
Title: _____
Phone: _____
Fax: _____
Email: _____

Address: _____
Federal ID No.: _____

BROKER
N/A

Attn: N/A
Title: _____

Address: _____
Phone: _____
Fax: _____
Email: _____
Federal ID No.: _____
Broker DRE License #: N/A
Agent DRE License #: N/A

Executed at: San Diego, CA
On: 12/30/2021

By LESSEE:
Bionano Genomics

By: /s/ Chris Stewart
Name Printed: Chris Stewart
Title: CFO
Phone:
Fax:
Email:

By: _____
Name Printed: _____
Title: _____
Phone: _____
Fax: _____
Email: _____

Address: _____
Federal ID No.: _____

BROKER
N/A

Attn: N/A
Title: _____

Address: _____
Phone: _____
Fax: _____
Email: _____
Federal ID No.: _____
Broker DRE License #: N/A
Agent DRE License #: N/A

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OPTION(S) TO EXTEND TERM

STANDARD LEASE ADDENDUM

Dated: November 23, 2021
By and Between
Lessor: 6777 Nancy Ridge LLC
Lessee: Bionano Genomics
Property Address: 6777 Nancy Ridge Drive, San Diego, CA 92121
(street address, city, state, zip)

Paragraph: _____**OPTION(S) TO EXTEND TERM.** Subject to the terms, conditions and provisions of Paragraph 39, Lessor grants Lessee ___1___ option(s) to extend the term of the Lease ("**Extension Option(s)**"), with each Extension Option being for a term of 36 months, commencing when the prior term expires ("**Option Term(s)**"). In order to exercise an Extension Option, Lessee must give written notice of such election to Lessor and Lessor must receive such notice at least ___9___ but not more than ___12___ months prior to the date that the applicable Option Term would commence, time being of the essence. If timely and proper notification of the exercise of an Extension Option is not given by Lessee and/or received by Lessor, such Extension Option shall automatically expire. Except as specifically modified, the terms, conditions and provisions of the Lease shall apply during Option Terms but the amount of Rent during Option Terms shall be established by using the method(s) selected below *(check method(s) to be used and fill in appropriately)*:

☐ **I. Consumer Price Index.**

(a) During the Option Term(s) which start(s) on _____, the monthly Base Rent shall be increased on _____and every _____months thereafter during such Option Term(s) ("**Option Term CPI Increase Date(s)**") commensurate with the increase in the Option Term CPI (as herein defined) determined as follows: the monthly Base Rent scheduled for the month immediately preceding the first occurring Option Term CPI Increase Date shall be multiplied by a fraction the denominator of which is the Option Term Base CPI (as herein defined), and the numerator of which is the Option Term Comparison CPI (as herein defined). The amount so calculated shall constitute the new Base Rent until the next Option Term CPI Increase Date during the applicable Option Term, but in no event shall any such new Base Rent be less than the Base Rent for the month immediately preceding the applicable Option Term CPI Increase Date.

(b) The term "**Option Term CPI**" shall mean the Consumer Price Index of the Bureau of Labor Statistics of the U.S. Department of Labor for *(select one)*: CPI W (Urban Wage Earners and Clerical Workers) or___CPI U (All Urban Consumers), for (*fill in Urban Area*): ___or___the area in which the Premises is located, All Items (1982-1984 = 100). The term "**Option Term Comparison CPI**" shall mean the CPI of the calendar month which is 2 full months prior to the applicable Option Term CPI Increase Date. The term "**Option Term Base CPI**" shall mean the CPI of the calendar month which is 2 full months prior to (*select one*): Commencement Date of the Original Term, ___ start of the applicable Option Term, or ___ (*fill in month*)_____.

(c) If compilation and/or publication of the CPI is transferred to another governmental department, bureau or agency or is discontinued, then instead the index most nearly the same as the CPI shall be used to calculate the Base Rent increases hereunder. If the Parties cannot agree on such alternative index, then the matter shall be submitted for decision to the American Arbitration Association in accordance with the then rules of said association and the decision of the arbitrators shall be binding upon the parties, with the cost of such arbitration being paid equally by the Parties.

☐ II. Fixed Percentage. During the Option Term(s) which start(s) on _____, the monthly Base Rent shall be increased on _____and every _____ months thereafter during such Option Term(s) ("Option Term Percentage Increase Date(s)") by _____ percent (_____%) of the monthly Base Rent scheduled to be paid for the month immediately preceding the applicable Option Term Percentage Increase Date.

☑ **III. Fair Market Value.**

(a) During the Option Term(s) which start(s) on February 1, 2026 , the amount of Rent shall be the amount forecasted to be the fair market rental value of the Premises during such Option Term established pursuant to the procedures, terms, assumptions and conditions set forth herein ("**Fair Market Value**"); provided, however, regardless of such Fair Market Value, Base Rent during an Option Term shall not be less than the Base Rent scheduled as of when the prior term expires. Starting as of Lessee's exercise of the applicable Extension Option (but not earlier than six (6) months before start of the applicable Option Term), the Parties shall for thirty (30) days ("**Negotiation Period**") attempt to agree upon the Fair Market Value. If during the Negotiation Period the Parties do not agree on the Fair Market Value, then the Fair Market Value shall be established pursuant to the procedures set forth herein, which shall be binding.

(b) Each Party shall, within fifteen (15) days after the end of the Negotiation Period, in writing submit to the other Party such Party's determination of the Fair Market Value ("**Submitted Value(s)**"). If a Party fails to timely provide a Submitted Value, then the other Party's Submitted Value shall be the Fair Market Value. If both Parties timely provide Submitted Values, then each Party shall, within fifteen (15) days after both Parties have exchanged Submitted Values, in writing notify the other Party of such Party's selected arbitrator who shall meet the qualifications set forth herein ("**Advocate Arbitrator(s)**"). Lessor and Lessee may select an Advocate Arbitrator who is favorable to such Party's position and may, prior to or after appointment of an Advocate Arbitrator, consult with such Party's Advocate Arbitrator. If a Party fails to timely and properly provide notice of such Party's chosen Advocate Arbitrator, then the other Party's Submitted Value shall be the Fair Market Value.

(c) If both Parties timely and properly designate Advocate Arbitrators, then such Advocate Arbitrators shall, within fifteen (15) days after their selection, choose a third (3rd) neutral arbitrator who shall meet the qualifications set forth herein ("**Neutral Arbitrator**"). The Neutral Arbitrator shall be engaged jointly by Lessor and Lessee. If Advocate Arbitrators fail to agree upon and timely appoint a Neutral Arbitrator, then the President of AIR CRE shall appoint such Neutral Arbitrator within fifteen (15) days after request by either Party. If the President of AIR CRE does not timely appoint the Neutral Arbitrator, then either Party may file an appropriate legal action for a judge with competent jurisdiction over the Parties to appoint the Neutral Arbitrator.

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(d) The Advocate Arbitrators and the Neutral Arbitrator ("**Arbitrator(s)**") shall be duly licensed real estate brokers or salespersons in good standing in the state in which the Premises is located, shall have been active over the five (5) year period before their appointment in the leasing of properties similar to the Premises within the general real estate market of the Premises. The Neutral Arbitrator shall additionally not be related to or affiliated with either Party or Advocate Arbitrator, and shall not have previously represented in a real estate transaction a Party or anyone related to or affiliated with a Party. All matters to be determined by the Arbitrators shall be decided by a majority vote of the Arbitrators, with each Arbitrator having one (1) vote. The Arbitrators may, as the Arbitrators determine, hold hearings and require briefs, including market data and additional information.

(e) Within thirty (30) days after selection of the Neutral Arbitrator, the three Arbitrators shall first reach a decision as to their own independent opinion of the Fair Market Value established by taking into account the terms, assumptions and conditions set forth herein ("**Arbitrators' Market Value**"), then decide which Party's Submitted Value is closer in monetary amount to the Arbitrators' Market Value ("**Selected Market Value**"), then provide the Parties a copy of the Arbitrators' Market Value and finally notify the Parties of the Selected Market Value. The Selected Market Value shall be the Fair Market Value. The Arbitrators shall have no right to decide a Selected Market Value which is a compromise to (or modification of) the Submitted Values. The decision of the Arbitrators shall be binding upon the Parties. The Party whose Submitted Value is not the Selected Market Value shall, within ten (10) days after the Arbitrators decide the Selected Market Value, pay the fees and costs of all three (3) Arbitrators.

(f) If the Fair Market Value has not been established before the start of the applicable Option Term, then Lessee shall continue to pay to Lessor rent in the amount payable for the month immediately preceding the start of such Option Term and Lessor's acceptance of such rent shall not waive, adversely affect or prejudice the Parties' right to complete establishment of the Fair Market Value or Lessor's right to collect the full amount of the Fair Market Value once the Fair Market Value is established. Lessee shall, within ten (10) days after establishment of the Fair Market Value, pay to Lessor any deficiency in rent then due for the Option Term. Following establishment of Fair Market Value, the Parties shall, within ten (10) days after request by either Party, sign an amendment to this Lease to confirm the Fair Market Value and the expiration date of this Lease, but the Parties' failure to request or to sign such an amendment shall not affect establishment of the Fair Market Value or extension of the Lease term.

(g) The Arbitrators, in deciding the Arbitrators' Market Value, shall take into account rent rates, rent abatements, periodic rent increases, real property taxes, insurance premiums and other operating expenses, tenant improvement and other applicable allowances, building services, length of lease term and other factors professional real estate brokers and/or appraisers customarily consider in determining fair market rent of property in an arm's length transaction by ready, willing and able parties for space of comparable location, size, age, condition, quality, parking, visibility, view, signage and accessibility if the Premises were marketed in a normal and customary manner for a reasonable length of time on the open market to be leased to a tenant with financial strength and credit worthiness comparable to Lessee and guarantors (if any) of this Lease (as of Lessee's exercise of the Extension Option) for a term comparable to the length of the applicable Option Term and used for the Agreed Use (or other reasonably comparable uses). The Arbitrators, in deciding the Arbitrators' Market Value, shall not consider as a comparable transaction any of the following: a sublease, lease assignment, lease renewal or extension; lease with a tenant that has equity, is related to or affiliated with the landlord; or a lease of space that was subject to a right of first refusal, right of first offer, expansion option or other encumbrances. The Arbitrators, in deciding the Arbitrators' Market Value, shall reduce the Fair Market Value on account of Alterations and improvements made by Lessee to the extent the cost thereof was paid solely by Lessee (in excess of any applicable improvement allowance, abated rent in lieu of improvement allowance or other consideration provided by Lessor for Lessee's improvement of the Premises), shall not reduce the Fair Market Value on account of any real estate brokerage commission savings by Lessor, and shall not reduce the Fair Market Value on account of deferred maintenance or repair of the Premises for which Lessee was responsible under the Lease but did not perform.

☐ IV. **Fixed Rental Adjustment(s) ("FRA").**

The monthly Base Rent shall be increased to the following amounts on the dates set forth below:

On (fill in FRA Adjustment Date(s)):	The new Base Rent shall be:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

☐ **V. Continuation of Original Term Adjustments.**

The monthly Base Rent during the Option Term(s) which start(s) on_____shall be increased in accordance with the same formula provided in the Lease to be used to calculate increases in the Base Rent during the Original Term of the Lease.

BROKER'S FEE: For each adjustment in Base Rent specified above, the Brokers shall be paid a Brokerage Fee in accordance with paragraph 15 of the Lease or if applicable, paragraph 9 of the Sublease.

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ADDENDUM TO LEASE

Date: November 23, 2021
By and Between
Lessor: 6777 Nancy Ridge LLC
Lessee: Bionano Genomics
Property Address: 6777 Nancy Ridge Drive, San Diego, CA 92121
(street address, city, state, zip)

Paragraph: 1-5

1. TENANT IMPROVEMENTS: Subject to the terms and condition hereof, Lessor agrees to provide $71,868.00 for interior build-out ("Tenant Improvements") of the office and lab areas. Lessee has the right to use the allowance for other uses, at Lessee's sole discretion, such as back-up generator, signage, IT and FF&E.

2. BUILDING SIGNAGE/DIRECTORY BOARD: Lessee shall have the exclusive right to building top and monument signage. Lessee shall have the right to place its name and corporate logo on the signage outside the Premises and Building lobby. Lessee shall give Lessor the right to approve the design of any signage. Such approval shall not be unreasonably withheld or delayed. All costs associated with fabrication, installation, permitting, maintaining and eventual removal of said signage shall be the responsibility of Lessee. Such signage must conform to all applicable governmental rules, laws, and regulations.

3. ASSIGNMENT/SUBLEASE RIGHTS: Lessee shall have the right to sublease or assign all or any portion of the Premises to any Lessee related entity, subsidiary or successor of Lessee ("Affiliate") without Lessor's consent, but by providing notice to Lessor. For non-affiliated companies, Lessor shall not unreasonably withhold, condition or delay the approval of any proposed sublease or assignment. Lessor shall not have a recapture right in the event of a sublease or assignment of less than sixty percent (60%) of the Premises. Any profits from a third-party sublease or assignment shall be split equally between Lessor and Lessee after Lessee's costs to sublease have been first deducted (including commissions, legal fees, tenant improvements, downtime during the marketing period, and any other concessions reasonable required to induce a subtenant). Lessor shall not have any recapture right in assignments or subleases to Lessee's Affiliates. In the event Lessee elects to sublease all or a portion of the Premises, Lessee shall not be precluded from marketing said sublease Premises to other tenants in the Building or Project. Additionally, there shall not be any floor/minimum rent that Lessee must obtain from any sublessee and/or assignee.

4. BACKUP GENERATOR: Subject to Lessor approval, which shall not be unreasonably conditioned, delayed or withheld, Lessee shall be able to install a generator in a location to be mutually agreed upon by Lessor and Lessee.

5. HOLDING OVER: Lessee shall have the right to holdover for a period of up to three (3) months at a rental rate equal to 110% of Lessee's Base Rent during the last month of the Term. Thereafter, Lessee shall have the right to holdover on a month-to-month basis at a rental rate equal to 150% of the last month's Base Rent.

6. HAZARDOUS SUBSTANCES: Notwithstanding anything to the contrary in this Lease, Lessee may use Hazardous Materials as reasonably necessary for the conduct of its business in the ordinary course, provided Lessee uses such Hazardous Materials in strict compliance with all Applicable Requirements.

7. PARKING: Lessee may use the parking areas adjacent to the Building during the Lease Term, at no additional cost.

In the event of any conflict between the provisions of this Addendum and the printed provisions of the Lease, this Addendum shall control.

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EMPLOYMENT AGREEMENT

This **EMPLOYMENT AGREEMENT** (the ***"Agreement"***) is made and entered into by and between Bionano Genomics, Inc. (the ***"Company"***) and Soheil Shams (***"Executive"***). The Company and Executive are hereinafter collectively referred to as the ***"Parties"***, and individually referred to as a ***"Party"***.

RECITALS

Concurrently with the execution and delivery of this Agreement, the Company; Starship Merger Sub I, Inc., a California corporation and a wholly-owned subsidiary of Company ("***Merger Sub I***"); Starship Merger Sub II, LLC, a California limited liability company ("***Merger Sub II***"); BioDiscovery, Inc., a California corporation (the "***Seller***"); and Soheil Shams, as Securityholders' Representative, are entering into that certain Agreement and Plan of Merger (as amended, modified, or supplemented from time to time in accordance with its terms, the "***Merger Agreement***"), pursuant to which Seller shall be acquired by the Company, by means of a merger of Merger Sub I with and into Seller, pursuant to which Seller will survive and become a wholly owned subsidiary of the Company ("***Merger I***"), and, as part of the same overall transaction, promptly after Merger I, the surviving entity of Merger I will merge with and into Merger Sub II, with Merger Sub II surviving such merger ("***Merger II***" and, together with Merger I, the "***Mergers***"), on the terms and subject to the conditions set forth in the Merger Agreement.

This Agreement and Executive's employment hereunder are conditional upon the closing of the transactions contemplated in the Merger Agreement. This Agreement will become effective as of the Closing Date as defined in the Merger Agreement (the "***Effective Date***"). If the anticipated transactions contemplated in the Merger Agreement do not close, this Agreement will have no effect (even if it has been executed), will not be binding on the Company (or any of its affiliates) or on Executive, and neither Executive, the Company nor any of the Sellers (or any of their respective affiliates) shall have rights or obligations hereunder.

The Company desires assurance of the association and services of Executive in order to retain Executive's experience, skills, abilities, background and knowledge, and is willing to continue to the engagement of Executive's services on the terms and conditions set forth in this Agreement.

Executive desires to be in the employ of the Company and is willing to accept employment on the terms and conditions set forth in this Agreement.

AGREEMENT

In consideration of the foregoing Recitals and mutual promises and covenants contained herein, and for other good and valuable consideration, the Parties, intending to be legally bound, agree as follows:

1. EMPLOYMENT.

1.1 Title. Executive's position shall be Chief Informatics Officer of the Company, subject to the terms and conditions set forth in this Agreement.

1.2 Term. The term of this Agreement shall begin on the Effective Date and shall continue until terminated in accordance with Section 4 herein (the ***"Term"***).

1.3 Duties. Executive shall do and perform all services, acts or things necessary or advisable to manage and conduct the business of the Company and that are normally associated with the position of Chief Informatics Officer, and such other duties as may from time to time be assigned to Executive. Executive shall report to the Chief Executive Officer of the Company.

1.4 Policies and Procedures. The employment relationship between the Parties shall be governed by this Agreement and by the policies and practices established by the Company and/or the Company's Board of Directors (the ***"Board"***), or any designated committee thereof. In the event the terms of this Agreement differ from or are in conflict with the Company's policies and practices or the Company's Employee Handbook, this Agreement shall control.

1.5 Location. Unless the Parties otherwise agree in writing, during the Term Executive shall perform the services Executive is required to perform pursuant to this Agreement at the Company's offices in El Segundo, California *provided, however*, that the Company may from time to time require Executive to travel temporarily to other locations in connection with the Company's business.

2. LOYALTY; NON-COMPETITION; NON-SOLICITATION.

2.1 Loyalty. Except as expressly provided herein or the Company otherwise consents in writing, during Executive's employment by the Company, Executive shall devote Executive's full business energies, interest, abilities and productive time to the proper and efficient performance of Executive's duties under this Agreement. Notwithstanding the foregoing, Executive shall be permitted to continue to provide ongoing consultation, board and/or advisory services to certain entities with the prior written consent of the Chief Executive Officer or Chairman of the board of directors of the Company (such consent not to be unreasonably withheld).

2.2 Agreement not to participate in Company's Competitors. During Executive's employment with the Company, Executive agrees not to acquire, assume or participate in, directly or indirectly, any position, investment or interest known by Executive to be adverse or antagonistic to the Company, its business, or prospects, financial or otherwise, or in any company, person or entity that is, directly or indirectly, in competition with the business of the Company or any of its Affiliates (as defined below**)**. Ownership by Executive, in professionally managed funds over which Executive does not have control or discretion in investment decisions, or as a passive investment, of less than two percent (2%) of the outstanding shares of capital stock of any corporation with one or more classes of its capital stock listed on a national securities exchange or publicly traded on a national securities exchange or in the over-the-counter market shall not constitute a breach of this Section. For purposes of this Agreement, "***Affiliate***" means, with respect to any specific entity, any other entity that, directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with such specified entity.

2.3 Covenant not to Compete. During Executive's employment with the Company, Executive shall not engage in competition with the Company and/or any of its Affiliates, either directly or indirectly, in any manner or capacity, as adviser, principal, agent, affiliate, promoter, partner, officer, director, employee, stockholder, owner, co-owner, consultant, or member of any association or otherwise, in any phase of the business of developing, manufacturing and marketing of products or services that are in the same field of use or which otherwise compete with the products or services of the Company except with the prior written consent of the Company.

3. COMPENSATION OF EXECUTIVE.

3.1 Base Salary. The Company shall pay Executive a base salary at the annualized rate of $325,000 per year (the ***"Base Salary"***), less payroll deductions and all required withholdings, payable in regular bi-weekly payments or otherwise in accordance with Company policy. Such Base Salary shall be prorated for any partial year of employment on the basis of a 365-day fiscal year.

3.2 Discretionary Bonus. At the sole discretion of the Company, following each calendar year of employment, Executive shall be eligible to receive a discretionary cash bonus with a target amount of up to forty percent (40%) of Executive's then-current base salary (the ***"Bonus"***), based on Executive's achievement relative to certain performance goals (***"Performance Goals"***) to be established by the Company. The determination of whether Executive has met the Performance Goals for

any given year, and if so, the amount of any Bonus that will be paid for such year (if any), shall be determined by the Company in its sole and absolute discretion. In order to be eligible to earn or receive any Bonus, Executive must remain employed by the Company through and including the end of the year with respect to which such Bonus is earned.

3.3 Expense Reimbursement. The Company will reimburse Executive for all reasonable business expenses Executive incurs in conducting Executive's duties hereunder, pursuant to the Company's usual expense reimbursement policies; provided that Executive supplies the appropriate substantiation for such expenses no later than the end of the calendar month following the month in which such expenses were incurred by Executive. For the avoidance of doubt, to the extent that any expense reimbursements payable to Executive under this Agreement are taxable income and subject to the provisions of Section 409A of the Internal Revenue Code of 1986, as amended (the ***"Code"***) and the regulations and other guidance thereunder and any state law of similar effect (collectively ***"Section 409A"***): (i) to be eligible to obtain reimbursement for such expenses Executive must supply the appropriate documentation substantiating such expenses no later than the end of the calendar month following the month in which such expenses were incurred by Executive, (ii) any such reimbursements will be paid by the Company as soon as administratively practicable after submission of such documentation, but in no event later than December 31 of the year following the year in which the expense was incurred, (iii) the amount of expenses reimbursed in one year will not affect the amount eligible for reimbursement in any subsequent year, and (iv) the right to expense reimbursement under this Agreement will not be subject to liquidation or exchange for another benefit.

3.4 Changes to Compensation. Executive's compensation will be reviewed annually and may be increased from time to time in the Company's sole discretion.

3.5 Employment Taxes. All of Executive's compensation and payments under this Agreement shall be subject to customary withholding taxes and any other employment taxes as are commonly required to be collected or withheld by the Company.

3.6 Benefits. Executive shall, in accordance with Company policy and the terms of the applicable plan documents, be eligible to participate in benefits under any benefit plan or arrangement which may be in effect from time to time and made available to the Company's executive or key management employees.

3.7 Holidays and Vacation. Executive shall be eligible for paid holiday and vacation time in accordance with Company policy as in effect from time to time and made available to Company's senior management employees.

3.8 Equity. Subject to approval by the Board (or a committee thereof), and as an inducement material to Executive's entering into employment with the Company, Executive shall be granted an option to purchase 400,000 shares of common stock in the Company at the fair market value on the date of grant (the "***Option***"). The shares subject to the Option will vest over four years of continuous service to the Company, with twenty-five percent (25%) of the shares subject to the Option vesting on the first year anniversary of the Effective Date, and the remaining shares vesting in equal monthly installments over the subsequent thirty-six (36) months of continuous service thereafter. The Option shall be governed in all respects by the terms of the Company's 2020 Inducement Plan (the "***Plan***"), as amended, and option agreement between Executive and the Company. Executive shall be entitled to be considered for additional stock option grants under the Plan, as approved by the Board (or a committee thereof) in its sole discretion.

4. TERMINATION.

4.1 Termination by the Company. Executive's employment with the Company is at will and may be terminated by the Company or Executive at any time and for any reason, or for no reason, including, but not limited to, under the following conditions:

4.1.1 Termination by the Company for Cause. The Company may terminate Executive's employment under this Agreement for Cause by delivery of written notice to Executive. Any notice of termination given pursuant to this Section shall effect termination as of the date of the notice, or as of such other date specified in the notice.

4.1.2 Termination by the Company without Cause. The Company may terminate Executive's employment under this Agreement without Cause at any time and for any reason, or for no reason. Such termination shall be effective on the date Executive is so informed by the Company.

4.2 Termination by Executive. Executive may terminate Executive's employment with the Company at any time and for any reason, or for no reason, upon 30 days' written notice to the Company.

4.3 Termination for Death or Complete Disability. Executive's employment with the Company shall automatically terminate effective upon the date of Executive's death or Complete Disability (as defined below).

4.4 Termination by Mutual Agreement of the Parties. Executive's employment with the Company may be terminated at any time upon a mutual agreement in writing of the Parties. Any such termination of employment shall have the consequences specified in such agreement.

4.5 Compensation upon Termination.

4.5.1 Death or Complete Disability. If Executive's employment with the Company is terminated as a result of Executive's death or Complete Disability, the Company shall pay to Executive, or to Executive's heirs, Executive's base salary and accrued and unused vacation benefits earned through the date of termination at the rate in effect at the time of termination, less standard deductions and withholdings (collectively the "*Accrued Obligations*"). The Company shall thereafter have no further obligations to Executive and/or Executive's heirs under this Agreement, except as otherwise provided by law (and except as provided otherwise in Executive's stock option agreements with the Company).

4.5.2 With Cause or Without Good Reason. If Executive's employment with the Company is terminated at any time either by the Company for Cause or by Executive without Good Reason, the Company shall pay the Accrued Obligations, and the Company shall thereafter have no further obligations to Executive under this Agreement, except as otherwise provided by law (and except as provided otherwise in Executive's stock option agreements with the Company).

4.5.3 Without Cause or for Good Reason. If Executive's employment with the Company is terminated by the Company without Cause or by Executive for Good Reason, and in either case Executive signs a separation agreement including a comprehensive waiver and release of claims in such form as the Company may require (the ***"Release"***) on or within the time period set forth therein, but in no event later than 45 days after Executive's termination date, and allows such Release to become effective in accordance with its terms (such latest permitted date on which the Release could become effective, the ***"Release Deadline"***), then Executive will receive the Accrued Obligations and the following benefits:

4.5.3.1 Severance Payment. Cash payments in the form of continuation of Executive's Base Salary at the rate in effect at the time of termination for a period of six (6) months following the termination date (***"Severance Payment"***); and

4.5.3.2 Benefits. Provided that Executive is eligible for and timely elects continued group health coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 (***"COBRA"***) following Executive's termination date, the Company shall pay directly to the insurance provider the premium for COBRA continuation coverage for Executive and Executive's family for a

period that will expire upon the earliest of (i) six (6) months following the termination date (the ***"COBRA Payment Period"***), (ii) the effective date that Executive becomes eligible for new healthcare coverage eligibility available through new employment, or (iii) the date Executive is no longer eligible for COBRA coverage, whichever comes first.

4.5.4 General Severance Benefit Terms.

4.5.4.1 The provisions in this Section shall control and supersede anything to the contrary set forth in this Agreement. For all purposes of this Agreement, references to COBRA premiums shall not include any amounts payable by Executive under a Section 125 health care reimbursement plan under the Code. If at any time the Company determines, in its sole discretion, that it cannot pay the COBRA premiums without potentially incurring financial costs or penalties under applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then regardless of whether Executive elects continued health coverage under COBRA, and in lieu of providing COBRA premiums, the Company will instead pay Executive on the last day of each remaining month of the COBRA Payment Period a fully taxable cash payment equal to the COBRA premiums for that month, subject to applicable tax withholdings, which payments shall continue until the earlier of expiration of the COBRA Payment Period of the date when Executive becomes eligible for health insurance coverage in connection with new employment. If Executive becomes eligible for coverage under another employer's group health plan, Executive must immediately notify the Company of such event, and all COBRA severance benefit payments and obligations under this Agreement shall cease effective as of such date of Executive's eligibility.

4.5.4.2 If all severance payments made under this Agreement will be subject to standard payroll deductions and withholdings and will be made on the Company's regular payroll cycle, provided, however, that any severance payments otherwise scheduled to be made prior to the effective date of the Release shall instead accrue and be paid in the first payroll period that follows such effective date. Following provisions of any severance benefits to which Executive may be entitled under Section 4.5.3, the Company shall thereafter have no further obligations to Executive under this Agreement, except as otherwise provided by law (and except as provided otherwise in Executive's stock option agreements with the Company).

4.6 Additional Definitions. For the purposes of this Agreement, the following terms shall have the following meanings:

4.6.1 ***"Complete Disability"*** shall mean with respect to Executive, the inability of Executive to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or that has lasted or can be expected to last for a continuous period of not less than 12 months, as provided in Sections 22(e)(3) and 409A(a)(2)(c)(i) of the Code, and will be determined in good faith by the Board based on the basis of such reasonable medical evidence as the Board deems warranted under the circumstances.

4.6.2 ***"Cause"*** shall mean the occurrence of any of the following events: (i) Executive's conviction of any felony or any crime involving fraud or dishonesty that has a material adverse effect on the Company; (ii) Executive's active participation (whether by affirmative act or material omission) in a fraud, act of dishonesty or other act of misconduct against the Company; (iii) Executive's material violation of any statutory or fiduciary duty owed to the Company; (iv) Executive's breach of any material term of any material contract between such Executive and the Company; and (v) Executive's repeated violation of any material the Company policy; *provided*, *however*, that termination by the Company due to Sections 1.5(b)(iii)–1.5(b)(vi) shall only be deemed for Cause if Executive fails to cure such conduct, violation, or breach within 30 days following Executive's receipt of written notice from the Company, unless such conduct, violation, or breach is not capable of being cured in the good faith determination of the Company. The Executive's Disability shall not constitute Cause as set forth herein. The determination that a termination is for Cause and whether the specified conduct, violation or breach, as applicable, has been satisfactorily cured shall be made in good faith by the Company in its sole and exclusive judgement and discretion. The term "Company" for purposes of this definition will be interpreted to include any Affiliate, as appropriate.

4.6.3 ***"Good Reason"*** shall mean the occurrence of any of the following events without Executive's consent; *provided*, *however*, that any resignation by Executive due to any of the following conditions shall only be deemed for Good Reason if: (A) Executive gives the Company written notice of the intent to terminate for Good Reason within 90 days following the first occurrence of the condition(s) that Executive believes constitutes Good Reason, which notice shall describe such condition(s); (B) the Company fails to remedy such condition(s) within 30 days following receipt of the written notice (the "***Cure Period***") of such condition(s) from Executive; and (C) Executive actually resigns Executive's employment within the first 15 days after expiration of the Cure Period:

4.6.3.1 material breach by the Company of any material provision in this Agreement or in any other material written agreement between the Company and Executive;

4.6.3.2 a material reduction (which the parties agree is a reduction of at least 10%) by the Company of Executive's base salary on the effective date hereof or as the same may be increased from time to time, unless such reduction is part of a reduction program equally applicable to other executive employees of the Company;

4.6.3.3 a material reduction in Executive's authority, duties or responsibilities, *provided*, *however,* that a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless Executive's new duties are materially reduced from the prior duties; or

4.6.3.4 the Company relocates the facility that is Executive's principal place of business with the Company to a location that requires an increase in Executive's one-way driving distance by more than 30 miles.

4.7 **Survival of Certain Provisions**. Sections 2, 3.3, 3.5, and 4 through 19 of this Agreement shall survive the termination of this Agreement.

4.8 **Parachute Payments**. Except as otherwise provided in an agreement between Executive and the Company, if any payment or benefit Executive would receive from the Company or otherwise in connection with a change in control ("***Payment***") would (i) constitute a "parachute payment" within the meaning of Section 280G of the Code, and (ii) but for this sentence, be subject to the excise tax imposed by Section 4999 of the Code (the "***Excise Tax***"), then such Payment shall be equal to the Reduced Amount (as defined herein). The "***Reduced Amount***" shall be either (x) the largest portion of the Payment that would result in no portion of the Payment being subject to the Excise Tax, or (y) the largest portion, up to and including the total, of the Payment, whichever amount, after taking into account all applicable federal, state and local employment taxes, income taxes, and the Excise Tax (all computed at the highest applicable marginal rate), results in Executive's receipt, on an after-tax basis, of the greater amount of the Payment notwithstanding that all or some portion of the Payment may be subject to the Excise Tax. If a reduction in payments or benefits constituting "parachute payments" is necessary so that the Payment equals the Reduced Amount, the reduction shall occur in the manner that results in the greatest economic benefit to Executive.

The independent registered public accounting firm engaged by the Company for general audit purposes as of the day prior to the effective date of the event described in Section 280G(b)(2)(A)(i) of the Code shall perform the foregoing calculations. If the independent registered public accounting firm so engaged by the Company is serving as accountant or auditor for the individual, entity or group effecting such event, the Company shall appoint a nationally recognized independent registered public accounting firm to make the determinations required hereunder. The Company shall bear all expenses with respect to the determinations by such independent registered public accounting firm required to be made hereunder. The independent registered public accounting firm engaged to make the determinations hereunder shall provide its calculations, together with detailed supporting documentation, to the Company and Executive within thirty (30) calendar days after the date on which Executive's right to a Payment is triggered (if requested at that time by the Company or Executive) or such other time as reasonably requested by the Company or Executive. Any good faith determinations of the independent registered

public accounting firm made hereunder shall be final, binding and conclusive upon the Company and Executive.

4.9 Application of Internal Revenue Code Section 409A.

All benefits under this Agreement are intended to qualify for an exemption from application of Section 409A of the Code and the regulations and other guidance thereunder and any state law of similar effect ("***Section 409A***") or to comply with its requirements to the extent necessary to avoid adverse personal tax consequences under Section 409A, and any ambiguities herein shall be interpreted accordingly.

Notwithstanding anything to the contrary set forth herein, any severance benefits that constitute "deferred compensation" within the meaning of Section 409A shall not commence in connection with Executive's termination of employment unless and until Executive has also incurred a "separation from service" (as such term is defined in Treasury Regulation Section 1.409A-1(h)) ("***Separation From Service***"), unless the Company reasonably determines that such amounts may be provided to Executive without causing Executive to incur the additional 20% tax under Section 409A.

It is intended that each installment of the severance benefit payments provided for in this Agreement is a separate "payment" for purposes of Treasury Regulation Section 1.409A-2(b)(2)(i). For the avoidance of doubt, it is intended that payments of the severance benefits set forth in this Agreement satisfy, to the greatest extent possible, the exemptions from the application of Section 409A provided under Treasury Regulation Sections 1.409A-1(b)(4), 1.409A-1(b)(5) and 1.409A-1(b)(9). However, if the Company (or, if applicable, the successor entity thereto) determines that the severance benefits constitute "deferred compensation" under Section 409A and Executive is, on the termination of service, a "specified employee" of the Company or any successor entity thereto, as such term is defined in Section 409A(a)(2)(B)(i) of the Code, then, solely to the extent necessary to avoid the incurrence of the adverse personal tax consequences under Section 409A, the timing of the severance benefit payments shall be delayed until the earlier to occur of: (i) the date that is six months and one day after Executive's Separation From Service, or (ii) the date of Executive's death. None of the severance benefits will be paid or otherwise delivered prior to the effective date of the Release. If the severance benefits are not covered by one or more exemptions from the application of Section 409A and the Release could become effective in the calendar year following the calendar year in which Executive's Separation From Service occurs, the Release will not be deemed effective any earlier than the Release Deadline. Except to the minimum extent that payments must be delayed because Executive is a "specified employee" or until the effectiveness of the Release, all amounts will be paid as soon as practicable in accordance with the Company's normal payroll practices.

The severance benefits are intended to qualify for an exemption from application of Section 409A or comply with its requirements to the extent necessary to avoid adverse personal tax consequences under Section 409A, and any ambiguities herein shall be interpreted accordingly.

5. CONFIDENTIAL AND PROPRIETARY INFORMATION; NONSOLICITATION.

5.1 As a condition of employment, Executive agrees to execute and abide by the Company's Confidential Information and Inventions Assignment Agreement attached hereto as **EXHIBIT A**.

5.2 While employed by the Company and for one year thereafter, Executive agrees that in order to protect the Company's trade secrets and confidential and proprietary information from unauthorized use, Executive will not, either directly or through others, solicit or attempt to solicit any employee, consultant or independent contractor of the Company to terminate his or her relationship with the Company in order to become an employee, consultant or independent contractor to or for any other person or business entity.

6. ASSIGNMENT AND BINDING EFFECT.

This Agreement shall be binding upon and inure to the benefit of Executive and Executive's heirs, executors, personal representatives, assigns, administrators and legal representatives. Because of the unique and personal nature of Executive's duties under this Agreement, neither this Agreement nor any rights or obligations under this Agreement shall be assignable by Executive. This Agreement shall be binding upon and inure to the benefit of the Company and its successors, assigns and legal representatives.

7. NOTICES.

All notices or demands of any kind required or permitted to be given by the Company or Executive under this Agreement shall be given in writing and shall be personally delivered (and receipted for) or faxed during normal business hours or mailed by certified mail return receipt requested, postage prepaid, address as follows,

If to the Company:	If to Executive:
Bionano Genomics, Inc. 9540 Towne Centre Drive, Suite 100 San Diego, CA, 92121 Attn: Chief Executive Officer Company	Soheil Shams [***] [***]

Any such written notice shall be deemed given on the earlier of the date on which such notice is personally delivered or three days after its deposit in the United States mail as specified above. Either Party may change its address for notices by giving notice to the other Party in the manner specified in this Section.

8. CHOICE OF LAW.

This Agreement shall be construed and interpreted in accordance with the internal laws of the State of California without regard to its conflict of laws principles.

9. INTEGRATION.

This Agreement, including **Exhibit A**, contains the complete, final and exclusive agreement of the Parties relating to the terms and conditions of Executive's employment and the termination of Executive's employment, and supersedes all prior and/or contemporaneous oral and written employment agreements or arrangements between the Parties.

10. AMENDMENT.

This Agreement cannot be amended or modified except by a written agreement signed by Executive and the Company.

11. WAIVER.

No term, covenant or condition of this Agreement or any breach thereof shall be deemed waived, except with the written consent of the Party against whom the wavier is claimed, and any waiver or any such term, covenant, condition or breach shall not be deemed to be a waiver of any preceding or succeeding breach of the same or any other term, covenant, condition or breach.

12. SEVERABILITY.

The finding by a court of competent jurisdiction of the unenforceability, invalidity or illegality of any provision of this Agreement shall not render any other provision of this Agreement unenforceable,

invalid or illegal. Such court shall have the authority to modify or replace the invalid or unenforceable term or provision with a valid and enforceable term or provision which most accurately represents the Parties' intention with respect to the invalid or unenforceable term or provision.

13. INTERPRETATION; CONSTRUCTION.

The headings set forth in this Agreement are for convenience of reference only and shall not be used in interpreting this Agreement. This Agreement has been drafted by legal counsel representing the Company, but Executive has been encouraged to consult with, and have consulted with, Executive's own independent counsel and tax advisors with respect to the terms of this Agreement. The Parties acknowledge that each Party and its counsel has reviewed and revised, or had an opportunity to review and revise, this Agreement, and any rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement.

14. REPRESENTATIONS AND WARRANTIES.

Executive represents and warrants that Executive is not restricted or prohibited, contractually or otherwise, from entering into and performing each of the terms and covenants contained in this Agreement, and that Executive's execution and performance of this Agreement will not violate or breach any other agreements between Executive and any other person or entity.

15. COUNTERPARTS; FACSIMILE.

This Agreement may be executed in two counterparts, each of which shall be deemed an original, all of which together shall contribute one and the same instrument. Facsimile signatures shall be treated the same as original signatures.

16. DISPUTE RESOLUTION.

To ensure the timely and economical resolution of disputes that may arise between Executive and the Company, both Executive and the Company mutually agree that pursuant to the Federal Arbitration Act, 9 U.S.C. §1-16, and to the fullest extent permitted by applicable law, Executive and the Company will submit solely to final, binding and confidential arbitration any and all disputes, claims, or causes of action arising from or relating to: **(i)** the negotiation, execution, interpretation, performance, breach or enforcement of this Agreement; or **(ii)** Executive's employment with the Company (including but not limited to all statutory claims); or **(iii)** the termination of Executive's employment with the Company (including but not limited to all statutory claims). **By agreeing to this arbitration procedure, both Executive and the Company waive the right to resolve any such disputes through a trial by jury or judge or through an administrative proceeding.**

16.1 Arbitrator Authority. The arbitrator shall have the sole and exclusive authority to determine whether a dispute, claim or cause of action is subject to arbitration under this Section and to determine any procedural questions which grow out of such disputes, claims or causes of action and bear on their final disposition.

16.2 Individual Capacity Only. All claims, disputes, or causes of action under this Section, whether by Executive or the Company, must be brought solely in an individual capacity, and shall not be brought as a plaintiff (or claimant) or class member in any purported class or representative proceeding, nor joined or consolidated with the claims of any other person or entity. The arbitrator may not consolidate the claims of more than one person or entity, and may not preside over any form of representative or class proceeding. To the extent that the preceding sentences in this Section are found to violate applicable law or are otherwise found unenforceable, any claim(s) alleged or brought on behalf of a class shall proceed in a court of law rather than by arbitration.

16.3 Arbitration Process. Any arbitration proceeding under this Section shall be presided over by a single arbitrator and conducted by Judicial Arbitration and Mediation Services, Inc.

("***JAMS***") in San Diego, California, or as otherwise agreed to by Executive and the Company, under the then applicable JAMS rules for the resolution of employment disputes (available upon request and also currently available at http://www.jamsadr.com/rules-employment-arbitration/). Executive and the Company both have the right to be represented by legal counsel at any arbitration proceeding, at each party's own expense. The arbitrator shall: **(i)** have the authority to compel adequate discovery for the resolution of the dispute; **(ii)** issue a written arbitration decision, to include the arbitrator's essential findings and conclusions and a statement of the award; and **(iii)** be authorized to award any or all remedies that Executive or the Company would be entitled to seek in a court of law. The Company shall pay all JAMS arbitration fees in excess of the amount of court fees that would be required of Executive if the dispute were decided in a court of law.

16.4 Excluded Claims. This Section shall not apply to any action or claim that cannot be subject to mandatory arbitration as a matter of law, including, without limitation, claims brought pursuant to the California Private Attorneys General Act of 2004, as amended, the California Fair Employment and Housing Act, as amended, and the California Labor Code, as amended, to the extent such claims are not permitted by applicable law to be submitted to mandatory arbitration and such applicable law is not preempted by the Federal Arbitration Act or otherwise invalid (collectively, the "***Excluded Claims***"). In the event Executive intends to bring multiple claims, including one of the Excluded Claims listed above, the Excluded Claims may be filed with a court, while any other claims will remain subject to mandatory arbitration.

16.5 Injunctive Relief and Final Orders. Nothing in this Section is intended to prevent either Executive or the Company from obtaining injunctive relief in court to prevent irreparable harm pending the conclusion of any such arbitration. Any final award in any arbitration proceeding hereunder may be entered as a judgment in the federal and state courts of any competent jurisdiction and enforced accordingly.

17. TRADE SECRETS OF OTHERS.

It is the understanding of both the Company and Executive that Executive shall not divulge to the Company and/or its subsidiaries any confidential information or trade secrets belonging to others, including Executive's former employers, nor shall the Company and/or its Affiliates seek to elicit from Executive any such information. Consistent with the foregoing, Executive shall not provide to the Company and/or its Affiliates, and the Company and/or its Affiliates shall not request, any documents or copies of documents containing such information.

18. ADVERTISING WAIVER.

Executive agrees to permit the Company and/or its affiliates, subsidiaries, or joint ventures currently existing or which shall be established during Executive's employment by the Company (collectively, ***"Affiliates"***), and persons or other organizations authorized by the Company and/or its Affiliates, to use, publish and distribute advertising or sales promotional literature concerning the products and/or services of the Company and/or its Affiliates, or the machinery and equipment used in the provision thereof, in which Executive's name and/or pictures of Executive taken in the course of Executive's provision of services to the Company and/or its Affiliates, appear. Executive hereby waives and releases any claim or right Executive may otherwise have arising out of such use, publication or distribution. The Company agrees that, following termination of Executive's employment, it will not create any new such literature containing Executive's name and/or pictures without Executive's prior written consent.

19. INDEMNIFICATION.

Subject to applicable law, Executive will be provided indemnification to the maximum extent permitted by the Company's Bylaws and Articles of Incorporation, including coverage, if applicable, under any directors and officers insurance policies, with such indemnification determined by the Board or any of its committees in good faith based on principles consistently applied (subject to such limited

exceptions as the Board may approve in cases of hardship) and on terms no less favorable than provided to any other Company executive officer or director.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first above written.

COMPANY:

BIONANO GENOMICS, INC.

By: /s/ R. Erik Holmlin, Ph.D.

Name: R. Erik Holmlin, Ph.D.

Title: President and Chief Executive Officer

Date: October 8, 2021

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first above written.

EXECUTIVE:

/s/ Soheil Shams

Soheil Shams

Date: October 8, 2021

(Signature Page to Employment Agreement)

EXHIBIT A

CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

STOCK RESTRICTION AGREEMENT

This STOCK RESTRICTION AGREEMENT (this "***Agreement***"), dated for reference purposes only as October 8, 2021, is made and entered into by and between Bionano Genomics, Inc., a Delaware corporation ("***Parent***"), and the undersigned stockholder of the Company (the "***Holder***"). Each of Parent and the Holder are collectively referred to from time to time herein as the "***Parties***," and each, individually, as a "***Party***." Capitalized terms used and not otherwise defined herein shall have the meanings ascribed to such terms in the Merger Agreement (as defined below).

RECITALS

WHEREAS, Parent, Starship Merger Sub I, Inc., a California corporation and a wholly owned Subsidiary of Parent ("***Merger Sub I***"), Starship Merger Sub II, LLC, a California limited liability company and a wholly owned Subsidiary of Parent ("***Merger Sub II***" and, together with Merger Sub I, the "***Merger Subs***"), BioDiscovery, Inc., a California corporation (the "***Company***"), and Soheil Shams solely in its capacity as the representative of the Participating Securityholders (the "***Stockholder Representative***"), have entered into that certain Agreement and Plan of Merger, dated as of October 8, 2021 (as such agreement may be amended from time to time, the "***Merger Agreement***"), pursuant to which the Company shall be acquired by Parent, by means of a merger of Merger Sub I with and into the Company, pursuant to which the Company will survive and become a wholly owned subsidiary of Parent ("***Merger I***"), and, as part of the same overall transaction, promptly after Merger I, the surviving entity of Merger I will merge with and into Merger Sub II, with Merger Sub II surviving such merger ("***Merger II***" and, together with Merger I, the "***Mergers***"), on the terms and subject to the conditions set forth in the Merger Agreement;

WHEREAS, at the Closing, as part of the Merger Consideration, the Holder will receive shares of Parent Common Stock (the "***Shares***"); and

WHEREAS, as a condition and inducement to Parent and the Merger Subs entering into the Merger Agreement and as a condition to the consummation of the Mergers and the other transactions contemplated by the Merger Agreement, the Holder is executing and delivering this Agreement.

NOW THEREFORE, in consideration of the premises, covenants and representations set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

ARTICLE I

REVESTED STOCK CONSIDERATION

1.1 Revesting of Certain Merger Consideration. The Holder hereby acknowledges and agrees that 5,006,479 of the Shares shall be subject to provisions set forth in this Agreement (such Shares subject to such provisions, the Holder's "***Revested Stock Consideration***").

1.2 Vesting of Revested Stock Consideration.

(a) The Revested Stock Consideration will be unvested as of its issuance to the Holder at the Closing.

(b) One-third of the Revested Stock Consideration shall vest on the first anniversary of the Closing Date and one-twelfth ($1/12^{th}$) of the Revested Stock Consideration shall vest every three (3) months following the first anniversary of the Closing Date (for illustrative purposes only, if the Closing Date is October 15, 2021, the first vesting will occur on October 15, 2022, the second vesting will occur on January 15, 2023 and the third vesting will occur on April 15, 2023 and so on until the final vesting date on October 15, 2024). The number of shares of Revested Stock Consideration that vest upon each vesting date shall be rounded down to the nearest whole share, with the balance of any shares that did not vest as a result of such rounding to vest on the final vesting date, subject to rounding.

(c) Subject to Section 1.2(d) below, the vesting of the Revested Stock Consideration on a particular vesting date shall be subject to the Holder's continuous Service (as defined below) through and including the day of the applicable calendar month on which the vesting date occurs. The Holder shall, for purposes of this Agreement, be deemed to provide "***Service***" for so long as the Holder remains an employee of, or a consultant or advisor (pursuant to a mutually negotiated consulting or advisor agreement) to, Parent or one of Parent's Subsidiaries. For the avoidance of doubt, termination of employment with or service to Parent or any of its Subsidiaries to take employment with or provide service to another of Parent or any of its Subsidiaries shall not be considered termination of Service.

(d) Upon the termination of Service (i) by Parent or a Subsidiary of Parent other than for Cause, (ii) by the Holder for Good Reason or (iii) as a result of the Holder's death or Disability, any then unvested Revested Stock Consideration shall automatically vest in full as of such date of termination of Service; *provided*, *however*, in the event of termination of Service pursuant to subclauses (i) or (ii) of this Section 1.2(d), such Revested Stock Consideration will not vest or be released to the Holder until the Holder has executed and delivered to Parent (and not revoked) a customary release of claims arising out of the Holder's employment (including any claims for discrimination, harassment or wrongful termination), in form and substance reasonably acceptable to Parent and subject to reasonable and customary exclusions, including exclusions for earned and unpaid compensation, unreimbursed business expenses, rights of indemnification and rights as a holder of equity securities, and such release shall have become effective.

1.3 Forfeiture of Revested Stock Consideration. Subject to Section 1.2(d), in the event that the Holder's Service terminates at any time after the Closing, then all of the Revested Stock Consideration that has not vested pursuant to Section 1.2 prior to the date of such termination shall be automatically forfeited by the Holder and redeemed by Parent for no consideration, without the requirement for any further action on the part of the Holder, Parent or any other Person.

1.4 Right to Satisfy Claims from the Revested Stock Consideration. Parent is expressly authorized to set off up to 100% of (i) any Damages for which it is entitled to indemnification under the Merger Agreement, or (ii) any negative Adjustment Amount determined pursuant to Section 1.17 (*Post-Closing Adjustment*) of the Merger agreement for which it is entitled to indemnification under the Merger Agreement against Holder, against any Shares subject to the Revested Stock Consideration, subject to any limitations on such setoff set forth in the Merger Agreement.

1.5 Definitions. For purposes of this Agreement:

(a) "***Board***" shall mean the Board of Directors of Parent; *provided*, *however*, that if the Board has delegated relevant authority to the Compensation Committee of the Board, then "***Board***" shall also mean the Compensation Committee.

(b) "***Cause***" shall have the meaning ascribed to such term in the Key Employee Agreement between the Holder and Parent executed in connection with the Mergers, as amended from time to time (the "***Key Employee Agreement***"), and, in the absence of such agreement or in the event that such agreement in effect is less favorable to the Holder, shall mean the occurrence of any of the following events: (i) the Holder's conviction of any felony or any crime involving fraud or dishonesty that has a material adverse effect on Parent; (ii) the Holder's active participation (whether by affirmative act or material omission) in a fraud, act of dishonesty or other act of misconduct against Parent; (iii) the Holder's material violation of any statutory or fiduciary duty owed to Parent; (iv) the Holder's breach of any material term of any material contract between such Holder and Parent; and (v) the Holder's repeated violation of any material Parent policy; *provided*, *however*, that termination by Parent due to Sections 1.5(b)(iii)–1.5(b)(vi) shall only be deemed for Cause if the Holder fails to cure such conduct, violation, or breach within 30 days following the Holder's receipt of written notice from Parent, unless such conduct, violation, or breach is not capable of being cured in the good faith determination of Parent. The Holder's Disability shall not constitute Cause as set forth herein. The determination that a termination is for Cause and whether the specified conduct, violation or breach, as applicable, has been satisfactorily cured shall be made in good faith by Parent in its sole and exclusive judgement and discretion. The term "Parent" for purposes of this definition will be interpreted to include any Affiliate, as appropriate.

(c) "***Disability***" shall have the meaning ascribed to such term or a similar term in the Key Employee Agreement, and, in the absence of such agreement or in the event that such agreement in effect is less favorable to the Holder, shall mean with respect to the Holder, the inability of the Holder to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or that has lasted or can be expected to last for a continuous period of not less than 12 months, as provided in Sections 22(e)(3) and 409A(a)(2)(c)(i) of the Internal Revenue Code of 1986, as amended (the "***Code***"), and will be determined in good faith by the Board based on the basis of such reasonable medical evidence as the Board deems warranted under the circumstances.

(d) "***Good Reason***" for the Holder's resignation shall have the meaning ascribed to such term in the Key Employee Agreement, and, in the absence of such agreement or in the event that such agreement in effect is less favorable to the Holder, shall mean the occurrence of any of the following events without the Holder's consent; *provided*, *however*, that any resignation by the Holder due to any of the following conditions shall only be deemed for Good Reason if: (A) the Holder gives Parent written notice of the intent to terminate for Good Reason within 90 days following the first occurrence of the condition(s) that the Holder believes constitutes Good Reason, which notice shall describe such condition(s); (B) Parent fails to remedy such condition(s) within 30 days following receipt of the written notice (the "***Cure Period***") of such condition(s) from the Holder; and (C) the Holder actually resigns the Holder's employment within the first 15 days after expiration of the Cure Period:

(i) material breach by Parent of any material provision in this Agreement or in any other material written agreement between Parent and the Holder;

(ii) a material reduction (which the parties agree is a reduction of at least 10%) by Parent of the Holder's base salary on the effective date hereof or as the same may be increased from time to time, unless such reduction is part of a reduction program equally applicable to other executive employees of Parent;

(iii) a material reduction in the Holder's authority, duties or responsibilities, *provided*, *however*, that a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless the Holder's new duties are materially reduced from the prior duties; or

(iv) Parent relocates the facility that is the Holder's principal place of business with Parent to a location that requires an increase in the Holder's one-way driving distance by more than 30 miles.

(e) The Holder will be deemed to have effected a "***Transfer***" of Restricted Stock Consideration if the Holder, whether voluntarily or involuntarily, directly or indirectly (i) sells, pledges, encumbers, hypothecates, leases, assigns, gifts, grants an option with respect to, transfers, exchanges, tenders or disposes (by merger, by testamentary disposition, by operation of law or otherwise) all or any portion of such Restricted Stock Consideration or any interest in such Restricted Stock Consideration, (ii) creates or permits to exist any lien, pledge, charge, claim, mortgage, security interest or other encumbrance on the Restricted Stock Consideration, or (iii) agrees to take any of the actions referred to in the foregoing clauses (i) through (iii).

1.6 Dividend and Voting Rights. During any period in which the Revested Stock Consideration has not fully vested pursuant to Section 1.2(b) and has not been forfeited pursuant to Section 1.3, the Holder shall be deemed to be the legal and beneficial owner of such shares (subject to the terms of this Agreement) of Parent Common Stock and shall have the right to (i) receive any cash dividends declared thereupon (any stock dividends declared shall be deemed additional Revested Stock Consideration and shall be subject to the same vesting schedule set forth in Section 1.2(b) and be released to the Holder or forfeited as provided herein) and (ii) vote any such shares in the Holder's discretion with respect to each matter for which holders of shares of Parent Common Stock are entitled to vote.

1.7 Tax Matters.

(a) Each Party agrees that the Revested Stock Consideration has been issued to the Holder as consideration in respect of the Holder's Company Capital Stock and is not subject to wage withholding except to the extent that another treatment is required by either (i) a change in Law or (ii) a final determination within the meaning of Section 1313 of the Code; *provided*, that no Party shall be prevented from taking a tax position inconsistent with such tax treatment in settlement of a tax controversy, and no Party shall be required to litigate in order to support a tax position. The Holder agrees that the Holder shall make a protective election under Section 83(b) of the Code, with respect to the Revested Stock Consideration within 30 days after the receipt of such Revested Stock Consideration, using the form attached hereto as **Exhibit A**, and will provide to Parent a copy of such election promptly after it is filed. Notwithstanding the foregoing, the Holder acknowledges that the Holder is relying solely on its own Tax advisors in connection with this Agreement.

(b) The Holder agrees to submit a properly completed and executed Internal Revenue Service Form W-9 to Parent at the Closing.

1.8 No Guarantee of Employment. In no event shall any provision of this Agreement or the transactions contemplated hereby give or be deemed to give the Holder any right to continued employment by Parent or any of its Subsidiaries or affect in any manner the right of the Holder's Employer to terminate the Holder's employment at any time.

1.9 Equitable Adjustments. In the event of any stock split, reverse stock split, stock dividend (including any dividend or distribution of securities convertible into capital stock), reorganization, reclassification, combination, recapitalization or other like change with respect to the Parent Common Stock occurring after the Merger I Effective Time, all references in this Article I to specified numbers or types of shares, and all calculations provided for that are based upon numbers or types of shares affected thereby, shall be equitably adjusted to the extent necessary to provide the parties the same economic effect as contemplated by this Article I prior to such stock split, reverse stock split, stock dividend, reorganization, reclassification, combination, recapitalization or other like change.

1.10 Transfer Restrictions; Additional Legend.

(a) The Holder shall not Transfer (or cause or permit the Transfer of) any Revested Stock Consideration that has not vested in accordance with the terms of Section 1.2, or enter into any agreement relating thereto.

(b) The Holder understands that any Revested Stock Consideration that has not vested in accordance with the terms of Section 1.2 shall bear the following restrictive legend (in addition to any other legend required by law or the Merger Agreement):

THE SECURITIES REPRESENTED BY THIS CERTIFICATE ARE SUBJECT TO A REACQUISITION RIGHT AND OTHER RESTRICTIONS AND CONDITIONS SET FORTH IN A STOCK RESTRICTION AGREEMENT BETWEEN THE COMPANY AND THE REGISTERED HOLDER, OR SUCH HOLDER'S PREDECESSOR IN INTEREST, A COPY OF WHICH IS ON FILE AT THE COMPANY'S PRINCIPAL CORPORATE OFFICE. ANY SALE, PLEDGE, HYPOTHECATION OR OTHER TRANSFER, OR ATTEMPT TO DO ANY OF THE FOREGOING, WITH RESPECT TO ANY SECURITIES SUBJECT TO SUCH RIGHT, RESTRICTIONS OR CONDITIONS IN CONTRAVENTION OF SUCH AGREEMENT IS NULL AND VOID WITHOUT THE PRIOR EXPRESS WRITTEN CONSENT OF THE COMPANY.

ARTICLE II

MISCELLANEOUS

2.1 Specific Performance.

(a) The Parties agree that, in the event of any breach or threatened breach by the other Party or Parties hereto of any covenant, obligation or other agreement set forth in this Agreement, (i) each Party shall be entitled, without any proof of actual damages (and in addition to any other remedy that may be available to it), to specific performance to enforce the observance and performance of such covenant, obligation or other agreement and an injunction preventing or restraining such breach or threatened breach, and (ii) no Party shall be required to provide or post any bond or other security or collateral in connection with any such decree, order or injunction or in connection with any related Legal Proceeding.

(b) Any and all remedies expressly conferred herein upon a Party hereunder shall be deemed to be cumulative with, and not exclusive of, any other remedy conferred hereby, or by Law or in equity upon such Party, and the exercise by a Party of any one remedy will not preclude the exercise of any other remedy.

2.2 Governing Law. This Agreement shall be governed by and construed in accordance with the internal laws of the State of Delaware without giving effect to any choice or conflict of Law provision or rule (whether of the State of Delaware or any other jurisdiction).

2.3 Exclusive Jurisdiction; Waiver of Jury Trial.

(a) ANY LEGAL PROCEEDING ARISING OUT OF OR BASED UPON THIS AGREEMENT, THE MERGER AGREEMENT, OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY MAY BE INSTITUTED FIRST, IN THE COURT OF CHANCERY WITHIN NEW CASTLE COUNTY IN THE STATE OF DELAWARE (AND ANY APPELLATE COURT THEREOF LOCATED WITHIN SUCH COUNTY) AND TO THE EXTENT SUCH COURT OF CHANCERY (OR APPELLATE COURT THEREOF LOCATED WITHIN SUCH COUNTY) LACKS JURISDICTION OVER THE MATTER, THE FEDERAL COURTS OF THE UNITED STATES OF AMERICA LOCATED WITHIN NEW CASTLE COUNTY IN THE STATE OF DELAWARE (OR APPELLATE COURT THEREOF LOCATED WITHIN SUCH COUNTY), AND EACH PARTY IRREVOCABLY SUBMITS TO THE EXCLUSIVE JURISDICTION OF SUCH COURTS IN ANY SUCH LEGAL PROCEEDING. SERVICE OF PROCESS, SUMMONS, NOTICE OR OTHER DOCUMENT BY MAIL TO SUCH PARTY'S ADDRESS SET FORTH HEREIN SHALL BE EFFECTIVE SERVICE OF PROCESS FOR ANY LEGAL PROCEEDING BROUGHT IN ANY SUCH COURT. THE PARTIES IRREVOCABLY AND UNCONDITIONALLY WAIVE ANY OBJECTION TO THE LAYING OF VENUE OF ANY LEGAL PROCEEDING IN SUCH COURTS AND IRREVOCABLY WAIVE AND AGREE NOT TO PLEAD OR CLAIM IN ANY SUCH COURT THAT ANY SUCH LEGAL PROCEEDING BROUGHT IN ANY SUCH COURT HAS BEEN BROUGHT IN AN INCONVENIENT FORUM.

(b) EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT OR THE MERGER AGREEMENT IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES AND, THEREFORE, EACH SUCH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT, THE MERGER AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY. EACH PARTY TO THIS AGREEMENT CERTIFIES AND ACKNOWLEDGES THAT (I) NO REPRESENTATIVE OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT SEEK TO ENFORCE THE FOREGOING WAIVER IN THE EVENT OF A LEGAL PROCEEDING, (II) SUCH PARTY HAS CONSIDERED THE IMPLICATIONS OF THIS WAIVER, (III) SUCH PARTY MAKES THIS WAIVER VOLUNTARILY, AND (IV) SUCH PARTY HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION 2.3(B).

2.4 Entire Agreement; Assignment. This Agreement, the Merger Agreement, the Non-Competition and Non-Solicitation Agreement and the Key Employee Agreement (a) constitute the entire agreement among the Parties with respect to the subject matter hereof and thereof and supersede all prior agreements and understandings, both written and oral, among the Parties with respect to the subject matter hereof and thereof, (b) are not intended to confer upon any other Person any rights or remedies hereunder (other than in the case of the Holder's estate or legal representative in the event of the Holder's death or disability), and (c) shall not be assigned by the Holder by operation of law or otherwise. Subject to the preceding sentence, this Agreement shall be binding upon, inure to the benefit of, and be enforceable by, the Parties and their respective successors and permitted assigns. Any purported assignment not permitted under this Section 2.4 shall be null and void.

2.5 Amendment; Waiver. This Agreement can be amended, supplemented or changed, and any provision hereof can be waived, only by written instrument making specific reference to this Agreement, signed by the Parties hereto. The waiver by any Party of a breach of any provision of this Agreement shall not operate or be construed as a further or continuing waiver of such breach or as a waiver of any other or subsequent breach. No failure on the part of any Party to exercise, and no delay in exercising, any right, power or remedy hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of such right, power or remedy by such Party preclude any other or further exercise thereof or the exercise of any other right, power or remedy.

2.6 Notices. Any notice or other communication required or permitted to be delivered to any Party under this Agreement shall be in writing and shall be deemed properly delivered, given and received (a) upon receipt when delivered by hand, (b) upon transmission, if sent by electronic mail transmission, or (c) one Business Day after being sent by courier or express delivery service; *provided*, that in each case the notice or other communication is sent to the address or electronic mail address as specified for such party below (or to such other address or electronic mail address as such party shall have specified in a written notice given to the other parties hereto):

(a) If to Parent, then as provided for in Section 10.9 (*Notices*) of the Merger Agreement; and

(b) If to the Holder, then to the address set forth on the Holder's signature page hereto.

2.7 Severability. In the event that any provision of this Agreement or the application thereof, becomes or is declared by a court of competent jurisdiction to be illegal, void or unenforceable, the remainder of this Agreement shall continue in full force and effect and the application of such provision to other Persons or circumstances shall be interpreted so as reasonably to effect the intent of the Parties hereto. The Parties further agree to replace such illegal, void or unenforceable provision of this Agreement with a valid and enforceable provision that shall achieve, to the extent possible, the economic, business and other purposes of such illegal, void or unenforceable provision.

2.8 Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be enforceable against the parties actually executing such counterparts, and all of which together shall constitute one instrument. A facsimile, telecopy or other reproduction of this Agreement may be executed by one or more parties hereto and delivered by such party by facsimile or any similar electronic transmission device pursuant to which the signature of or on

behalf of such party can be seen. Such execution and delivery shall be considered valid, binding and effective for all purposes.

2.9 Interpretation. The words "include," "includes" and "including" when used herein shall be deemed in each case to be followed by the words "without limitation." The headings contained in this Agreement are for reference purposes only and shall not affect in any way the meaning or interpretation of this Agreement. The words "hereof," "herein" and "herewith" and words of similar import shall, unless otherwise stated, be construed to refer to this Agreement as a whole and not to any particular provision of this Agreement. Article, section and paragraph references are to the articles, sections and paragraphs of this Agreement unless otherwise specified. The meaning assigned to each term defined herein shall be equally applicable to both the singular and the plural forms of such term, and words denoting any gender shall include all genders. The word "extent" and the phrase "to the extent" when used in this Agreement shall mean the degree to which a subject or other things extends, and such word or phrase shall not merely mean "if." The term "or" is not exclusive, and shall be interpreted as "and/or" unless the context clearly requires otherwise. A reference to any specific legislation or to any provision of any legislation shall include any amendment to, and any modification or re-enactment thereof, any legislative provision substituted therefor and all regulations and statutory instruments issued thereunder or pursuant thereto.

2.10 Termination. This Agreement shall terminate upon the earlier of (a) the valid termination of the Merger Agreement in accordance with the provisions of Section 9 (*Termination*) of the Merger Agreement and (b) the termination of this Agreement by mutual consent of the Parties (each individually a "***Termination Event***") and shall be null and void in all respects after a Termination Event; *provided*, that, nothing herein shall relieve any Party from liability in connection with any breach of such party's representations, warranties or covenants contained herein occurring prior to a Termination Event.

2.11 Acknowledgments. Each party to this Agreement acknowledges that (a) Pillsbury Winthrop Shaw Pittman LLP, counsel for the Company, represented the Company in connection with the Mergers and related transactions, (b) Cooley LLP, counsel for Parent and the Merger Subs, represented Parent and the Merger Subs in connection with this Agreement, the Mergers and related transactions, and (c) neither of the foregoing firms has represented the Holder in connection with this Agreement, the Mergers or related transactions.

2.12 Effective Date. Notwithstanding the date of execution of this Agreement, this Agreement shall only become effective upon the Closing, and if the Merger Agreement shall terminate in accordance with its terms prior to the Closing, this Agreement shall never become effective.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be duly executed as of the date first above written.

PARENT:

BIONANO GENOMICS, INC.

By: /s/ R. Erik Holmlin, Ph.D.
Name: R. Erik Holmlin, Ph.D.
Title: President and Chief Executive Officer

HOLDER:

By: /s/ Soheil Shams

Name: Soheil Shams

Address:

[***]

[***]

[***]

Email: [***]
Shares: 5,006,479

EXHIBIT A

SECTION 83(b) ELECTION

_____ _____, 2021

Department of the Treasury
Internal Revenue Service
Ogden, UT 84201-0002

Re: Election Under Section 83(b)

Ladies and Gentlemen:

The undersigned taxpayer hereby elects, pursuant to Section 83(b) of the Internal Revenue Code of 1986, as amended, to include in gross income as compensation for services the excess (if any) of the fair market value of the shares described below over the amount paid for those shares. The following information is supplied in accordance with Treasury Regulation § 1.83-2:

1. **The name, social security number, address of the undersigned, and the taxable year for which this election is being made are:**

   Name: __

   Social Security Number: __

   Address: __

   __

   Taxable year: Calendar year 2021.

2. **The property that is the subject of this election: _____**[1] shares of common stock (the "***Shares***") of Bionano Genomics, Inc., a Delaware corporation ("***Parent***").

3. **The Shares were transferred on:** _____ _____, 2021.[2]

4. **The Shares are subject to the following restrictions:** The Shares are subject to forfeiture if the undersigned does not continue to provide services for Parent for a designated period of time. The risk of forfeiture lapses over a specified vesting period.

5. **The fair market value of the Shares at the time of transfer (determined without regard to any lapse restriction as defined in Treasury Regulation § 1.83-3(i)):** _____.[3]

6. **The amount paid by the undersigned for the Shares:** _____. [4] The Shares were transferred as part of the consideration received by the undersigned incident to the acquisition of BioDiscovery, Inc., a California corporation (the "***Company***") by Parent in a transaction qualifying as a "reorganization" within the meaning of Internal Revenue Code section 368(a). Gain or loss with respect to the undersigned's shares of Company capital stock will be recognized to the extent provided by Internal Revenue Code section 356. See Revenue Ruling 2007-49, 2007-2 C.B. 237.

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[1] The quotient of (i) the product of (A) $30 million and (B) taxpayer's Ownership Percentage, divided by (ii) the Parent Trading Price.

[2] Closing Date.

[3] $30 million multiplied by taxpayer's Ownership Percentage.

[4] $30 million multiplied by taxpayer's Ownership Percentage.

The undersigned taxpayer will file this election with the Internal Revenue Service office with which taxpayer files his annual income tax return not later than 30 days after the date of transfer of the Shares. A copy of the election also will be furnished to the person for whom the services were performed. The undersigned is the person performing the services in connection with which the Shares were transferred.

Very truly yours,

_____

[Name]

RETURN SERVICE REQUESTED

Department of the Treasury
Internal Revenue Service
Ogden, UT 84201-0002

Re: **Election Under Section 83(b) of the Internal Revenue Code**

Dear Sir or Madam:

Enclosed please find an executed election under Section 83(b) of the Internal Revenue Code of 1986, as amended, filed with respect to shares of common stock of Bionano Genomics, Inc.

Also enclosed is a copy of this letter and a stamped, self-addressed envelope. Please acknowledge receipt of these materials by marking the copy when received and returning it to the undersigned.

Thank you very much for your assistance.

Very truly yours,

_____

[Name]

Enclosures

EMPLOYMENT AGREEMENT

This **EMPLOYMENT AGREEMENT** (the ***"Agreement"***) is made and entered into effective as of June 14, 2021 (the ***"Effective Date"***), by and between **BIONANO GENOMICS, INC**. (the ***"Company"***) and **Richard Shippy** (***"Executive"***). The Company and Executive are hereinafter collectively referred to as the ***"Parties"***, and individually referred to as a ***"Party"***.

RECITALS

The Company desires assurance of the association and services of Executive in order to retain Executive's experience, skills, abilities, background and knowledge, and is willing to continue to the engagement of Executive's services on the terms and conditions set forth in this Agreement.

Executive desires to be in the employ of the Company, and is willing to accept employment on the terms and conditions set forth in this Agreement.

AGREEMENT

In consideration of the foregoing Recitals and mutual promises and covenants contained herein, and for other good and valuable consideration, the Parties, intending to be legally bound, agree as follows:

1. EMPLOYMENT.

1.1 Title. Executive's position shall be Chief Business Officer of the Company, subject to the terms and conditions set forth in this Agreement.

1.2 Term. The term of this Agreement shall begin on the Effective Date, and shall continue until terminated in accordance with Section 4 herein (the ***"Term"***).

1.3 Duties. Executive shall do and perform all services, acts or things necessary or advisable to manage and conduct the business of the Company and that are normally associated with the position of Chief Business Officer, and such other duties as may from time to time be assigned to Executive. Executive shall report to the Chief Executive Officer of the Company.

1.4 Policies and Procedures. The employment relationship between the Parties shall be governed by this Agreement and by the policies and practices established by the Company and/or the Company's Board of Directors (the ***"Board"***), or any designated committee thereof. In the event the terms of this Agreement differ from or are in conflict with the Company's policies and practices or the Company's Employee Handbook, this Agreement shall control.

1.5 Location. Unless the Parties otherwise agree in writing, during the Term Executive shall perform the services Executive is required to perform pursuant to this Agreement at the Company's offices in San Diego, California *provided, however*, that the Company may from time to time require Executive to travel temporarily to other locations in connection with the Company's business.

2. LOYAL; NON-COMPETITION; NON-SOLICITATION.

2.1 Loyalty. Except as expressly provided herein, during Executive's employment by the Company, Executive shall devote Executive's full business energies, interest, abilities and productive time to the proper and efficient performance of Executive's duties under this Agreement.

2.2 Agreement not to participate in Company's Competitors. During Executive's employment with the Company, Executive agrees not to acquire, assume or participate in, directly or indirectly, any position, investment or interest known by Executive to be adverse or antagonistic to the Company, its business, or prospects, financial or otherwise, or in any company, person or entity that is, directly or indirectly, in competition with the business of the Company or any of its Affiliates (as defined below**).** Ownership by Executive, in professionally managed funds over which Executive does not have

control or discretion in investment decisions, or as a passive investment, of less than two percent (2%) of the outstanding shares of capital stock of any corporation with one or more classes of its capital stock listed on a national securities exchange or publicly traded on a national securities exchange or in the over-the-counter market shall not constitute a breach of this Section. For purposes of this Agreement, "Affiliate" means, with respect to any specific entity, any other entity that, directly or indirectly, through one or more intermediaries, controls is controlled by or is under common control with such specified entity.

2.3 Covenant not to Compete. During Executive's employment with the Company, Executive shall not engage in competition with the Company and/or any of its Affiliates, either directly or indirectly, in any manner or capacity, as adviser, principal, agent, affiliate, promoter, partner, officer, director, employee, stockholder, owner, co-owner, consultant, or member of any association or otherwise, in any phase of the business of developing, manufacturing and marketing of products or services that are in the same field of use or which otherwise compete with the products or services of the Company except with the prior written consent of the Company.

3. COMPENSATION OF EXECUTIVE.

3.1 Base Salary. The Company shall pay Executive a base salary at the annualized rate of $320,000 per year (the ***"Base Salary"***), less payroll deductions and all required withholdings, payable in regular bi-weekly payments or otherwise in accordance with Company policy. Such Base Salary shall be prorated for any partial year of employment on the basis of a 365-day fiscal year.

3.2 Discretionary Bonus. At the sole discretion of the Company, following each calendar year of employment, Executive shall be eligible to receive a discretionary cash bonus with a target amount of up to forty percent (40%) of Executive's then-current base salary (the ***"Bonus"***), based on Executive's achievement relative to certain performance goals (***"Performance Goals"***) to be established by the Company. The determination of whether Executive has met the Performance Goals for any given year, and if so, the amount of any Bonus that will be paid for such year (if any), shall be determined by the Company in its sole and absolute discretion. In order to be eligible to earn or receive any Bonus, Executive must remain employed by the Company through and including the end of the year with respect to which such Bonus is earned.

3.3 Expense Reimbursement. The Company will reimburse Executive for all reasonable business expenses Executive incurs in conducting Executive's duties hereunder, pursuant to the Company's usual expense reimbursement policies; provided that Executive supplies the appropriate substantiation for such expenses no later than the end of the calendar month following the month in which such expenses were incurred by Executive. For the avoidance of doubt, to the extent that any expense reimbursements payable to Executive under this Agreement are taxable income and subject to the provisions of Section 409A of the Internal Revenue Code of 1986, as amended (the ***"Code"***) and the regulations and other guidance thereunder and any state law of similar effect (collectively ***"Section 409A"***): (i) to be eligible to obtain reimbursement for such expenses Executive must supply the appropriate documentation substantiating such expenses no later than the end of the calendar month following the month in which such expenses were incurred by Executive, (ii) any such reimbursements will be paid by the Company as soon as administratively practicable after submission of such documentation, but in no event later than December 31 of the year following the year in which the expense was incurred, (iii) the amount of expenses reimbursed in one year will not affect the amount eligible for reimbursement in any subsequent year, and (iv) the right to expense reimbursement under this Agreement will not be subject to liquidation or exchange for another benefit.

3.4 Changes to Compensation. Executive's compensation will be reviewed annually and may be increased from time to time in the Company's sole discretion.

3.5 Employment Taxes. All of Executive's compensation and payments under this Agreement shall be subject to customary withholding taxes and any other employment taxes as are commonly required to be collected or withheld by the Company.

3.6 Benefits. Executive shall, in accordance with Company policy and the terms of the applicable plan documents, be eligible to participate in benefits under any benefit plan or arrangement which may be in effect from time to time and made available to the Company's executive or key management employees.

3.7 Holidays and Vacation. Executive shall be eligible for paid holiday and vacation time in accordance with Company policy as in effect from time to time and made available to Company's senior management employees.

3.9 Equity. Subject to approval by the Board (or a committee thereof), Executive shall be granted an option to purchase 400,000 shares of common stock in the Company at the fair market value on the date of grant (the "***Option***"). The shares subject to the Option will vest over four years of continuous service to the Company, with twenty-five percent (25%) of the shares subject to the Option vesting on the first year anniversary of the Effective Date, and the remaining shares vesting in equal monthly installments over the subsequent thirty-six (36) months of continuous service thereafter. The Option shall be governed in all respects by the terms of the Company's 2018 Equity Incentive Plan (the "***Plan***"), as amended, and option agreement between Executive and the Company. Executive shall be entitled to be considered for additional stock option grants under the Plan, as approved by the Board (or a committee thereof) in its sole discretion.

4. TERMINATION.

4.1 Termination by the Company. Executive's employment with the Company is at will and may be terminated by the Company at any time and for any reason, or for no reason, including, but not limited to, under the following conditions:

4.1.1 Termination by the Company for Cause. The Company may terminate Executive's employment under this Agreement for Cause by delivery of written notice to Executive. Any notice of termination given pursuant to this Section shall effect termination as of the date of the notice, or as of such other date specified in the notice.

4.1.2 Termination by the Company without Cause. The Company may terminate Executive's employment under this Agreement without Cause at any time and for any reason, or for no reason. Such termination shall be effective on the date Executive is so informed by the Company.

4.2 Termination by Executive. Executive may terminate Executive's employment with the Company at any time and for any reason, or for no reason, upon 30 days' written notice to the Company.

4.3 Termination for Death or Complete Disability. Executive's employment with the Company shall automatically terminate effective upon the date of Executive's death or Complete Disability (as defined below).

4.4 Termination by Mutual Agreement of the Parties. Executive's employment with the Company may be terminated at any time upon a mutual agreement in writing of the Parties. Any such termination of employment shall have the consequences specified in such agreement.

4.5 Compensation upon Termination.

4.5.1 Death or Complete Disability. If Executive's employment with the Company is terminated as a result of Executive's death or Complete Disability, the Company shall pay to Executive, or to Executive's heirs, Executive's base salary and accrued and unused vacation benefits earned through the date of termination at the rate in effect at the time of termination, less standard deductions and withholdings. The Company shall thereafter have no further obligations to Executive and/or Executive's heirs under this Agreement, except as otherwise provided by law (and except as provided otherwise in Executive's stock option agreements with the Company).

4.5.2 With Cause or Without Good Reason. If Executive's employment with the Company is terminated at any time either by the Company for Cause or by Executive without Good Reason, the Company shall pay the Accrued Obligations, and the Company shall thereafter have no further obligations to Executive under this Agreement, except as otherwise provided by law (and except as provided otherwise in Executive's stock option agreements with the Company).

4.5.3 Without Cause or for Good Reason. If Executive's employment with the Company is terminated by the Company without Cause or by Executive for Good Reason, and in either case Executive signs a separation agreement including a comprehensive waiver and release of claims in such form as the Company may require (the ***"Release"***) on or within the time period set forth therein, but in no event later than 45 days after Executive's termination date, and allows such Release to become effective in accordance with its terms (such latest permitted date on which the Release could become effective, the (***"Release Deadline"***), then Executive will receive the following benefits:

4.5.3.1 Severance Payment. Cash payments in the form of continuation of Executive's Base Salary at the rate in effect at the time of termination for a period of six (6) months following the termination date (***"Severance Payment"***); and

4.5.3.2 Benefits. Provided that Executive is eligible for and timely elects continued group health coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 (***"COBRA"***) following Executive's termination date, the Company shall pay directly to the insurance provider the premium for COBRA continuation coverage for Executive and Executive's family for a period that will expire upon the earliest of (i) six (6) months following the termination date (the ***"COBRA Payment Period"***), (ii) the effective date that Executive becomes eligible for new healthcare coverage eligibility available through new employment, or (iii) the date Executive is no longer eligible for COBRA coverage, whichever comes first.

4.5.4 General Severance Benefit Terms.

4.5.4.1 The provisions in this Section shall control and supersede anything to the contrary set forth in this Agreement. For all purposes of this Agreement, references to COBRA premiums shall not include any amounts payable by Executive under a Section 125 health care reimbursement plan under the Code. If at any time the Company determines, in its sole discretion, that it cannot pay the COBRA premiums without potentially incurring financial costs or penalties under applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then regardless of whether Executive elects continued health coverage under COBRA, and in lieu of providing COBRA premiums, the Company will instead pay Executive on the last day of each remaining month of the COBRA Payment Period a fully taxable cash payment equal to the COBRA premiums for that month, subject to applicable tax withholdings, which payments shall continue until the earlier of expiration of the COBRA Payment Period of the date when Executive becomes eligible for health insurance coverage in connection with new employment. If Executive becomes eligible for coverage under another employer's group health plan, Executive must immediately notify the Company of such event, and all COBRA severance benefit payments and obligations under this Agreement shall cease effective as of such date of Executive's eligibility.

4.5.4.2 If all severance payments made under this Agreement will be subject to standard payroll deductions and withholdings and will be made on the Company's regular payroll cycle, provided, however, that any severance payments otherwise scheduled to be made prior to the effective date of the Release shall instead accrue and be paid in the first payroll period that follows such effective date. Following provisions of any severance benefits to which Executive may be entitled under Section 4.5.3, the Company shall thereafter have no further obligations to Executive under this Agreement, except as otherwise provided by law (and except as provided otherwise in Executive's stock option agreements with the Company).

4.6 Additional Definitions. For the purposes of this Agreement, the following terms shall have the following meanings:

4.6.1 ***"Complete Disability"*** shall mean the inability of executive to perform Executive's duties under this Agreement, whether with or without reasonable accommodation, because Executive has become permanently disabled within the meaning of any policy of disability income insurance covering employees of the Company then in force. In the event the Company has no policy of disability income insurance covering employees of the Company in force when Executive becomes disabled, the term ***"Complete Disability"*** shall mean the inability of Executive to perform Executive's duties under this Agreement, whether with or without reasonable accommodation, by reason of any incapacity, physical or mental, which the Company, based upon medical advice or an opinion provided by a licensed physician acceptable to the Company, determines to have incapacitated Executive from satisfactorily performing all of Executive's usual services for the Company, with or without reasonable accommodation, for a period of at least one hundred 120 days during any 12-month period (whether or not consecutive). Based upon such medical advice or opinion, the determination of the Company shall be final and binding and the date such determination is made shall be the date of such Complete Disability for purposes of this Agreement.

4.6.2 ***"Cause"*** shall mean the occurrence of any of the following: (i) Executive's conviction of any felony or any crime involving fraud or dishonesty that has a material adverse effect on the Company; (ii) Executive's active participation (whether by affirmative act or material omission) in a fraud, act of dishonesty or other act of misconduct against the Company and/or its affiliates; (iii) conduct by Executive which, based upon a good faith and reasonable factual investigation by the Company, demonstrates Executive's gross unfitness to serve; (iv) Executive's material violation of any statutory or fiduciary duty, or duty of loyalty, owed to the Company; (v) Executive's breach of any material term of any material contract between such Executive and the Company and the failure to cure such breach within 30 days of written notice; and (vi) Executive's repeated violation of any material Company policy. Executive's Complete Disability shall not constitute Cause as set forth herein. The determination that a termination is for Cause shall be by the Company in its sole and exclusive judgement and discretion.

4.6.3 **Good Reason**. ***"Good Reason"*** for Executive to terminate Executive's employment hereunder shall mean the occurrence of any of the following events without Executive's consent; provided however, that any resignation by Executive due to any of the following conditions shall only be deemed for Good Reason if: (i) Executive gives the Company written notice of the intent to terminate for Good Reason within 90 days following the first occurrence of the condition(s) that Executive believes constitutes Good Reason, which notice shall describe such condition(s); (ii) the Company fails to remedy such condition(s) within 30 days following receipt of the written notice (the ***"Cure Period"***) of such condition(s) from Executive; and (iii) Executive actually resigns Executive's employment within the first 15 days after expiration of the Cure Period:

4.6.3.1 a material breach of this Agreement by the Company;

4.6.3.2 a material reduction (which the parties agree is a reduction of at least 10% of Executive's Base Salary) by the Company of Executive's Base Salary as initially set forth herein or as the same may be increased from time to time, unless such reduction is part of a reduction program equally applicable to other executive employees of the Company;

4.6.3.3 a material reduction in Executive's authority, duties or responsibilities, *provided, however,* that a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless Executive's new duties are materially reduced from the prior duties; or

4.6.3.4 the Company relocates the facility that is Executive's principal place of business with the Company to a location that requires an increase in Executive's one-way driving distance by more than 50 miles, provided that Executive's relocation back to the Company office from remote work will not be considered a relocation of Executive's principal place of business for purposes of this definition.

4.7 **Survival of Certain Provisions**. Sections 2, 3.3, 3.5, and 4 through 19 of this Agreement shall survive the termination of this Agreement.

4.8 Reserved.

4.9 Application of Internal Revenue Code Section 409A.

All benefits under this Agreement are intended to qualify for an exemption from application of Section 409A of the Code and the regulations and other guidance thereunder and any state law of similar effect ("***Section 409A***") or to comply with its requirements to the extent necessary to avoid adverse personal tax consequences under Section 409A, and any ambiguities herein shall be interpreted accordingly.

Notwithstanding anything to the contrary set forth herein, any severance benefits that constitute "deferred compensation" within the meaning of Section 409A shall not commence in connection with Executive's termination of employment unless and until Executive has also incurred a "separation from service" (as such term is defined in Treasury Regulation Section 1.409A-1(h)) ("***Separation From Service***"), unless the Company reasonably determines that such amounts may be provided to Executive without causing Executive to incur the additional 20% tax under Section 409A.

It is intended that each installment of the severance benefit payments provided for in this Agreement is a separate "payment" for purposes of Treasury Regulation Section 1.409A-2(b)(2)(i). For the avoidance of doubt, it is intended that payments of the severance benefits set forth in this Agreement satisfy, to the greatest extent possible, the exemptions from the application of Section 409A provided under Treasury Regulation Sections 1.409A-1(b)(4), 1.409A-1(b)(5) and 1.409A-1(b)(9). However, if the Company (or, if applicable, the successor entity thereto) determines that the severance benefits constitute "deferred compensation" under Section 409A and Executive is, on the termination of service, a "specified employee" of the Company or any successor entity thereto, as such term is defined in Section 409A(a)(2)(B)(i) of the Code, then, solely to the extent necessary to avoid the incurrence of the adverse personal tax consequences under Section 409A, the timing of the severance benefit payments shall be delayed until the earlier to occur of: (i) the date that is six months and one day after Executive's Separation From Service, or (ii) the date of Executive's death. None of the severance benefits will be paid or otherwise delivered prior to the effective date of the Release. If the severance benefits are not covered by one or more exemptions from the application of Section 409A and the Release could become effective in the calendar year following the calendar year in which Executive's Separation From Service occurs, the Release will not be deemed effective any earlier than the Release Deadline. Except to the minimum extent that payments must be delayed because Executive is a "specified employee" or until the effectiveness of the Release, all amounts will be paid as soon as practicable in accordance with the Company's normal payroll practices.

The severance benefits are intended to qualify for an exemption from application of Section 409A or comply with its requirements to the extent necessary to avoid adverse personal tax consequences under Section 409A, and any ambiguities herein shall be interpreted accordingly.

5. CONFIDENTIAL AND PROPRIETARY INFORMATION; NONSOLICITATION.

5.1 As a condition of employment, Executive agrees to execute and abide by the Company's Confidential Information and Inventions Assignment Agreement attached hereto as **EXHIBIT A**.

5.2 While employed by the Company and for one year thereafter, Executive agrees that in order to protect the Company's trade secrets and confidential and proprietary information from unauthorized use, Executive will not, either directly or through others, solicit or attempt to solicit any employee, consultant or independent contractor of the Company to terminate his or her relationship with the Company in order to become an employee, consultant or independent contractor to or for any other person or business entity.

6. ASSIGNMENT AND BINDING EFFECT.

This Agreement shall be binding upon and inure to the benefit of Executive and Executive's heirs, executors, personal representatives, assigns, administrators and legal representatives. Because of the unique and personal nature of Executive's duties under this Agreement, neither this Agreement nor any rights or obligations under this Agreement shall be assignable by Executive. This Agreement shall be binding upon and inure to the benefit of the Company and its successors, assigns and legal representatives.

7. NOTICES.

All notices or demands of any kind required or permitted to be given by the Company or Executive under this Agreement shall be given in writing and shall be personally delivered (and receipted for) or faxed during normal business hours or mailed by certified mail return receipt requested, postage prepaid, address as follows,

If to the Company:	If to Executive:
Attn: Chief Executive Officer	Richard Shippy
Bionano Genomics, Inc.	**[***]**
9540 Towne Centre Drive, Suite 100	**[***]**
San Diego, CA 92121	

Any such written notice shall be deemed given on the earlier of the date on which such notice is personally delivered or three days after its deposit in the United States mail as specified above. Either Party may change its address for notices by giving notice to the other Party in the manner specified in this Section.

8. CHOICE OF LAW.

This Agreement shall be construed and interpreted in accordance with the internal laws of the State of California without regard to its conflict of laws principles.

9. INTEGRATION.

This Agreement, including **Exhibit A**, contains the complete, final and exclusive agreement of the Parties relating to the terms and conditions of Executive's employment and the termination of Executive's employment, and supersedes all prior and/or contemporaneous oral and written employment agreements or arrangements between the Parties.

10. AMENDMENT.

This Agreement cannot be amended or modified except by a written agreement signed by Executive and the Company.

11. WAIVER.

No term, covenant or condition of this Agreement or any breach thereof shall be deemed waived, except with the written consent of the Party against whom the wavier is claimed, and any waiver or any

such term, covenant, condition or breach shall not be deemed to be a waiver of any preceding or succeeding breach of the same or any other term, covenant, condition or breach.

12. SEVERABILITY.

The finding by a court of competent jurisdiction of the unenforceability, invalidity or illegality of any provision of this Agreement shall not render any other provision of this Agreement unenforceable, invalid or illegal. Such court shall have the authority to modify or replace the invalid or unenforceable term or provision with a valid and enforceable term or provision which most accurately represents the Parties' intention with respect to the invalid or unenforceable term or provision.

13. INTERPRETATION; CONSTRUCTION.

The headings set forth in this Agreement are for convenience of reference only and shall not be used in interpreting this Agreement. This Agreement has been drafted by legal counsel representing the Company, but Executive has been encouraged to consult with, and have consulted with, Executive's own independent counsel and tax advisors with respect to the terms of this Agreement. The Parties acknowledge that each Party and its counsel has reviewed and revised, or had an opportunity to review and revise, this Agreement, and any rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement.

14. REPRESENTATIONS AND WARRANTIES.

Executive represents and warrants that Executive is not restricted or prohibited, contractually or otherwise, from entering into and performing each of the terms and covenants contained in this Agreement, and that Executive's execution and performance of this Agreement will not violate or breach any other agreements between Executive and any other person or entity.

15. COUNTERPARTS; FACSIMILE.

This Agreement may be executed in two counterparts, each of which shall be deemed an original, all of which together shall contribute one and the same instrument. Facsimile signatures shall be treated the same as original signatures.

16. DISPUTE RESOLUTION.

To ensure the timely and economical resolution of disputes that may arise between Executive and the Company, both Executive and the Company mutually agree that pursuant to the Federal Arbitration Act, 9 U.S.C. §1-16, and to the fullest extent permitted by applicable law, Executive and the Company will submit solely to final, binding and confidential arbitration any and all disputes, claims, or causes of action arising from or relating to: **(i)** the negotiation, execution, interpretation, performance, breach or enforcement of this Agreement; or **(ii)** Executive's employment with the Company (including but not limited to all statutory claims); or **(iii)** the termination of Executive's employment with the Company (including but not limited to all statutory claims). **By agreeing to this arbitration procedure, both Executive and the Company waive the right to resolve any such disputes through a trial by jury or judge or through an administrative proceeding.**

Arbitrator Authority. The arbitrator shall have the sole and exclusive authority to determine whether a dispute, claim or cause of action is subject to arbitration under this Section and to determine any procedural questions which grow out of such disputes, claims or causes of action and bear on their final disposition.

Individual Capacity Only. All claims, disputes, or causes of action under this Section, whether by Executive or the Company, must be brought solely in an individual capacity, and shall not be brought as a plaintiff (or claimant) or class member in any purported class or representative proceeding, nor joined or consolidated with the claims of any other person or entity. The arbitrator may not consolidate the claims of more than one person or entity, and may not preside over any form of representative or class proceeding. To the extent that the preceding sentences in this Section are found to violate applicable law

or are otherwise found unenforceable, any claim(s) alleged or brought on behalf of a class shall proceed in a court of law rather than by arbitration.

Arbitration Process. Any arbitration proceeding under this Section shall be presided over by a single arbitrator and conducted by Judicial Arbitration and Mediation Services, Inc. ("***JAMS***") in San Diego, California, or as otherwise agreed to by Executive and the Company, under the then applicable JAMS rules for the resolution of employment disputes (available upon request and also currently available at http://www.jamsadr.com/rules-employment-arbitration/). Executive and the Company both have the right to be represented by legal counsel at any arbitration proceeding, at each party's own expense. The arbitrator shall: **(i)** have the authority to compel adequate discovery for the resolution of the dispute; **(ii)** issue a written arbitration decision, to include the arbitrator's essential findings and conclusions and a statement of the award; and **(iii)** be authorized to award any or all remedies that Executive or the Company would be entitled to seek in a court of law. The Company shall pay all JAMS arbitration fees in excess of the amount of court fees that would be required of Executive if the dispute were decided in a court of law.

Excluded Claims. This Section shall not apply to any action or claim that cannot be subject to mandatory arbitration as a matter of law, including, without limitation, claims brought pursuant to the California Private Attorneys General Act of 2004, as amended, the California Fair Employment and Housing Act, as amended, and the California Labor Code, as amended, to the extent such claims are not permitted by applicable law to be submitted to mandatory arbitration and such applicable law is not preempted by the Federal Arbitration Act or otherwise invalid (collectively, the "**Excluded Claims**"). In the event Executive intends to bring multiple claims, including one of the Excluded Claims listed above, the Excluded Claims may be filed with a court, while any other claims will remain subject to mandatory arbitration.

Injunctive Relief and Final Orders. Nothing in this Section is intended to prevent either Executive or the Company from obtaining injunctive relief in court to prevent irreparable harm pending the conclusion of any such arbitration. Any final award in any arbitration proceeding hereunder may be entered as a judgment in the federal and state courts of any competent jurisdiction and enforced accordingly.

17. TRADE SECRETS OF OTHERS.

It is the understanding of both the Company and Executive that Executive shall not divulge to the Company and/or its subsidiaries any confidential information or trade secrets belonging to others, including Executive's former employers, nor shall the Company and/or its Affiliates seek to elicit from Executive any such information. Consistent with the foregoing, Executive shall not provide to the Company and/or its Affiliates, and the Company and/or its Affiliates shall not request, any documents or copies of documents containing such information.

18. ADVERTISING WAIVER.

Executive agrees to permit the Company and/or its affiliates, subsidiaries, or joint ventures currently existing or which shall be established during Executive's employment by the Company (collectively, ***"Affiliates"***), and persons or other organizations authorized by the Company and/or its Affiliates, to use, publish and distribute advertising or sales promotional literature concerning the products and/or services of the Company and/or its Affiliates, or the machinery and equipment used in the provision thereof, in which Executive's name and/or pictures of Executive taken in the course of Executive's provision of services to the Company and/or its Affiliates, appear. Executive hereby waives and releases any claim or right Executive may otherwise have arising out of such use, publication or distribution. The Company agrees that, following termination of Executive's employment, it will not create any new such literature containing Executive's name and/or pictures without Executive's prior written consent.

19. INDEMNIFICATION.

Subject to applicable law, Executive will be provided indemnification to the maximum extent permitted by the Company's Bylaws and Articles of Incorporation, including coverage, if applicable,

under any directors and officers insurance policies, with such indemnification determined by the Board or any of its committees in good faith based on principles consistently applied (subject to such limited exceptions as the Board may approve in cases of hardship) and on terms no less favorable than provided to any other Company executive officer or director.

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IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first above written.

BIONANO GENOMICS, INC

By: /s/ R. Erik Holmlin

R. Erik Holmlin, President and CEO

Date:

EXECUTIVE

/s/ Richard Shippy

Richard Shippy

Date: May 16, 2021

EXHIBIT A

CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

COMMERCIAL SINGLE-TENANT LEASE -- NET

1. Basic Provisions ("Basic Provisions").

1.1 **Parties:** This Lease **("Lease"),** dated for reference purposes only, is made by and between TESA BEACH, LLC **("Lessor")** and BioDiscovery, Inc. **("Lessee"),** (collectively the **"Parties,"** or individually a **"Party").**

1.2 **Premises:** That certain real property, including all improvements therein or to be provided by Lessor under the terms of this Lease, and commonly known as 715 N. Douglas Avenue, El Segundo 90245 located in the County of Los Angeles, State of California, and generally described as the Office Suite ("Premises"). (See also Paragraph 2)

1.3 **Term:** 25 years ("Original Term") commencing March 1st, 2016 ("Commencement Date") and ending February 28, 2041 ("Expiration Date"). (See also Paragraph 3)

1.4 **Option to Renew:** Provided that Tenant is not in default in the performance of this Lease, Tenant shall have the option to renew the Lease for one additional term of 60 months commencing at the expiration of the initial Lease term. All of the terms and conditions of the Lease shall apply during the renewal term except that the monthly rent shall be the determined based on future market rents (subject to the restrictions of paragraph 4, below). The option shall be exercised by written notice given to Lessor not less than 90 days prior to the expiration of the prior Lease term. If notice is not given in the manner provided herein within the time specified, this option shall lapse and expire

1.5 **Base Rent:** $25,000 per month ("Base Rent"), payable on the day of each month commencing March 1st, 2016. (See also Paragraph 4) If this box is checked, there are provisions in this Lease for the Base Rent to be adjusted. See Paragraph 51

1.6 **Base Rent and Other Monies Paid Upon Execution:**

(a) Base Rent: $25,000 for the period March 1st, 2016 to March 31st, 2016.

(b) Security Deposit: $35,000 ("Security Deposit"). (See also Paragraph 5)

(c) Association Fees: $ 2013.35 for the period March 1st to March 31st, 2016.

(d) Total Due Upon Execution of this Lease: $62,013.35.

1.7 **Agreed Use:** General office space. (See also Paragraph 6)

1.8 **Insuring Party:** Lessor is the "Insuring Party" unless otherwise stated herein. (See also Paragraph 8)

2. Premises.

2.1 **Letting.** Lessor hereby leases to Lessee, and Lessee hereby leases from Lessor, the Premises, for the term, at the rental, and upon all of the terms, covenants and conditions set forth in this Lease. While the approximate square footage of the Premises may have been used in the marketing of the Premises for purposes of comparison, the Base Rent stated herein is NOT tied to square footage and is not subject to adjustment should the actual size be determined to be different. Note: Lessee is advised to verify the actual size prior to executing this Lease.

2.2 **Condition.** Lessor shall deliver the Premises to Lessee broom clean and free of debris on the Commencement Date or the Early Possession Date, whichever first occurs ("Start Date"), and, so long as the required service contracts described in Paragraph 7.1(b) below are obtained by Lessee and in effect within thirty days following the Start Date, warrants that the existing electrical, plumbing, fire sprinkler, lighting, heating, ventilating and air conditioning systems ("HVAC"), loading doors, sump pumps, if any, and all other such elements in the Premises, other than those constructed by Lessee, shall be in good operating condition on said date, that the structural elements of the roof, bearing walls and foundation of any buildings on the Premises (the "Building") shall be free of material defects, and that the Premises do not contain hazardous levels of any mold or fungi defined as toxic under applicable state or federal law. If a non-compliance with said warranty exists as of the Start Date, or if one of such systems or elements should malfunction or fail within the appropriate warranty period, Lessor shall, as Lessor's sole obligation with respect to such matter, except as otherwise provided in this Lease, promptly after receipt of written notice from Lessee setting forth with specificity the nature and extent of such non-compliance, malfunction or failure, rectify same at Lessor's expense. The warranty periods shall be as follows: (i) 6 months as to the HVAC systems, and (ii) 30 days as to the remaining systems and other elements of the Building. If Lessee does not give Lessor the required notice within the appropriate warranty period, correction of any such noncompliance, malfunction or failure shall be the obligation of Lessee at Lessee's sole cost and expense. Lessor also warrants, that unless otherwise specified in writing, Lessor is unaware of (i) any recorded Notices of Default affecting the Premise; (ii) any delinquent amounts due under any loan secured by the Premises; and (iii) any bankruptcy proceeding affecting the Premises.

2.3 **Compliance.** Lessor warrants that to the best of its knowledge the improvements on the Premises comply with the building codes applicable laws, covenants or restrictions of record, regulations, and ordinances ("Applicable Requirements") that were in effect at the time that each improvement, or portion thereof, was constructed. Said warranty does not apply to the use to which Lessee will put the Premises, modifications which may be required by the Americans with Disabilities Act or any similar laws as a result of Lessee's use (see Paragraph 50), or to any Alterations or Utility Installations (as defined in Paragraph 7.3(a)) made or to be made by Lessee. NOTE: Lessee is responsible for determining whether or not the Applicable Requirements, and especially the zoning, are appropriate for Lessee's intended use, and acknowledges that past uses of the Premises may no longer be allowed. If the Premises do not comply with said warranty, Lessor shall, except as otherwise provided, promptly after receipt of written notice from Lessee setting forth with specificity the nature and extent of such

non-compliance, rectify the same at Lessor's expense. If Lessee does not give Lessor written notice of a non-compliance with this warranty within 6 months following the Start Date, correction of that non-compliance shall be the obligation of Lessee at Lessee's sole cost and expense. If the Applicable Requirements are hereafter changed so as to require during the term of this Lease the construction of an addition to or an alteration of the Premises and/or Building, the remediation of any Hazardous Substance, or the reinforcement or other physical modification of the Unit, Premises and/or Building ("Capital Expenditure"), Lessor and Lessee shall allocate the cost of such work as follows:

(a) Subject to Paragraph 2.3(c) below, if such Capital Expenditures are required as a result of the specific and unique use of the Premises by Lessee as compared with uses by tenants in general, Lessee shall be fully responsible for the cost thereof, provided, however that if such Capital Expenditure is required during the last 2 years of this Lease and the cost thereof exceeds 6 months' Base Rent, Lessee may instead terminate this Lease unless Lessor notifies Lessee, in writing, within 10 days after receipt of Lessee's termination notice that Lessor has elected to pay the difference between the actual cost thereof and an amount equal to 6 months' Base Rent. If Lessee elects termination, Lessee shall immediately cease the use of the Premises which requires such Capital Expenditure and deliver to Lessor written notice specifying a termination date at least 90 days thereafter. Such termination date shall, however, in no event be earlier than the last day that Lessee could legally utilize the Premises without commencing such Capital Expenditure.

(b) If such Capital Expenditure is not the result of the specific and unique use of the Premises by Lessee (such as, governmentally mandated seismic modifications), then Lessor shall pay for such Capital Expenditure and Lessee shall only be obligated to pay, each month during the remainder of the term of this Lease or any extension thereof, on the date that on which the Base Rent is due, an amount equal to 1/144th of the portion of such costs reasonably attributable to the Premises. Lessee shall pay Interest on the balance but may prepay its obligation at any time. If, however, such Capital Expenditure is required during the last 2 years of this Lease or if Lessor reasonably determines that it is not economically feasible to pay its share thereof, Lessor shall have the option to terminate this Lease upon 90 days prior written notice to Lessee unless Lessee notifies Lessor, in writing, within 10 days after receipt of Lessor's termination notice that Lessee will pay for such Capital Expenditure. If Lessor does not elect to terminate, and fails to tender its share of any such Capital Expenditure, Lessee may advance such funds and deduct same, with Interest, from Rent until Lessor's share of such costs have been fully paid. If Lessee is unable to finance Lessor's share, or if the balance of the Rent due and payable for the remainder of this Lease is not sufficient to fully reimburse Lessee on an offset basis, Lessee shall have the right to terminate this Lease upon 30 days written notice to Lessor.

(c) Notwithstanding the above, the provisions concerning Capital Expenditures are intended to apply only to non-voluntary, unexpected, and new Applicable Requirements. If the Capital Expenditures are instead triggered by Lessee as a result of an actual or proposed change in use, change in intensity of use, or modification to the Premises then, and in that event, Lessee shall either: (i) immediately cease such changed use or intensity of use and/or take such other steps as may be necessary to eliminate the requirement for such Capital Expenditure, or (ii) complete such Capital Expenditure at its own expense. Lessee shall not, however, have any right to terminate this Lease.

2.4 **Acknowledgements.** Lessee acknowledges that: (a) it has been given an opportunity to inspect and measure the Premises, (b) it has been advised by Lessor and/or Brokers to satisfy itself with respect to the size and condition of the Premises (including but not limited to the electrical, HVAC and fire sprinkler systems, security, environmental aspects, and compliance with Applicable Requirements and the Americans with Disabilities Act), and their suitability for Lessee's intended use, (c) Lessee has made such investigation as it deems necessary with reference to such matters and assumes all responsibility therefor as the same relate to its occupancy of the Premises, (d) it is not relying on any representation as to the size of the Premises made by Brokers or Lessor, (e) the square footage of the Premises was not material to Lessee's decision to lease the Premises and pay the Rent stated herein, and (f) neither Lessor, Lessor's agents, nor Brokers have made any oral or written representations or warranties with respect to said matters other than as set forth in this Lease. In addition, Lessor acknowledges that: (i) Brokers have made no representations, promises or warranties concerning Lessee's ability to honor the Lease or suitability to occupy the Premises, and (ii) it is Lessor's sole responsibility to investigate the financial capability and/or suitability of all proposed tenants.

2.5 **Lessee as Prior Owner/Occupant.** The warranties made by Lessor in Paragraph 2 shall be of no force or effect if immediately prior to the Start Date Lessee was the owner or occupant of the Premises. In such event, Lessee shall be responsible for any necessary corrective work.

3. **Term.**

3.1 **Term.** The Commencement Date, Expiration Date and Original Term of this Lease are as specified in Paragraph 1.3.

3.2 **Lessee Compliance.** Lessor shall not be required to deliver possession of the Premises to Lessee until Lessee complies with its obligation to provide evidence of insurance (Paragraph 8.5). Pending delivery of such evidence, Lessee shall be required to perform all of its obligations under this Lease from and after the Start Date, including the payment of Rent, notwithstanding Lessor's election to withhold possession pending receipt of such evidence of insurance. Further, if Lessee is required to perform any other conditions prior to or concurrent with the Start Date, the Start Date shall occur but Lessor may elect to withhold possession until such conditions are satisfied.

4. **Rent.**

4.1. **Rent Defined.** All monetary obligations of Lessee to Lessor under the terms of this Lease (except for the Security Deposit) are deemed to be rent **("Rent").**

4.2 **Payment.** Lessee shall cause payment of Rent to be received by Lessor in lawful money of the United States, without offset or deduction (except as specifically permitted in this Lease), on or before the day on which it is due. All monetary amounts shall be rounded to the nearest

whole dollar. In the event that any invoice prepared by Lessor is inaccurate such inaccuracy shall not constitute a waiver and Lessee shall be obligated to pay the amount set forth in this Lease. Rent for any period during the term hereof which is for less than one full calendar month shall be prorated based upon the actual number of days of said month. Payment of Rent shall be made to Lessor at its address stated herein or to such other persons or place as Lessor may from time to time designate in writing. Acceptance of a payment which is less than the amount then due shall not be a waiver of Lessor's rights to the balance of such Rent, regardless of Lessor's endorsement of any check so stating. In the event that any check, draft, or other instrument of payment given by Lessee to Lessor is dishonored for any reason, Lessee agrees to pay to Lessor the sum of $25 in addition to any Late Charge and Lessor, at its option, may require all future Rent be paid by cashier's check. Payments will be applied first to accrued late charges and attorney's fees, second to accrued interest, then to Base Rent, Insurance and Real Property Taxes, and any remaining amount to any other outstanding charges or costs.

4.3 **Association Fees.** In addition to the Base Rent, Lessee shall pay to Lessor each month an amount equal to any owner's association or condominium fees levied or assessed against the Premises. Said monies shall be paid at the same time and in the same manner as the Base Rent. Lessee may pay the association fee directly to the association.

5. **Security Deposit.** Lessee shall deposit with Lessor upon execution hereof the Security Deposit as security for Lessee's faithful performance of its obligations under this Lease. If Lessee fails to pay Rent, or otherwise Defaults under this Lease, Lessor may use, apply or retain all or any portion of said Security Deposit for the payment of any amount already due Lessor, for Rents which will be due in the future, and/ or to reimburse or compensate Lessor for any liability, expense, loss or damage which Lessor may suffer or incur by reason thereof. If Lessor uses or applies all or any portion of the Security Deposit, Lessee shall within 10 days after written request therefor deposit monies with Lessor sufficient to restore said Security Deposit to the full amount required by this Lease. If the Base Rent increases during the term of this Lease, Lessee shall, upon written request from Lessor, deposit additional monies with Lessor so that the total amount of the Security Deposit shall at all times bear the same proportion to the increased Base Rent as the initial Security Deposit bore to the initial Base Rent. Should the Agreed Use be amended to accommodate a material change in the business of Lessee or to accommodate a sublessee or assignee, Lessor shall have the right to increase the Security Deposit to the extent necessary, in Lessor's reasonable judgment, to account for any increased wear and tear that the Premises may suffer as a result thereof. If a change in control of Lessee occurs during this Lease and following such change the financial condition of Lessee is, in Lessor's reasonable judgment, significantly reduced, Lessee shall deposit such additional monies with Lessor as shall be sufficient to cause the Security Deposit to be at a commercially reasonable level based on such change in financial condition. Lessor shall not be required to keep the Security Deposit separate from its general accounts. Within 30 days after the expiration or termination of this Lease, Lessor shall return that portion of the Security Deposit not used or applied by Lessor. No part of the Security Deposit shall be considered to be held in trust, to bear interest or to be prepayment for any monies to be paid by Lessee under this Lease.

6. **Use.**

6.1 **Use.** Lessee shall use and occupy the Premises only for the Agreed Use, or any other legal use which is reasonably comparable thereto, and for no other purpose. Lessee shall not use or permit the use of the Premises in a manner that is unlawful, creates damage, waste or a nuisance, or that disturbs occupants of or causes damage to neighboring premises or properties. Other than guide, signal and seeing eye dogs, Lessee shall not keep or allow in the Premises any pets, animals, birds, fish, or reptiles. Lessor shall not unreasonably withhold or delay its consent to any written request for a modification of the Agreed Use, so long as the same will not impair the structural integrity of the improvements on the Premises or the mechanical or electrical systems therein, and/or is not significantly more burdensome to the Premises. If Lessor elects to withhold consent, Lessor shall within 7 days after such request give written notification of same, which notice shall include an explanation of Lessor's objections to the change in the Agreed Use.

6.2 **Hazardous Substances.**

(a) **Reportable Uses Require Consent.** The term **"Hazardous Substance"** as used in this Lease shall mean any product, substance, or waste whose presence, use, manufacture, disposal, transportation, or release, either by itself or in combination with other materials expected to be on the Premises, is either: (i) potentially injurious to the public health, safety or welfare, the environment or the Premises, (ii) regulated or monitored by any governmental authority, or (iii) a basis for potential liability of Lessor to any governmental agency or third party under any applicable statute or common law theory. Hazardous Substances shall include, but not be limited to, hydrocarbons, petroleum, gasoline, and/or crude oil or any products, by-products or fractions thereof. Lessee shall not engage in any activity in or on the Premises which constitutes a Reportable Use of Hazardous Substances without the express prior written consent of Lessor and timely compliance (at Lessee's expense) with all Applicable Requirements. **"Reportable Use"** shall mean (i) the installation or use of any above or below ground storage tank, (ii) the generation, possession, storage, use, transportation, or disposal of a Hazardous Substance that requires a permit from, or with respect to which a report, notice, registration or business plan is required to be filed with, any governmental authority, and/or (iii) the presence at the Premises of a Hazardous Substance with respect to which any Applicable Requirements requires that a notice be given to persons entering or occupying the Premises or neighboring properties. Notwithstanding the foregoing, Lessee may use any ordinary and customary materials reasonably required to be used in the normal course of the Agreed Use, ordinary office supplies (copier toner, liquid paper, glue, etc.) and common household cleaning materials, so long as such use is in compliance with all Applicable Requirements, is not a Reportable Use, and does not expose the Premises or neighboring property to any meaningful risk of contamination or damage or expose Lessor to any liability therefor. In addition, Lessor may condition its consent to any Reportable Use upon receiving such additional assurances as Lessor reasonably deems necessary to protect itself, the public, the Premises and/or the environment against damage, contamination, injury and/or liability, including, but not limited to, the installation (and removal on or before Lease expiration or termination) of protective modifications (such as concrete encasements) and/or increasing the Security Deposit.

(b) **Duty to Inform Lessor.** If Lessee knows, or has reasonable cause to believe, that a Hazardous Substance has come to be located in, on, under or about the Premises, other than as previously consented to by Lessor, Lessee shall immediately give written notice of such fact to Lessor, and provide Lessor with a copy of any report, notice, claim or other documentation which it has concerning the presence of such Hazardous Substance.

(c) **Lessee Remediation.** Lessee shall not cause or permit any Hazardous Substance to be spilled or released in, on, under, or about the Premises (including through the plumbing or sanitary sewer system) and shall promptly, at Lessee's expense, comply with all Applicable Requirements and take all investigatory and/or remedial action reasonably recommended, whether or not formally ordered or required, for the cleanup of any contamination of, and for the maintenance, security and/or monitoring of the Premises or neighboring properties, that was caused or materially contributed to by Lessee, or pertaining to or involving any Hazardous Substance brought onto the Premises during the term of this Lease, by or for Lessee, or any third party.

(d) **Lessee Indemnification.** Lessee shall indemnify, defend and hold Lessor, its agents, employees, lenders and ground lessor, if any, harmless from and against any and all loss of rents and/or damages, liabilities, judgments, claims, expenses, penalties, and attorneys' and consultants' fees arising out of or involving any Hazardous Substance brought onto the Premises by or for Lessee, or any third

party (provided, however, that Lessee shall have no liability under this Lease with respect to underground migration of any Hazardous Substance under the Premises from adjacent properties not caused or contributed to by Lessee). Lessee's obligations shall include, but not be limited to, the effects of any contamination or injury to person, property or the environment created or suffered by Lessee, and the cost of investigation, removal, remediation, restoration and/or abatement, and shall survive the expiration or termination of this Lease. **No termination, cancellation or release agreement entered into by Lessor and Lessee shall release Lessee from its obligations under this Lease with respect to Hazardous Substances, unless specifically so agreed by Lessor in writing at the time of such agreement.**

(e) **Lessor Indemnification.** Except as otherwise provided in paragraph 8.7, Lessor and its successors and assigns shall indemnify, defend, reimburse and hold Lessee, its employees and lenders, harmless from and against any and all environmental damages, including the cost of remediation, which result from Hazardous Substances which existed on the Premises prior to Lessee's occupancy or which are caused by the gross negligence or willful misconduct of Lessor, its agents or employees. Lessor's obligations, as and when required by the Applicable Requirements, shall include, but not be limited to, the cost of investigation, removal, remediation, restoration and/or abatement, and shall survive the expiration or termination of this Lease.

(f) **Investigations and Remediations.** Lessor shall retain the responsibility and pay for any investigations or remediation measures required by governmental entities having jurisdiction with respect to the existence of Hazardous Substances on the Premises prior to Lessee's occupancy, unless such remediation measure is required as a result of Lessee's use (including "Alterations", as defined in paragraph 7.3(a) below) of the Premises, in which event Lessee shall be responsible for such payment. Lessee shall cooperate fully in any such activities at the request of Lessor, including allowing Lessor and Lessor's agents to have reasonable access to the Premises at reasonable times in order to carry out Lessor's investigative and remedial responsibilities.

(g) **Lessor Termination Option.** If a Hazardous Substance Condition (see Paragraph 9.1(e)) occurs during the term of this Lease, unless Lessee is legally responsible therefor (in which case Lessee shall make the investigation and remediation thereof required by the Applicable Requirements and this Lease shall continue in full force and effect, but subject to Lessor's rights under Paragraph 6.2(d) and Paragraph 13), Lessor may, at Lessor's option, either (i) investigate and remediate such Hazardous Substance Condition, if required, as soon as reasonably possible at Lessor's expense, in which event this Lease shall continue in full force and effect, or (ii) if the estimated cost to remediate such condition exceeds 12 times the then monthly Base Rent or $100,000, whichever is greater, give written notice to Lessee, within 30 days after receipt by Lessor of knowledge of the occurrence of such Hazardous Substance Condition, of Lessor's desire to terminate this Lease as of the date 60 days following the date of such notice. In the event Lessor elects to give a termination notice, Lessee may, within 10 days thereafter, give written notice to Lessor of Lessee's commitment to pay the amount by which the cost of the remediation of such Hazardous Substance Condition exceeds an amount equal to 12 times the then monthly Base Rent or $100,000, whichever is greater. Lessee shall provide Lessor with said funds or satisfactory assurance thereof within 30 days following such commitment. In such event, this Lease shall continue in full force and effect, and Lessor shall proceed to make such remediation as soon as reasonably possible after the required funds are available. If Lessee does not give such notice and provide the required funds or assurance thereof within the time provided, this Lease shall terminate as of the date specified in Lessor's notice of termination.

6.3 **Lessee's Compliance with Applicable Requirements.** Except as otherwise provided in this Lease, Lessee shall, at Lessee's sole expense, fully, diligently and in a timely manner, materially comply with all Applicable Requirements, the requirements of any applicable fire insurance underwriter or rating bureau, and the recommendations of Lessor's engineers and/or consultants which relate in any manner to the such Requirements, without regard to whether such Requirements are now in effect or become effective after the Start Date. Lessee shall, within 10 days after receipt of Lessor's written request, provide Lessor with copies of all permits and other documents, and other information evidencing Lessee's compliance with any Applicable Requirements specified by Lessor, and shall immediately upon receipt, notify Lessor in writing (with copies of any documents involved) of any threatened or actual claim, notice, citation, warning, complaint or report pertaining to or involving the failure of Lessee or the Premises to comply with any Applicable Requirements. Likewise, Lessee shall immediately give written notice to Lessor of: (i) any water damage to the Premises and any suspected seepage, pooling, dampness or other condition conducive to the production of mold; or (ii) any mustiness or other odors that might indicate the presence of mold in the Premises.

6.4 **Inspection; Compliance.** Lessor and Lessor's **"Lender"** (as defined in Paragraph 30) and consultants shall have the right to enter into Premises at any time, in the case of an emergency, and otherwise at reasonable times after reasonable notice, for the purpose of inspecting the condition of the Premises and for verifying compliance by Lessee with this Lease. The cost of any such inspections shall be paid by Lessor, unless a violation of Applicable Requirements, or a Hazardous Substance Condition (see paragraph 9.1) is found to exist or be imminent, or the inspection is requested or ordered by a governmental authority. In such case, Lessee shall upon request reimburse Lessor for the cost of such inspection, so long as such inspection is reasonably related to the violation or contamination. In addition, Lessee shall provide copies of all relevant material safety data sheets **(MSDS)** to Lessor within 10 days of the receipt of a written request therefor.

7. **Maintenance; Repairs, Utility Installations; Trade Fixtures and Alterations.**

7.1 **Lessee's Obligations.**

(a) **In General.** Subject to the provisions of Paragraph 2.2 (Condition), 2.3 (Compliance), 6.3 (Lessee's Compliance with Applicable Requirements), 7.2 (Lessor's Obligations), 9 (Damage or Destruction), and 14 (Condemnation), Lessee shall, at Lessee's sole expense, keep the Premises, Utility Installations (intended for Lessee's exclusive use, no matter where located), and Alterations in good order, condition and repair (whether or not the portion of the Premises requiring repairs, or the means of repairing the same, are reasonably or readily accessible to Lessee, and whether or not the need for such repairs occurs as a result of Lessee's use, any prior use, the elements or the age of such portion of the Premises), including, but not limited to, all equipment or facilities, such as plumbing, HVAC equipment, electrical, lighting facilities, boilers, pressure vessels, fire protection system, fixtures, walls (interior and exterior), foundations, ceilings, roofs, roof drainage systems, floors, windows, doors, plate glass, skylights, landscaping, driveways, parking lots, fences, retaining walls, signs, sidewalks and parkways located in, on, or adjacent to the Premises. Lessee, in keeping the Premises in good order, condition and repair, shall exercise and perform good maintenance practices, specifically including the procurement and maintenance of the service contracts required by Paragraph 7.1(b) below. Lessee's obligations shall include restorations, replacements or renewals when necessary to keep the Premises and all improvements thereon or a part thereof in good order, condition and state of repair. Lessee shall, during the term of this Lease, keep the exterior appearance of the Building in a first-class condition (including, e.g. graffiti removal) consistent with the exterior appearance of other similar facilities of comparable age and size in the vicinity, including, when necessary, the exterior repainting of the Building.

(b) **Service Contracts.** Lessee shall, at Lessee's sole expense, procure and maintain contracts, with copies to Lessor, in customary form and substance for, and with contractors specializing and experienced in the maintenance of the following equipment and improvements, if any, if and when installed on the Premises: (i) HVAC equipment, (ii) boiler, and pressure vessels, (iii) fire extinguishing systems, including fire alarm and/or smoke detection, (iv) landscaping and irrigation systems, (v) roof covering and drains, and (vi) clarifiers. However, Lessor reserves the right, upon notice to Lessee, to procure and maintain any or all of such service contracts, and Lessee shall reimburse Lessor, upon demand, for the cost thereof.

(c) **Failure to Perform.** If Lessee fails to perform Lessee's obligations under this Paragraph 7.1, Lessor may enter upon the Premises after 10 days' prior written notice to Lessee (except in the case of an emergency, in which case no notice shall be required), perform such obligations on Lessee's behalf, and put the Premises in good order, condition and repair, and Lessee shall promptly pay to Lessor a sum equal to 115% of the cost thereof.

(d) **Replacement.** Subject to Lessee's indemnification of Lessor as set forth in Paragraph 8.7 below, and without relieving Lessee of liability resulting from Lessee's failure to exercise and perform good maintenance practices, if an item described in Paragraph 7.1(b) cannot be repaired other than at a cost which is in excess of 50% of the cost of replacing such item, then such item shall be replaced by Lessor, and the cost thereof shall be prorated between the Parties and Lessee shall only be obligated to pay, each month during the remainder of the term of this Lease, on the date on which Base Rent is due, an amount equal to the product of multiplying the cost of such replacement by a fraction, the numerator of which is ne, and the denominator of which is 144 (ie. 1/144th of the cost per month). Lessee shall pay Interest on the unamortized balance but may prepay its obligation at any time.

7.2 **Lessor's Obligations.** Subject to the provisions of Paragraphs 2.2 (Condition), 2.3 (Compliance), 9 (Damage or Destruction) and 14 (Condemnation), it is intended by the Parties hereto that Lessor have no obligation, in any manner whatsoever, to repair and maintain the Premises, or the equipment therein, all of which obligations are intended to be that of the Lessee. It is the intention of the Parties that the terms of this Lease govern the respective obligations of the Parties as to maintenance and repair of the Premises, and they expressly waive the benefit of any statute now or hereafter in effect to the extent it is inconsistent with the terms of this Lease.

7.3 **Utility Installations; Trade Fixtures; Alterations.**

(a) **Definitions.** The term **"Utility Installations"** refers to all floor and window coverings, air and/or vacuum lines, power panels, electrical distribution, security and fire protection systems, communication cabling, lighting fixtures, HVAC equipment, plumbing, and fencing in or on the Premises. The term **"Trade Fixtures"** shall mean Lessee's machinery and equipment that can be removed without doing material damage to the Premises. The term **"Alterations"** shall mean any modification of the improvements, other than Utility Installations or Trade Fixtures, whether by addition or deletion. **"Lessee Owned Alterations and/or Utility Installations"** are defined as Alterations and/or Utility Installations made by Lessee that are not yet owned by Lessor pursuant to Paragraph 7.4(a).

(b) **Consent.** Lessee shall not make any Alterations or Utility Installations to the Premises without Lessor's prior written consent. Lessee may, however, make non-structural Alterations or Utility Installations to the interior of the Premises (excluding the roof) without such consent but upon notice to Lessor, as long as they are not visible from the outside, do not involve puncturing, relocating or removing the roof or any existing walls, will not affect the electrical, plumbing, HVAC, and/or life safety systems, and the cumulative cost thereof during this Lease as extended does not exceed a sum equal to 3 month's Base Rent in the aggregate or a sum equal to one month's Base Rent in any one year. Notwithstanding the foregoing, Lessee shall not make or permit any roof penetrations and/or install anything on the roof without the prior written approval of Lessor. Lessor may, as a precondition to granting such approval, require Lessee to utilize a contractor chosen and/or approved by Lessor. Any Alterations or Utility Installations that Lessee shall desire to make and which require the consent of the Lessor shall be presented to Lessor in written form with detailed plans. Consent shall be deemed conditioned upon Lessee's: (i) acquiring all applicable governmental permits, (ii) furnishing Lessor with copies of both the permits and the plans and specifications prior to commencement of the work, and (iii) compliance with all conditions of said permits and other Applicable Requirements in a prompt and expeditious manner. Any Alterations or Utility Installations shall be performed in a workmanlike manner with good and sufficient materials. Lessee shall promptly upon completion furnish Lessor with as-built plans and specifications. For work which costs an amount in excess of one month's Base Rent, Lessor may condition its consent upon Lessee providing a lien and completion bond in an amount equal to 150% of the estimated cost of such Alteration or Utility Installation and/or upon Lessee's posting an additional Security Deposit with Lessor.

(c) **Liens; Bonds.** Lessee shall pay, when due, all claims for labor or materials furnished or alleged to have been furnished to or for Lessee at or for use on the Premises, which claims are or may be secured by any mechanic's or materialmen's lien against the Premises or any interest therein. Lessee shall give Lessor not less than 10 days notice prior to the commencement of any work in, on or about the Premises, and Lessor shall have the right to post notices of non-responsibility. If Lessee shall contest the validity of any such lien, claim or demand, then Lessee shall, at its sole expense defend and protect itself, Lessor and the Premises against the same and shall pay and satisfy any such adverse judgment that may be rendered thereon before the enforcement thereof. If Lessor shall require, Lessee shall furnish a surety bond in an amount equal to 150% of the amount of such contested lien, claim or demand, indemnifying Lessor against liability for the same. If Lessor elects to participate in any such action, Lessee shall pay Lessor's attorneys' fees and costs.

7.4 **Ownership; Removal; Surrender; and Restoration.**

(a) **Ownership.** Subject to Lessor's right to require removal or elect ownership as hereinafter provided, all Alterations and Utility Installations made by Lessee shall be the property of Lessee, but considered a part of the Premises. Lessor may, at any time, elect in writing to be the owner of all or any specified part of the Lessee Owned Alterations and Utility Installations. Unless otherwise instructed per paragraph 7.4(b) hereof, all Lessee Owned Alterations and Utility Installations shall, at the expiration or termination of this Lease, become the property of Lessor and be surrendered by Lessee with the Premises.

(b) **Removal.** By delivery to Lessee of written notice from Lessor not earlier than 90 and not later than 30 days prior to the end of the term of this Lease, Lessor may require that any or all Lessee Owned Alterations or Utility Installations be removed by the expiration or termination of this Lease. Lessor may require the removal at any time of all or any part of any Lessee Owned Alterations or Utility Installations made without the required consent.

(c) **Surrender; Restoration.** Lessee shall surrender the Premises by the Expiration Date or any earlier termination date, with all of the improvements, parts and surfaces thereof broom clean and free of debris, and in good operating order, condition and state of repair, ordinary wear and tear excepted. "Ordinary wear and tear" shall not include any damage or deterioration that would have been prevented by good maintenance practice. Notwithstanding the foregoing, if this Lease is for 12 months or less, then Lessee shall surrender the Premises in the same condition as delivered to Lessee on the Start Date with NO allowance for ordinary wear and tear. Lessee shall repair any damage occasioned by the installation, maintenance or removal of Trade Fixtures, Lessee owned Alterations and/or Utility Installations, furnishings, and equipment as well as the removal of any storage tank installed by or for Lessee. Lessee shall completely remove from the Premises any and all Hazardous Substances brought onto the Premises by or for Lessee, or any third party (except Hazardous Substances which were deposited via underground migration from areas outside of the Premises) even if such removal would require Lessee to perform or pay for work that exceeds statutory requirements. Trade Fixtures shall remain the property of Lessee and shall be removed by Lessee. Any personal property of Lessee not removed on or before the Expiration Date or any earlier termination date shall be deemed to have been abandoned by Lessee and may be disposed of or retained by Lessor as Lessor may desire. The failure by Lessee to timely vacate the Premises pursuant to this Paragraph 7.4(c) without the express written consent of Lessor shall constitute a holdover under the provisions of Paragraph 26 below.

8. **Insurance; Indemnity.**

8.1 **Payment For Insurance.** Lessee shall pay for all insurance required under Paragraph 8 except to the extent of the cost attributable to liability insurance carried by Lessor under Paragraph 8.2(b) in excess of $2,000,000 per occurrence. Premiums for policy periods commencing prior to or extending beyond the Lease term shall be prorated to correspond to the Lease term. Payment shall be made by Lessee to Lessor within 10 days following receipt of an invoice.

8.2 **Liability Insurance.**

(a) **Carried by Lessee.** Lessee shall obtain and keep in force a Commercial General Liability policy of insurance protecting Lessee and Lessor as an additional insured against claims for bodily injury, personal injury and property damage based upon or arising out of the ownership, use, occupancy or maintenance of the Premises and all areas appurtenant thereto. Such insurance shall be on an occurrence basis providing single limit coverage in an amount not less than $1,000,000 per occurrence with an annual aggregate of not less than $2,000,000. Lessee shall add Lessor as an additional insured by means of an endorsement at least as broad as the Insurance Service Organization's "Additional Insured-Managers or Lessors of Premises" Endorsement. The policy shall not contain any intra-insured exclusions as between insured persons or organizations, but shall include coverage for liability assumed under this Lease as an **"insured contract"** for the performance of Lessee's indemnity obligations under this Lease. The limits of said insurance shall not, however, limit the liability of Lessee nor relieve Lessee of any obligation hereunder. Lessee shall provide an endorsement on its liability policy(ies) which provides that its insurance shall be primary to and not contributory with any similar insurance carried by Lessor, whose insurance shall be considered excess insurance only.

(b) **Carried by Lessor.** Lessor shall maintain liability insurance as described in Paragraph 8.2(a), in addition to, and not in lieu of, the insurance required to be maintained by Lessee. Lessee shall not be named as an additional insured therein.

8.3 **Property Insurance - Building, Improvements and Rental Value.**

(a) **Building and Improvements.** The Insuring Party shall obtain and keep in force a policy or policies in the name of Lessor, with loss payable to Lessor, any ground-lessor, and to any Lender insuring loss or damage to the Premises. The amount of such insurance shall be equal to the full insurable replacement cost of the Premises, as the same shall exist from time to time, or the amount required by any Lender, but in no event more than the commercially reasonable and available insurable value thereof. Lessee Owned Alterations and Utility Installations, Trade Fixtures, and Lessee's personal property shall be insured by Lessee not by Lessor. If the coverage is available and commercially appropriate, such policy or policies shall insure against all risks of direct physical loss or damage (except the perils of flood and/or earthquake unless required by a Lender), including coverage for debris removal and the enforcement of any Applicable Requirements requiring the upgrading, demolition, reconstruction or

replacement of any portion of the Premises as the result of a covered loss. Said policy or policies shall also contain an agreed valuation provision in lieu of any coinsurance clause, waiver of subrogation, and inflation guard protection causing an increase in the annual property insurance coverage amount by a factor of not less than the adjusted U.S. Department of Labor Consumer Price Index for All Urban Consumers for the city nearest to where the Premises are located. If such insurance coverage has a deductible clause, the deductible amount shall not exceed $5,000 per occurrence, and Lessee shall be liable for such deductible amount in the event of an Insured Loss.

(b) **Rental Value.** The Insuring Party shall obtain and keep in force a policy or policies in the name of Lessor with loss payable to Lessor and any Lender, insuring the loss of the full Rent for one year with an extended period of indemnity for an additional 180 days ("Rental Value insurance"). Said insurance shall contain an agreed valuation provision in lieu of any coinsurance clause, and the amount of coverage shall be adjusted annually to reflect the projected Rent otherwise payable by Lessee, for the next 12 month period. Lessee shall be liable for any deductible amount in the event of such loss.

(c) **Adjacent Premises.** If the Premises are part of a larger building, or of a group of buildings owned by Lessor which are adjacent to the Premises, the Lessee shall pay for any increase in the premiums for the property insurance of such building or buildings if said increase is caused by Lessee's acts, omissions, use or occupancy of the Premises.

8.4 **Lessee's Property; Business Interruption Insurance; Worker's Compensation Insurance.**

(a) **Property Damage.** Lessee shall obtain and maintain insurance coverage on all of Lessee's personal property, Trade Fixtures, and Lessee Owned Alterations and Utility Installations. Such insurance shall be full replacement cost coverage with a deductible of not to exceed $1,000 per occurrence. The proceeds from any such insurance shall be used by Lessee for the replacement of personal property, Trade Fixtures and Lessee Owned Alterations and Utility Installations.

(b) **Business Interruption.** Lessee shall obtain and maintain loss of income and extra expense insurance in amounts as will reimburse Lessee for direct or indirect loss of earnings attributable to all perils commonly insured against by prudent lessees in the business of Lessee or attributable to prevention of access to the Premises as a result of such perils.

(c) **Worker's Compensation Insurance.** Lessee shall obtain and maintain Worker's Compensation Insurance in such amount as may be required by Applicable Requirements. Such policy shall include a 'Waiver of Subrogation' endorsement. Lessee shall provide Lessor with a copy of such endorsement along with the certificate of insurance or copy of the policy required by paragraph 8.5.

(d) **No Representation of Adequate Coverage.** Lessor makes no representation that the limits or forms of coverage of insurance specified herein are adequate to cover Lessee's property, business operations or obligations under this Lease.

8.5 **Insurance Policies.** Insurance required herein shall be by companies maintaining during the policy term a "General Policyholders Rating" of at least A-, VII, as set forth in the most current issue of "Best's Insurance Guide", or such other rating as may be required by a Lender. Lessee shall not do or permit to be done anything which invalidates the required insurance policies. Lessee shall, prior to the Start Date, deliver to Lessor certified copies of policies of such insurance or certificates with copies of the required endorsements evidencing the existence and amounts of the required insurance. No such policy shall be cancelable or subject to modification except after 30 days prior written notice to Lessor. Lessee shall, at least 10 days prior to the expiration of such policies, furnish Lessor with evidence of renewals or "insurance binders" evidencing renewal thereof, or Lessor may order such insurance and charge the cost thereof to Lessee, which amount shall be payable by Lessee to Lessor upon demand. Such policies shall be for a term of at least one year, or the length of the remaining term of this Lease, whichever is less. If either Party shall fail to procure and maintain the insurance required to be carried by it, the other Party may, but shall not be required to, procure and maintain the same.

8.6 **Waiver of Subrogation.** Without affecting any other rights or remedies, Lessee and Lessor each hereby release and relieve the other, and waive their entire right to recover damages against the other, for loss of or damage to its property arising out of or incident to the perils required to be insured against herein. The effect of such releases and waivers is not limited by the amount of insurance carried or required, or by any deductibles applicable hereto. The Parties agree to have their respective property damage insurance carriers waive any right to subrogation that such companies may have against Lessor or Lessee, as the case may be, so long as the insurance is not invalidated thereby.

8.7 **Indemnity.** Except for Lessor's gross negligence or willful misconduct, Lessee shall indemnify, protect, defend and hold harmless the Premises, Lessor and its agents, Lessor's master or ground lessor, partners and Lenders, from and against any and all claims, loss of rents and/or damages, liens, judgments, penalties, attorneys' and consultants' fees, expenses and/or liabilities arising out of, involving, or in connection with, the use and/or occupancy of the Premises by Lessee. If any action or proceeding is brought against Lessor by reason of any of the foregoing matters, Lessee shall upon notice defend the same at Lessee's expense by counsel reasonably satisfactory to Lessor and Lessor shall cooperate with Lessee in such defense. Lessor need not have first paid any such claim in order to be defended or indemnified.

8.8 **Exemption of Lessor and its Agents from Liability.** Notwithstanding the negligence or breach of this Lease by Lessor or its agents, neither Lessor nor its agents shall be liable under any circumstances for: (i) injury or damage to the person or goods, wares, merchandise or other property of Lessee, Lessee's employees, contractors, invitees, customers, or any other person in or about the Premises, whether such damage or injury is caused by or results from fire, steam, electricity, gas, water or rain, indoor air quality, the presence of mold or from the breakage, leakage, obstruction or other defects of pipes, fire sprinklers, wires, appliances, plumbing, HVAC or lighting fixtures, or from any other cause, whether the said injury or damage results from conditions arising upon the Premises or upon other portions of the building of which the Premises are a part, or from other sources or places, (ii) any damages arising from any act or neglect of any other tenant of Lessor or from the failure of Lessor or its agents to enforce the provisions of any other lease in the Project, or (iii) injury to Lessee's business or for any loss of income or profit therefrom. Instead, it is intended that Lessee's sole recourse in the event of such

damages or injury be to file a claim on the insurance policy(ies) that Lessee is required to maintain pursuant to the provisions of paragraph 8.

8.9 **Failure to Provide Insurance.** Lessee acknowledges that any failure on its part to obtain or maintain the insurance required herein will expose Lessor to risks and potentially cause Lessor to incur costs not contemplated by this Lease, the extent of which will be extremely difficult to ascertain. Accordingly, for any month or portion thereof that Lessee does not maintain the required insurance and/or does not provide Lessor with the required binders or certificates evidencing the existence of the required insurance, the Base Rent shall be automatically increased, without any requirement for notice to Lessee, by an amount equal to 10% of the then existing Base Rent or $100, whichever is greater. The parties agree that such increase in Base Rent represents fair and reasonable compensation for the additional risk/costs that Lessor will incur by reason of Lessee's failure to maintain the required insurance. Such increase in Base Rent shall in no event constitute a waiver of Lessee's Default or Breach with respect to the failure to maintain such insurance, prevent the exercise of any of the other rights and remedies granted hereunder, nor relieve Lessee of its obligation to maintain the insurance specified in this Lease.

9. **Damage or Destruction.**

9.1 **Definitions.**

(a) **"Premises Partial Damage"** shall mean damage or destruction to the improvements on the Premises, other than Lessee Owned Alterations and Utility Installations, which can reasonably be repaired in 6 months or less from the date of the damage or destruction. Lessor shall notify Lessee in writing within 30 days from the date of the damage or destruction as to whether or not the damage is Partial or Total.

(b) **"Premises Total Destruction"** shall mean damage or destruction to the Premises, other than Lessee Owned Alterations and Utility Installations and Trade Fixtures, which cannot reasonably be repaired in 6 months or less from the date of the damage or destruction. Lessor shall notify Lessee in writing within 30 days from the date of the damage or destruction as to whether or not the damage is Partial or Total.

(c) **"Insured Loss"** shall mean damage or destruction to improvements on the Premises, other than Lessee Owned Alterations and Utility Installations and Trade Fixtures, which was caused by an event required to be covered by the insurance described in Paragraph 8.3(a), irrespective of any deductible amounts or coverage limits involved.

(d) **"Replacement Cost"** shall mean the cost to repair or rebuild the improvements owned by Lessor at the time of the occurrence to their condition existing immediately prior thereto, including demolition, debris removal and upgrading required by the operation of Applicable Requirements, and without deduction for depreciation.

(e) **"Hazardous Substance Condition"** shall mean the occurrence or discovery of a condition involving the presence of, or a contamination by, a Hazardous Substance, in, on, or under the Premises which requires remediation.

9.2 **Partial Damage - Insured Loss.** If a Premises Partial Damage that is an Insured Loss occurs, then Lessor shall, at Lessor's expense, repair such damage (but not Lessee's Trade Fixtures or Lessee Owned Alterations and Utility Installations) as soon as reasonably possible and this Lease shall continue in full force and effect; provided, however, that Lessee shall, at Lessor's election, make the repair of any damage or destruction the total cost to repair of which is $10,000 or less, and, in such event, Lessor shall make any applicable insurance proceeds available to Lessee on a reasonable basis for that purpose. Notwithstanding the foregoing, if the required insurance was not in force or the insurance proceeds are not sufficient to effect such repair, the Insuring Party shall promptly contribute the shortage in proceeds (except as to the deductible which is Lessee's responsibility) as and when required to complete said repairs. In the event, however, such shortage was due to the fact that, by reason of the unique nature of the improvements, full replacement cost insurance coverage was not commercially reasonable and available, Lessor shall have no obligation to pay for the shortage in insurance proceeds or to fully restore the unique aspects of the Premises unless Lessee provides Lessor with the funds to cover same, or adequate assurance thereof, within 10 days following receipt of written notice of such shortage and request therefor. If Lessor receives said funds or adequate assurance thereof within said 10 day period, the party responsible for making the repairs shall complete them as soon as reasonably possible and this Lease shall remain in full force and effect. If such funds or assurance are not received, Lessor may nevertheless elect by written notice to Lessee within 10 days thereafter to: (i) make such restoration and repair as is commercially reasonable with Lessor paying any shortage in proceeds, in which case this Lease shall remain in full force and effect, or (ii) have this Lease terminate 30 days thereafter. Lessee shall not be entitled to reimbursement of any funds contributed by Lessee to repair any such damage or destruction. Premises Partial Damage due to flood or earthquake shall be subject to Paragraph 9.3, notwithstanding that there may be some insurance coverage, but the net proceeds of any such insurance shall be made available for the repairs if made by either Party.

9.3 **Partial Damage - Uninsured Loss.** If a Premises Partial Damage that is not an Insured Loss occurs, unless caused by a negligent or willful act of Lessee (in which event Lessee shall make the repairs at Lessee's expense), Lessor may either: (i) repair such damage as soon as reasonably possible at Lessor's expense, in which event this Lease shall continue in full force and effect, or (ii) terminate this Lease by giving written notice to Lessee within 30 days after receipt by Lessor of knowledge of the occurrence of such damage. Such termination shall be effective 60 days following the date of such notice. In the event Lessor elects to terminate this Lease, Lessee shall have the right within 10 days after receipt of the termination notice to give written notice to Lessor of Lessee's commitment to pay for the repair of such damage without reimbursement from Lessor. Lessee shall provide Lessor with said funds or satisfactory assurance thereof within 30 days after making such commitment. In such event this Lease shall continue in full force and effect, and Lessor shall proceed to make such repairs as soon as reasonably possible after the required funds are available. If Lessee does not make the required commitment, this Lease shall terminate as of the date specified in the termination notice.

9.4 **Total Destruction.** Notwithstanding any other provision hereof, if a Premises Total Destruction occurs, this Lease shall terminate 60 days following such Destruction. If the damage or destruction was caused by the gross negligence or willful misconduct of Lessee, Lessor shall have the right to recover Lessor's damages from Lessee, except as provided in Paragraph 8.6.

9.5 **Damage Near End of Term.** If at any time during the last 6 months of this Lease there is damage for which the cost to repair exceeds one month's Base Rent, whether or not an Insured Loss, Lessor may terminate this Lease effective 60 days following the date of occurrence of such damage by giving a written termination notice to Lessee within 30 days after the date of occurrence of such damage. Notwithstanding the foregoing, if Lessee at that time has an exercisable option to extend this Lease or to purchase the Premises, then Lessee may preserve this Lease by, (a) exercising such option and (b) providing Lessor with any shortage in insurance proceeds (or adequate assurance thereof) needed to make the repairs on or before the earlier of (i) the date which is 10 days after Lessee's receipt of Lessor's written notice purporting to terminate this Lease, or (ii) the day prior to the date upon which such option expires. If Lessee duly exercises such option during such period and provides Lessor with funds (or adequate assurance thereof) to cover any shortage in insurance proceeds, Lessor shall, at Lessor's commercially reasonable expense, repair such damage as soon as reasonably possible and this Lease shall continue in full force and effect. If Lessee fails to exercise such option and provide such funds or assurance during such period, then this Lease shall terminate on the date specified in the termination notice and Lessee's option shall be extinguished.

9.6 **Abatement of Rent; Lessee's Remedies.**

(a) **Abatement.** In the event of Premises Partial Damage or Premises Total Destruction or a Hazardous Substance Condition for which Lessee is not responsible under this Lease, the Rent payable by Lessee for the period required for the repair, remediation or restoration of such damage shall be abated in proportion to the degree to which Lessee's use of the Premises is impaired, but not to exceed the proceeds received from the Rental Value insurance. All other obligations of Lessee hereunder shall be performed by Lessee, and Lessor shall have no liability for any such damage, destruction, remediation, repair or restoration except as provided herein.

(b) **Remedies.** If Lessor is obligated to repair or restore the Premises and does not commence, in a substantial and meaningful way, such repair or restoration within 90 days after such obligation shall accrue, Lessee may, at any time prior to the commencement of such repair or restoration, give written notice to Lessor and to any Lenders of which Lessee has actual notice, of Lessee's election to terminate this Lease on a date not less than 60 days following the giving of such notice. If Lessee gives such notice and such repair or restoration is not commenced within 30 days thereafter, this Lease shall terminate as of the date specified in said notice. If the repair or restoration is commenced within such 30 days, this Lease shall continue in full force and effect. "Commence" shall mean either the unconditional authorization of the preparation of the required plans, or the beginning of the actual work on the Premises, whichever first occurs.

9.7 **Termination; Advance Payments.** Upon termination of this Lease pursuant to Paragraph 6.2(g) or Paragraph 9, an equitable adjustment shall be made concerning advance Base Rent and any other advance payments made by Lessee to Lessor. Lessor shall, in addition, return to Lessee so much of Lessee's Security Deposit as has not been, or is not then required to be, used by Lessor.

10. **This section is left blank**

11. **Utilities and Services.** Lessee shall pay for all water, gas, heat, light, power, telephone, trash disposal and other utilities and services supplied to the Premises, together with any taxes thereon. If any such services are not separately metered or billed to Lessee, Lessee shall pay a reasonable proportion, to be determined by Lessor, of all charges jointly metered or billed. There shall be no abatement of rent and Lessor shall not be liable in any respect whatsoever for the inadequacy, stoppage, interruption or discontinuance of any utility or service due to riot, strike, labor dispute, breakdown, accident, repair or other cause beyond Lessor's reasonable control or in cooperation with governmental request or directions.

12. **Assignment and Subletting.**

12.1 **Lessor's Consent Required.**

(a) Lessee shall not voluntarily or by operation of law assign, transfer, mortgage or encumber (collectively, **"assign or assignment")** or sublet all or any part of Lessee's interest in this Lease or in the Premises without Lessor's prior written consent.

(b) Unless Lessee is a corporation and its stock is publicly traded on a national stock exchange, a change in the control of Lessee shall constitute an assignment requiring consent. The transfer, on a cumulative basis, of 25% or more of the voting control of Lessee shall constitute a change in control for this purpose.

(c) The involvement of Lessee or its assets in any transaction, or series of transactions (by way of merger, sale, acquisition, financing, transfer, leveraged buy-out or otherwise), whether or not a formal assignment or hypothecation of this Lease or Lessee's assets occurs, which results or will result in a reduction of the Net Worth of Lessee by an amount greater than 25% of such Net Worth as it was represented at the time of the execution of this Lease or at the time of the most recent assignment to which Lessor has consented, or as it exists immediately prior to said transaction or transactions constituting such reduction, whichever was or is greater, shall be considered an assignment of this Lease to which Lessor may withhold its consent. **"Net Worth of Lessee"** shall mean the net worth of Lessee (excluding any guarantors) established under generally accepted accounting principles.

(d) An assignment or subletting without consent shall, at Lessor's option, be a Default curable after notice per Paragraph 13.1(c), or a noncurable Breach without the necessity of any notice and grace period. If Lessor elects to treat such unapproved assignment or subletting as a noncurable Breach, Lessor may either: (i) terminate this Lease, or (ii) upon 30 days written notice, increase the monthly Base Rent to 110% of the Base Rent then in effect. Further, in the event of such Breach and rental

adjustment, (i) the purchase price of any option to purchase the Premises held by Lessee shall be subject to similar adjustment to 110% of the price previously in effect, and (ii) all fixed and non-fixed rental adjustments scheduled during the remainder of the Lease term shall be increased to 110% of the scheduled adjusted rent.

(e) Lessee's remedy for any breach of Paragraph 12.1 by Lessor shall be limited to compensatory damages and/or injunctive relief.

(f) Lessor may reasonably withhold consent to a proposed assignment or subletting if Lessee is in Default at the time consent is requested.

(g) Notwithstanding the foregoing, allowing a de minimis portion of the Premises, ie. 20 square feet or less, to be used by a third party vendor in connection with the installation of a vending machine or payphone shall not constitute a subletting.

12.2 **Terms and Conditions Applicable to Assignment and Subletting.**

(a) Regardless of Lessor's consent, no assignment or subletting shall: (i) be effective without the express written assumption by such assignee or sublessee of the obligations of Lessee under this Lease, (ii) release Lessee of any obligations hereunder, or (iii) alter the primary liability of Lessee for the payment of Rent or for the performance of any other obligations to be performed by Lessee.

(b) Lessor may accept Rent or performance of Lessee's obligations from any person other than Lessee pending approval or disapproval of an assignment. Neither a delay in the approval or disapproval of such assignment nor the acceptance of Rent or performance shall constitute a waiver or estoppel of Lessor's right to exercise its remedies for Lessee's Default or Breach.

(c) Lessor's consent to any assignment or subletting shall not constitute a consent to any subsequent assignment or subletting.

(d) In the event of any Default or Breach by Lessee, Lessor may proceed directly against Lessee, any Guarantors or anyone else responsible for the performance of Lessee's obligations under this Lease, including any assignee or sublessee, without first exhausting Lessor's remedies against any other person or entity responsible therefor to Lessor, or any security held by Lessor.

(e) Each request for consent to an assignment or subletting shall be in writing, accompanied by information relevant to Lessor's determination as to the financial and operational responsibility and appropriateness of the proposed assignee or sublessee, including but not limited to the intended use and/or required modification of the Premises, if any, together with a fee of $500 as consideration for Lessor's considering and processing said request. Lessee agrees to provide Lessor with such other or additional information and/or documentation as may be reasonably requested. (See also Paragraph 36)

(f) Any assignee of, or sublessee under, this Lease shall, by reason of accepting such assignment, entering into such sublease, or entering into possession of the Premises or any portion thereof, be deemed to have assumed and agreed to conform and comply with each and every term, covenant, condition and obligation herein to be observed or performed by Lessee during the term of said assignment or sublease, other than such obligations as are contrary to or inconsistent with provisions of an assignment or sublease to which Lessor has specifically consented to in writing.

(g) Lessor's consent to any assignment or subletting shall not transfer to the assignee or sublessee any Option granted to the original Lessee by this Lease unless such transfer is specifically consented to by Lessor in writing. (See Paragraph 39.2)

12.3 **Additional Terms and Conditions Applicable to Subletting.** The following terms and conditions shall apply to any subletting by Lessee of all or any part of the Premises and shall be deemed included in all subleases under this Lease whether or not expressly incorporated therein:

(a) Lessee hereby assigns and transfers to Lessor all of Lessee's interest in all Rent payable on any sublease, and Lessor may collect such Rent and apply same toward Lessee's obligations under this Lease; provided, however, that until a Breach shall occur in the performance of Lessee's obligations, Lessee may collect said Rent. In the event that the amount collected by Lessor exceeds Lessee's then outstanding obligations any such excess shall be refunded to Lessee. Lessor shall not, by reason of the foregoing or any assignment of such sublease, nor by reason of the collection of Rent, be deemed liable to the sublessee for any failure of Lessee to perform and comply with any of Lessee's obligations to such sublessee. Lessee hereby irrevocably authorizes and directs any such sublessee, upon receipt of a written notice from Lessor stating that a Breach exists in the performance of Lessee's obligations under this Lease, to pay to Lessor all Rent due and to become due under the sublease. Sublessee shall rely upon any such notice from Lessor and shall pay all Rents to Lessor without any obligation or right to inquire as to whether such Breach exists, notwithstanding any claim from Lessee to the contrary.

(b) In the event of a Breach by Lessee, Lessor may, at its option, require sublessee to attorn to Lessor, in which event Lessor shall undertake the obligations of the sublessor under such sublease from the time of the exercise of said option to the expiration of such sublease; provided, however, Lessor shall not be liable for any prepaid rents or security deposit paid by such sublessee to such sublessor or for any prior Defaults or Breaches of such sublessor.

(c) Any matter requiring the consent of the sublessor under a sublease shall also require the consent of Lessor.

(d) No sublessee shall further assign or sublet all or any part of the Premises without Lessor's prior written consent.

(e) Lessor shall deliver a copy of any notice of Default or Breach by Lessee to the sublessee, who shall have the right to cure the Default of Lessee within the grace period, if any, specified in such notice. The sublessee shall have a right of reimbursement and offset from and against Lessee for any such Defaults cured by the sublessee.

13. **Default; Breach; Remedies.**

13.1 **Default; Breach.** A **"Default"** is defined as a failure by the Lessee to comply with or perform any of the terms, covenants, conditions or Rules and Regulations under this Lease. A **"Breach"** is defined as the occurrence of one or more of the following Defaults, and the failure of Lessee to cure such Default within any applicable grace period:

(a) The abandonment of the Premises; or the vacating of the Premises without providing a commercially reasonable level of security, or where the coverage of the property insurance described in Paragraph 8.3 is jeopardized as a result thereof, or without providing reasonable assurances to minimize potential vandalism.

(b) The failure of Lessee to make any payment of Rent or any Security Deposit required to be made by Lessee hereunder, whether to Lessor or to a third party, when due, to provide reasonable evidence of insurance or surety bond, or to fulfill any obligation under this Lease which endangers or threatens life or property, where such failure continues for a period of 3 business days following written notice to Lessee. THE ACCEPTANCE BY LESSOR OF A PARTIAL PAYMENT OF RENT OR SECURITY DEPOSIT SHALL NOT CONSTITUTE A WAIVER OF ANY OF LESSOR'S RIGHTS, INCLUDING LESSOR'S RIGHT TO RECOVER POSSESSION OF THE PREMISES.

(c) The failure of Lessee to allow Lessor and/or its agents access to the Premises or the commission of waste, act or acts constituting public or private nuisance, and/or an illegal activity on the Premises by Lessee, where such actions continue for a period of 3 business days following written notice to Lessee.

(d) The failure by Lessee to provide (i) reasonable written evidence of compliance with Applicable Requirements, (ii) the service contracts, (iii) the rescission of an unauthorized assignment or subletting, (iv) an Estoppel Certificate or financial statements, (v) a requested subordination, (vi) evidence concerning any guaranty and/or Guarantor, (vii) any document requested under Paragraph 42, (viii) material safety data sheets (MSDS), or (ix) any other documentation or information which Lessor may reasonably require of Lessee under the terms of this Lease, where any such failure continues for a period of 10 days following written notice to Lessee.

(e) A Default by Lessee as to the terms, covenants, conditions or provisions of this Lease, or of the rules adopted under Paragraph 40 hereof, other than those described in subparagraphs 13.1(a), (b), (c) or (d), above, where such Default continues for a period of 30 days after written notice; provided, however, that if the nature of Lessee's Default is such that more than 30 days are reasonably required for its cure, then it shall not be deemed to be a Breach if Lessee commences such cure within said 30 day period and thereafter diligently prosecutes such cure to completion.

(f) The occurrence of any of the following events: (i) the making of any general arrangement or assignment for the benefit of creditors; (ii) becoming a "debtor" as defined in 11 U.S.C. §101 or any successor statute thereto (unless, in the case of a petition filed against Lessee, the same is dismissed within 60 days); (iii) the appointment of a trustee or receiver to take possession of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease, where possession is not restored to Lessee within 30 days; or (iv) the attachment, execution or other judicial seizure of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease, where such seizure is not discharged within 30 days; provided, however, in the event that any provision of this subparagraph is contrary to any applicable law, such provision shall be of no force or effect, and not affect the validity of the remaining provisions.

(g) The discovery that any financial statement of Lessee or of any Guarantor given to Lessor was materially false.

(h) If the performance of Lessee's obligations under this Lease is guaranteed: (i) the death of a Guarantor, (ii) the termination of a Guarantor's liability with respect to this Lease other than in accordance with the terms of such guaranty, (iii) a Guarantor's becoming insolvent or the subject of a bankruptcy filing, (iv) a Guarantor's refusal to honor the guaranty, or (v) a Guarantor's breach of its guaranty obligation on an anticipatory basis, and Lessee's failure, within 60 days following written notice of any such event, to provide written alternative assurance or security, which, when coupled with the then existing resources of Lessee, equals or exceeds the combined financial resources of Lessee and the Guarantors that existed at the time of execution of this Lease.

13.2 **Remedies.** If Lessee fails to perform any of its affirmative duties or obligations, within 10 days after written notice (or in case of an emergency, without notice), Lessor may, at its option, perform such duty or obligation on Lessee's behalf, including but not limited to the obtaining of reasonably required bonds, insurance policies, or governmental licenses, permits or approvals. Lessee shall pay to Lessor an amount equal to 115% of the costs and expenses incurred by Lessor in such performance upon receipt of an invoice therefor. In the event of a Breach, Lessor may, with or without further notice or demand, and without limiting Lessor in the exercise of any right or remedy which Lessor may have by reason of such Breach:

(a) Terminate Lessee's right to possession of the Premises by any lawful means, in which case this Lease shall terminate and Lessee shall immediately surrender possession to Lessor. In such event Lessor shall be entitled to recover from Lessee: (i) the unpaid Rent which had been earned at the time of termination; (ii) the worth at the time of award of the amount by which the unpaid rent which would have been earned after termination until the time of award exceeds the amount of such rental loss that the Lessee proves could have been reasonably avoided; (iii) the worth at the time of award of the amount by which the unpaid rent for the balance of the term after the time of award exceeds the amount of such rental loss that the Lessee proves could be reasonably avoided; and (iv) any other amount necessary to compensate Lessor for all the detriment proximately caused by the Lessee's failure to perform its obligations under this Lease or which in the ordinary course of things would be likely to result therefrom, including but not limited to the cost of recovering possession of the Premises, expenses of reletting, including necessary renovation and alteration of the Premises, reasonable attorneys' fees, and that portion of any leasing commission paid by Lessor in connection with this Lease applicable to the unexpired term of this Lease. The worth at the time of award of the amount referred to in provision (iii) of the immediately preceding sentence shall be computed by discounting such amount at the discount rate of the Federal Reserve Bank of the District within which the Premises are located at the time of award plus one percent. Efforts by Lessor to mitigate damages caused by Lessee's Breach of this Lease shall not waive Lessor's right to recover any damages to which Lessor is otherwise entitled. If termination of this Lease is obtained through the provisional remedy of unlawful detainer, Lessor shall have the right to recover in such proceeding any unpaid Rent and damages as are recoverable therein, or Lessor may reserve the right to recover all or any part thereof in a separate suit. If a

notice and grace period required under Paragraph 13.1 was not previously given, a notice to pay rent or quit, or to perform or quit given to Lessee under the unlawful detainer statute shall also constitute the notice required by Paragraph 13.1. In such case, the applicable grace period required by Paragraph 13.1 and the unlawful detainer statute shall run concurrently, and the failure of Lessee to cure the Default within the greater of the two such grace periods shall constitute both an unlawful detainer and a Breach of this Lease entitling Lessor to the remedies provided for in this Lease and/or by said statute.

(b) Continue the Lease and Lessee's right to possession and recover the Rent as it becomes due, in which event Lessee may sublet or assign, subject only to reasonable limitations. Acts of maintenance, efforts to relet, and/or the appointment of a receiver to protect the Lessor's interests, shall not constitute a termination of the Lessee's right to possession.

(c) Pursue any other remedy now or hereafter available under the laws or judicial decisions of the state wherein the Premises are located. The expiration or termination of this Lease and/or the termination of Lessee's right to possession shall not relieve Lessee from liability under any indemnity provisions of this Lease as to matters occurring or accruing during the term hereof or by reason of Lessee's occupancy of the Premises.

13.3 **Inducement Recapture.** Any agreement for free or abated rent or other charges, or for the giving or paying by Lessor to or for Lessee of any cash or other bonus, inducement or consideration for Lessee's entering into this Lease, all of which concessions are hereinafter referred to as **"Inducement Provisions,"** shall be deemed conditioned upon Lessee's full and faithful performance of all of the terms, covenants and conditions of this Lease. Upon Breach of this Lease by Lessee, any such Inducement Provision shall automatically be deemed deleted from this Lease and of no further force or effect, and any rent, other charge, bonus, inducement or consideration theretofore abated, given or paid by Lessor under such an inducement Provision shall be immediately due and payable by Lessee to Lessor, notwithstanding any subsequent cure of said Breach by Lessee. The acceptance by Lessor of rent or the cure of the Breach which initiated the operation of this paragraph shall not be deemed a waiver by Lessor of the provisions of this paragraph unless specifically so stated in writing by Lessor at the time of such acceptance.

13.4 **Late Charges.** Lessee hereby acknowledges that late payment by Lessee of Rent will cause Lessor to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult to ascertain. Such costs include, but are not limited to, processing and accounting charges, and late charges which may be imposed upon Lessor by any Lender. Accordingly, if any Rent shall not be received by Lessor within 5 days after such amount shall be due, then, without any requirement for notice to Lessee, Lessee shall immediately pay to Lessor a one-time late charge equal to 10% of each such overdue amount or $100, whichever is greater. The Parties hereby agree that such late charge represents a fair and reasonable estimate of the costs Lessor will incur by reason of such late payment. Acceptance of such late charge by Lessor shall in no event constitute a waiver of Lessee's Default or Breach with respect to such overdue amount, nor prevent the exercise of any of the other rights and remedies granted hereunder. In the event that a late charge is payable hereunder, whether or not collected, for 3 consecutive installments of Base Rent, then notwithstanding any provision of this Lease to the contrary, Base Rent shall, at Lessor's option, become due and payable quarterly in advance.

13.5 **Interest.** Any monetary payment due Lessor hereunder, other than late charges, not received by Lessor, when due shall bear interest from the 31st day after it was due. The interest **("Interest")** charged shall be computed at the rate of 10% per annum but shall not exceed the maximum rate allowed by law. Interest is payable in addition to the potential late charge provided for in Paragraph 13.4.

13.6 **Breach by Lessor.**

(a) **Notice of Breach.** Lessor shall not be deemed in breach of this Lease unless Lessor fails within a reasonable time to perform an obligation required to be performed by Lessor. For purposes of this Paragraph, a reasonable time shall in no event be less than 30 days after receipt by Lessor, and any Lender whose name and address shall have been furnished Lessee in writing for such purpose, of written notice specifying wherein such obligation of Lessor has not been performed; provided, however, that if the nature of Lessor's obligation is such that more than 30 days are reasonably required for its performance, then Lessor shall not be in breach if performance is commenced within such 30 day period and thereafter diligently pursued to completion.

(b) **Performance by Lessee on Behalf of Lessor.** In the event that neither Lessor nor Lender cures said breach within 30 days after receipt of said notice, or if having commenced said cure they do not diligently pursue it to completion, then Lessee may elect to cure said breach at Lessee's expense and offset from Rent the actual and reasonable cost to perform such cure, provided, however, that such offset shall not exceed an amount equal to the greater of one month's Base Rent or the Security Deposit, reserving Lessee's right to seek reimbursement from Lessor for any such expense in excess of such offset. Lessee shall document the cost of said cure and supply said documentation to Lessor.

14. **Condemnation.** If the Premises or any portion thereof are taken under the power of eminent domain or sold under the threat of the exercise of said power (collectively **"Condemnation"),** this Lease shall terminate as to the part taken as of the date the condemning authority takes title or possession, whichever first occurs. If more than 10% of the Building, or more than 25% of that portion of the Premises not occupied by any building, is taken by Condemnation, Lessee may, at Lessee's option, to be exercised in writing within 10 days after Lessor shall have given Lessee written notice of such taking (or in the absence of such notice, within 10 days after the condemning authority shall have taken possession) terminate this Lease as of the date the condemning authority takes such possession. If Lessee does not terminate this Lease in accordance with the foregoing, this Lease shall remain in full force and effect as to the portion of the Premises remaining, except that the Base Rent shall be reduced in proportion to the reduction in utility of the Premises caused by such Condemnation. Condemnation awards and/or payments shall be the property of Lessor, whether such award shall be made as compensation for diminution in value of the leasehold, the value of the part taken, or for severance damages; provided, however, that Lessee shall be entitled to any compensation paid by the condemnor for Lessee's relocation expenses, loss of business goodwill and/or Trade Fixtures, without regard to whether or not this Lease is terminated pursuant to the provisions of this Paragraph. All Alterations and Utility Installations made to the Premises by Lessee, for purposes of Condemnation only, shall be considered the

property of the Lessee and Lessee shall be entitled to any and all compensation which is payable therefor. In the event that this Lease is not terminated by reason of the Condemnation, Lessor shall repair any damage to the Premises caused by such Condemnation.

15. **This section is left blank**

16. **Estoppel Certificates.**

(a) Each Party (as **"Responding Party")** shall within 10 days after written notice from the other Party (the **"Requesting Party")** execute, acknowledge and deliver to the Requesting Party a statement in writing in form similar to the then most current **"Estoppel Certificate"** form published by the AIR Commercial Real Estate Association, plus such additional information, confirmation and/or statements as may be reasonably requested by the Requesting Party.

(b) If the Responding Party shall fail to execute or deliver the Estoppel Certificate within such 10 day period, the Requesting Party may execute an Estoppel Certificate stating that: (i) the Lease is in full force and effect without modification except as may be represented by the Requesting Party, (ii) there are no uncured defaults in the Requesting Party's performance, and (iii) if Lessor is the Requesting Party, not more than one month's rent has been paid in advance. Prospective purchasers and encumbrancers may rely upon the Requesting Party's Estoppel Certificate, and the Responding Party shall be estopped from denying the truth of the facts contained in said Certificate. In addition, Lessee acknowledges that any failure on its part to provide such an Estoppel Certificate will expose Lessor to risks and potentially cause Lessor to incur costs not contemplated by this Lease, the extent of which will be extremely difficult to ascertain. Accordingly, should the Lessee fail to execute and/or deliver a requested Estoppel Certificate in a timely fashion the monthly Base Rent shall be automatically increased, without any requirement for notice to Lessee, by an amount equal to 10% of the then existing Base Rent or $100, whichever is greater for remainder of the Lease. The Parties agree that such increase in Base Rent represents fair and reasonable compensation for the additional risk/costs that Lessor will incur by reason of Lessee's failure to provide the Estoppel Certificate. Such increase in Base Rent shall in no event constitute a waiver of Lessee's Default or Breach with respect to the failure to provide the Estoppel Certificate nor prevent the exercise of any of the other rights and remedies granted hereunder.

(c) If Lessor desires to finance, refinance, or sell the Premises, or any part thereof, Lessee and all Guarantors shall within 10 days after written notice from Lessor deliver to any potential lender or purchaser designated by Lessor such financial statements as may be reasonably required by such lender or purchaser, including but not limited to Lessee's financial statements for the past 3 years. All such financial statements shall be received by Lessor and such lender or purchaser in confidence and shall be used only for the purposes herein set forth.

17. **Definition of Lessor.** The term **"Lessor"** as used herein shall mean the owner or owners at the time in question of the fee title to the Premises, or, if this is a sublease, of the Lessee's interest in the prior lease. In the event of a transfer of Lessor's title or interest in the Premises or this Lease, Lessor shall deliver to the transferee or assignee (in cash or by credit) any unused Security Deposit held by Lessor. Upon such transfer or assignment and delivery of the Security Deposit, as aforesaid, the prior Lessor shall be relieved of all liability with respect to the obligations and/or covenants under this Lease thereafter to be performed by the Lessor. Subject to the foregoing, the obligations and/or covenants in this Lease to be performed by the Lessor shall be binding only upon the Lessor as hereinabove defined.

18. **Severability.** The invalidity of any provision of this Lease, as determined by a court of competent jurisdiction, shall in no way affect the validity of any other provision hereof.

19. **Days.** Unless otherwise specifically indicated to the contrary, the word "days" as used in this Lease shall mean and refer to calendar days.

20. **Limitation on Liability.** The obligations of Lessor under this Lease shall not constitute personal obligations of Lessor or its partners, members, directors, officers or shareholders, and Lessee shall look to the Premises, and to no other assets of Lessor, for the satisfaction of any liability of Lessor with respect to this Lease, and shall not seek recourse against Lessor's partners, members, directors, officers or shareholders, or any of their personal assets for such satisfaction.

21. **Time of Essence.** Time is of the essence with respect to the performance of all obligations to be performed or observed by the Parties under this Lease.

22. **This section is left blank**

23. **Notices.**

23.1 **Notice Requirements.** All notices required or permitted by this Lease or applicable law shall be in writing and may be delivered in person (by hand or by courier) or may be sent by regular, certified or registered mail or U.S. Postal Service Express Mail, with postage prepaid, or by facsimile transmission, and shall be deemed sufficiently given if served in a manner specified in this Paragraph 23. The addresses noted adjacent to a Party's signature on this Lease shall be that Party's address for delivery or mailing of notices. Either Party may by written notice to the other specify a different address for notice, except that upon Lessee's taking possession of the Premises, the Premises shall constitute Lessee's address for notice. A copy of all notices to Lessor shall be concurrently transmitted to such party or parties at such addresses as Lessor may from time to time hereafter designate in writing.

23.2 **Date of Notice.** Any notice sent by registered or certified mail, return receipt requested, shall be deemed given on the date of delivery shown on the receipt card, or if no delivery date is shown, the postmark thereon. If sent by regular mail the notice shall be deemed given 72 hours after the same is addressed as required herein and mailed with postage prepaid. Notices delivered by United States Express Mail or overnight courier that guarantees next day delivery shall be deemed given 24 hours after delivery of the same to

the Postal Service or courier. Notices transmitted by facsimile transmission or similar means shall be deemed delivered upon telephone confirmation of receipt (confirmation report from fax machine is sufficient), provided a copy is also delivered via delivery or mail. If notice is received on a Saturday, Sunday or legal holiday, it shall be deemed received on the next business day.

24. **Waivers.**

(a) No waiver by Lessor of the Default or Breach of any term, covenant or condition hereof by Lessee, shall be deemed a waiver of any other term, covenant or condition hereof, or of any subsequent Default or Breach by Lessee of the same or of any other term, covenant or condition hereof. Lessor's consent to, or approval of, any act shall not be deemed to render unnecessary the obtaining of Lessor's consent to, or approval of, any subsequent or similar act by Lessee, or be construed as the basis of an estoppel to enforce the provision or provisions of this Lease requiring such consent.

(b) The acceptance of Rent by Lessor shall not be a waiver of any Default or Breach by Lessee. Any payment by Lessee may be accepted by Lessor on account of moneys or damages due Lessor, notwithstanding any qualifying statements or conditions made by Lessee in connection therewith, which such statements and/or conditions shall be of no force or effect whatsoever unless specifically agreed to in writing by Lessor at or before the time of deposit of such payment.

(c) THE PARTIES AGREE THAT THE TERMS OF THIS LEASE SHALL GOVERN WITH REGARD TO ALL MATTERS RELATED THERETO AND HEREBY WAIVE THE PROVISIONS OF ANY PRESENT OR FUTURE STATUTE TO THE EXTENT THAT SUCH STATUTE IS INCONSISTENT WITH THIS LEASE.

25. **Disclosures Regarding The Nature of a Real Estate Agency Relationship.**

(a) When entering into a discussion with a real estate agent regarding a real estate transaction, a Lessor or Lessee should from the outset understand what type of agency relationship or representation it has with the agent or agents in the transaction. Lessor and Lessee acknowledge being advised by the Brokers in this transaction, as follows:

(i) Lessor's Agent. A Lessor's agent under a listing agreement with the Lessor acts as the agent for the Lessor only. A Lessor's agent or subagent has the following affirmative obligations: To the Lessor: A fiduciary duty of utmost care, integrity, honesty, and loyalty in dealings with the Lessor. To the Lessee and the Lessor: a. Diligent exercise of reasonable skills and care in performance of the agent's duties. b. A duty of honest and fair dealing and good faith. c. A duty to disclose all facts known to the agent materially affecting the value or desirability of the property that are not known to, or within the diligent attention and observation of, the Parties. An agent is not obligated to reveal to either Party any confidential information obtained from the other Party which does not involve the affirmative duties set forth above.

(ii) Lessee's Agent. An agent can agree to act as agent for the Lessee only. In these situations, the agent is not the Lessor's agent, even if by agreement the agent may receive compensation for services rendered, either in full or in part from the Lessor. An agent acting only for a Lessee has the following affirmative obligations. To the Lessee: A fiduciary duty of utmost care, integrity, honesty, and loyalty in dealings with the Lessee. To the Lessee and the Lessor: a. Diligent exercise of reasonable skills and care in performance of the agent's duties. b. A duty of honest and fair dealing and good faith. c. A duty to disclose all facts known to the agent materially affecting the value or desirability of the property that are not known to, or within the diligent attention and observation of, the Parties. An agent is not obligated to reveal to either Party any confidential information obtained from the other Party which does not involve the affirmative duties set forth above.

(iii) Agent Representing Both Lessor and Lessee. A real estate agent, either acting directly or through one or more associate licenses, can legally be the agent of both the Lessor and the Lessee in a transaction, but only with the knowledge and consent of both the Lessor and the Lessee. In a dual agency situation, the agent has the following affirmative obligations to both the Lessor and the Lessee: a. A fiduciary duty of utmost care, integrity, honesty and loyalty in the dealings with either Lessor or the Lessee. b. Other duties to the Lessor and the Lessee as stated above in subparagraphs (i) or (ii). In representing both Lessor and Lessee, the agent may not without the express permission of the respective Party, disclose to the other Party that the Lessor will accept rent in an amount less than that indicated in the listing or that the Lessee is willing to pay a higher rent than that offered. The above duties of the agent in a real estate transaction do not relieve a Lessor or Lessee from the responsibility to protect their own interests. Lessor and Lessee should carefully read all agreements to assure that they adequately express their understanding of the transaction. A real estate agent is a person qualified to advise about real estate. If legal or tax advice is desired, consult a competent professional.

(b) Brokers have no responsibility with respect to any default or breach hereof by either Party. The Parties agree that no lawsuit or other legal proceeding involving any breach of duty, error or omission relating to this Lease may be brought against Broker more than one year after the Start Date and that the liability (including court costs and attorneys' fees), of any Broker with respect to any such lawsuit and/or legal proceeding shall not exceed the fee received by such Broker pursuant to this Lease; provided, however, that the foregoing limitation on each Broker's liability shall not be applicable to any gross negligence or willful misconduct of such Broker.

(c) Lessor and Lessee agree to identify to Brokers as "Confidential" any communication or information given Brokers that is considered by such Party to be confidential.

26. **No Right To Holdover.** Lessee has no right to retain possession of the Premises or any part thereof beyond the expiration or termination of this Lease. In the event that Lessee holds over, then the Base Rent shall be increased to 150% of the Base Rent applicable immediately preceding the expiration or termination. Nothing contained herein shall be construed as consent by Lessor to any holding over by Lessee.

27. **Cumulative Remedies.** No remedy or election hereunder shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies at law or in equity.

28. **Covenants and Conditions; Construction of Agreement.** All provisions of this Lease to be observed or performed by Lessee are both covenants and conditions. In construing this Lease, all headings and titles are for the convenience of the Parties only and shall not be considered a part of this

Lease. Whenever required by the context, the singular shall include the plural and vice versa. This Lease shall not be construed as if prepared by one of the Parties, but rather according to its fair meaning as a whole, as if both Parties had prepared it.

29. **Binding Effect; Choice of Law.** This Lease shall be binding upon the Parties, their personal representatives, successors and assigns and be governed by the laws of the State in which the Premises are located. Any litigation between the Parties hereto concerning this Lease shall be initiated in the county in which the Premises are located.

30. **Subordination; Attornment; Non-Disturbance.**

30.1 **Subordination.** This Lease and any Option granted hereby shall be subject and subordinate to any ground lease, mortgage, deed of trust, or other hypothecation or security device (collectively, **"Security Device"**), now or hereafter placed upon the Premises, to any and all advances made on the security thereof, and to all renewals, modifications, and extensions thereof. Lessee agrees that the holders of any such Security Devices (in this Lease together referred to as **"Lender"**) shall have no liability or obligation to perform any of the obligations of Lessor under this Lease. Any Lender may elect to have this Lease and/or any Option granted hereby superior to the lien of its Security Device by giving written notice thereof to Lessee, whereupon this Lease and such Options shall be deemed prior to such Security Device, notwithstanding the relative dates of the documentation or recordation thereof.

30.2 **Attornment.** In the event that Lessor transfers title to the Premises, or the Premises are acquired by another upon the foreclosure or termination of a Security Device to which this Lease is subordinated (i) Lessee shall, subject to the non-disturbance provisions of Paragraph 30.3, attorn to such new owner, and upon request, enter into a new lease, containing all of the terms and provisions of this Lease, with such new owner for the remainder of the term hereof, or, at the election of the new owner, this Lease will automatically become a new lease between Lessee and such new owner, and (ii) Lessor shall thereafter be relieved of any further obligations hereunder and such new owner shall assume all of Lessor's obligations, except that such new owner shall not: (a) be liable for any act or omission of any prior lessor or with respect to events occurring prior to acquisition of ownership; (b) be subject to any offsets or defenses which Lessee might have against any prior lessor, (c) be bound by prepayment of more than one month's rent, or (d) be liable for the return of any security deposit paid to any prior lessor which was not paid or credited to such new owner.

30.3 **Non-Disturbance.** With respect to Security Devices entered into by Lessor after the execution of this Lease, Lessee's subordination of this Lease shall be subject to receiving a commercially reasonable non-disturbance agreement (a **"Non-Disturbance Agreement"**) from the Lender which Non-Disturbance Agreement provides that Lessee's possession of the Premises, and this Lease, including any options to extend the term hereof, will not be disturbed so long as Lessee is not in Breach hereof and attorns to the record owner of the Premises. Further, within 60 days after the execution of this Lease, Lessor shall, if requested by Lessee, use its commercially reasonable efforts to obtain a Non-Disturbance Agreement from the holder of any pre-existing Security Device which is secured by the Premises. In the event that Lessor is unable to provide the Non-Disturbance Agreement within said 60 days, then Lessee may, at Lessee's option, directly contact Lender and attempt to negotiate for the execution and delivery of a Non-Disturbance Agreement.

30.4 **Self-Executing.** The agreements contained in this Paragraph 30 shall be effective without the execution of any further documents; provided, however, that, upon written request from Lessor or a Lender in connection with a sale, financing or refinancing of the Premises, Lessee and Lessor shall execute such further writings as may be reasonably required to separately document any subordination, attornment and/or Non-Disturbance Agreement provided for herein.

31. **Attorneys' Fees.** If any Party or Broker brings an action or proceeding involving the Premises whether founded in tort, contract or equity, or to declare rights hereunder, the Prevailing Party (as hereafter defined) in any such proceeding, action, or appeal thereon, shall be entitled to reasonable attorneys' fees. Such fees may be awarded in the same suit or recovered in a separate suit, whether or not such action or proceeding is pursued to decision or judgment. The term, **"Prevailing Party"** shall include, without limitation, a Party or Broker who substantially obtains or defeats the relief sought, as the case may be, whether by compromise, settlement, judgment, or the abandonment by the other Party or Broker of its claim or defense.

The attorneys' fees award shall not be computed in accordance with any court fee schedule, but shall be such as to fully reimburse all attorneys' fees reasonably incurred. In addition, Lessor shall be entitled to attorneys' fees, costs and expenses incurred in the preparation and service of notices of Default and consultations in connection therewith, whether or not a legal action is subsequently commenced in connection with such Default or resulting Breach ($200 is a reasonable minimum per occurrence for such services and consultation).

32. **Lessor's Access; Showing Premises; Repairs.** Lessor and Lessor's agents shall have the right to enter the Premises at any time, in the case of an emergency, and otherwise at reasonable times after reasonable prior notice for the purpose of showing the same to prospective purchasers, lenders, or tenants, and making such alterations, repairs, improvements or additions to the Premises as Lessor may deem necessary or desirable and the erecting, using and maintaining of utilities, services, pipes and conduits through the Premises and/or other premises as long as there is no material adverse effect to Lessee's use of the Premises. All such activities shall be without abatement of rent or liability to Lessee.

33. **Auctions.** Lessee shall not conduct, nor permit to be conducted, any auction upon the Premises without Lessor's prior written consent. Lessor shall not be obligated to exercise any standard of reasonableness in determining whether to permit an auction.

34. **Signs.** Lessor may place on the Premises ordinary **"For Sale"** signs at any time and ordinary **"For Lease"** signs during the last 6 months of the term hereof. Except for ordinary "for sublease" signs, Lessee shall not place any sign upon the Premises without Lessor's prior written consent. All signs must comply with all Applicable Requirements.

35. **Termination; Merger.** Unless specifically stated otherwise in writing by Lessor, the voluntary or other surrender of this Lease by Lessee, the mutual termination or cancellation hereof, or a termination hereof by Lessor for Breach by Lessee, shall automatically terminate any sublease or lesser estate in the Premises; provided, however, that Lessor may elect to continue any one or all existing subtenancies. Lessor's failure within 10 days following any such event to elect to the contrary by written notice to the holder of any such lesser interest, shall constitute Lessor's election to have such event constitute the termination of such interest.

36. **Consents.** Except as otherwise provided herein, wherever in this Lease the consent of a Party is required to an act by or for the other Party, such consent shall not be unreasonably withheld or delayed. Lessor's actual reasonable costs and expenses (including but not limited to architects', attorneys', engineers' and other consultants' fees) incurred in the consideration of, or response to, a request by Lessee for any Lessor consent, including but not limited to consents to an assignment, a subletting or the presence or use of a Hazardous Substance, shall be paid by Lessee upon receipt of an invoice and supporting documentation therefor. Lessor's consent to any act, assignment or subletting shall not constitute an acknowledgment that no Default or Breach by Lessee of this Lease exists, nor shall such consent be deemed a waiver of any then existing Default or Breach, except as may be otherwise specifically stated in writing by Lessor at the time of such consent. The failure to specify herein any particular condition to Lessor's consent shall not preclude the imposition by Lessor at the time of consent of such further or other conditions as are then reasonable with reference to the particular matter for which consent is being given. In the event that either Party disagrees with any determination made by the other hereunder and reasonably requests the reasons for such determination, the determining party shall furnish its reasons in writing and in reasonable detail within 10 business days following such request.

37. **Guarantor.**

37.1 **Execution.** The Guarantors, if any, shall each execute a guaranty in the form most recently published by the AIR Commercial Real Estate Association, and each such Guarantor shall have the same obligations as Lessee under this Lease.

37.2 **Default.** It shall constitute a Default of the Lessee if any Guarantor fails or refuses, upon request to provide: (a) evidence of the execution of the guaranty, including the authority of the party signing on Guarantor's behalf to obligate Guarantor, and in the case of a corporate Guarantor, a certified copy of a resolution of its board of directors authorizing the making of such guaranty, (b) current financial statements, (c) an Estoppel Certificate, or (d) written confirmation that the guaranty is still in effect.

38. **Quiet Possession.** Subject to payment by Lessee of the Rent and performance of all of the covenants, conditions and provisions on Lessee's part to be observed and performed under this Lease, Lessee shall have quiet possession and quiet enjoyment of the Premises during the term hereof.

39. **Options.** If Lessee is granted any Option, as defined below, then the following provisions shall apply:

39.1 **Definition. "Option"** shall mean: (a) the right to extend or reduce the term of or renew this Lease or to extend or reduce the term of or renew any lease that Lessee has on other property of Lessor; (b) the right of first refusal or first offer to lease either the Premises or other property of Lessor; (c) the right to purchase, the right of first offer to purchase or the right of first refusal to purchase the Premises or other property of Lessor.

39.2 **Options Personal To Original Lessee.** Any Option granted to Lessee in this Lease is personal to the original Lessee, and cannot be assigned or exercised by anyone other than said original Lessee and only while the original Lessee is in full possession of the Premises and, if requested by Lessor, with Lessee certifying that Lessee has no intention of thereafter assigning or subletting.

39.3 **Multiple Options.** In the event that Lessee has any multiple Options to extend or renew this Lease, a later Option cannot be exercised unless the prior Options have been validly exercised.

39.4 **Effect of Default on Options.**

(a) Lessee shall have no right to exercise an Option: (i) during the period commencing with the giving of any notice of Default and continuing until said Default is cured, (ii) during the period of time any Rent is unpaid (without regard to whether notice thereof is given Lessee), (iii) during the time Lessee is in Breach of this Lease, or (iv) in the event that Lessee has been given 3 or more notices of separate Default, whether or not the Defaults are cured, during the 12 month period immediately preceding the exercise of the Option.

(b) The period of time within which an Option may be exercised shall not be extended or enlarged by reason of Lessee's inability to exercise an Option because of the provisions of Paragraph 39.4(a).

(c) An Option shall terminate and be of no further force or effect, notwithstanding Lessee's due and timely exercise of the Option, if, after such exercise and prior to the commencement of the extended term or completion of the purchase, (i) Lessee fails to pay Rent for a period of 30 days after such Rent becomes due (without any necessity of Lessor to give notice thereof), or (ii) if Lessee commits a Breach of this Lease.

40. **Multiple Buildings.** If the Premises are a part of a group of buildings controlled by Lessor, Lessee agrees that it will abide by and conform to all reasonable rules and regulations which Lessor may make from time to time for the management, safety, and care of said properties, including the care and cleanliness of the grounds and including the parking, loading and unloading of vehicles, and to cause its employees, suppliers, shippers, customers, contractors and invitees to so abide and conform. Lessee also agrees to pay its fair share of common expenses incurred in connection with such rules and regulations.

41. **Security Measures.** Lessee hereby acknowledges that the Rent payable to Lessor hereunder does not include the cost of guard service or other security measures, and that Lessor shall have no obligation whatsoever to provide same. Lessee assumes all responsibility for the protection of the Premises, Lessee, its agents and invitees and their property from the acts of third parties.

42. **Reservations.** Lessor reserves to itself the right, from time to time, to grant, without the consent or joinder of Lessee, such easements, rights and dedications that Lessor deems necessary, and to cause the recordation of parcel maps and restrictions, so long as such easements, rights, dedications, maps and restrictions do not unreasonably interfere with the use of the Premises by Lessee. Lessee agrees to sign any documents reasonably requested by Lessor to effectuate any such easement rights, dedication, map or restrictions.

43. **Performance Under Protest.** If at any time a dispute shall arise as to any amount or sum of money to be paid by one Party to the other under the provisions hereof, the Party against whom the obligation to pay the money is asserted shall have the right to make payment "under protest" and such payment shall not be regarded as a voluntary payment and there shall survive the right on the part of said Party to institute suit for recovery of such sum. If it shall be adjudged that there was no legal obligation on the part of said Party to pay such sum or any part thereof, said Party shall be entitled to recover such sum or so much thereof as it was not legally required to pay. A Party who does not initiate suit for the recovery of sums paid "under protest" with 6 months shall be deemed to have waived its right to protest such payment.

44. **Authority; Multiple Parties; Execution.**

(a) If either Party hereto is a corporation, trust, limited liability company, partnership, or similar entity, each individual executing this Lease on behalf of such entity represents and warrants that he or she is duly authorized to execute and deliver this Lease on its behalf. Each Party shall, within 30 days after request, deliver to the other Party satisfactory evidence of such authority.

(b) If this Lease is executed by more than one person or entity as "Lessee", each such person or entity shall be jointly and severally liable hereunder. It is agreed that any one of the named Lessees shall be empowered to execute any amendment to this Lease, or other document ancillary thereto and bind all of the named Lessees, and Lessor may rely on the same as if all of the named Lessees had executed such document.

(c) This Lease may be executed by the Parties in counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument.

45. **Conflict.** Any conflict between the printed provisions of this Lease and typewritten or handwritten provisions shall be controlled by the typewritten or handwritten provisions.

46. **Offer.** Preparation of this Lease by either Party or their agent and submission of same to the other Party shall not be deemed an offer to lease to the other Party. This Lease is not intended to be binding until executed and delivered by all Parties hereto.

47. **Amendments.** This Lease may be modified only in writing, signed by the Parties in interest at the time of the modification. As long as they do not materially change Lessee's obligations hereunder, Lessee agrees to make such reasonable non-monetary modifications to this Lease as may be reasonably required by a Lender in connection with the obtaining of normal financing or refinancing of the Premises.

48. **Waiver of Jury Trial. THE PARTIES HEREBY WAIVE THEIR RESPECTIVE RIGHTS TO TRIAL BY JURY IN ANY ACTION OR PROCEEDING INVOLVING THE PROPERTY OR ARISING OUT OF THIS AGREEMENT.**

49. **Arbitration of Disputes.** An Addendum requiring the Arbitration of all disputes between the Parties and/or Brokers arising out of this Lease **is is not** attached to this Lease.

50. **Accessibility; Americans with Disabilities Act.**

(a) The Premises: have not undergone an inspection by a Certified Access Specialist (CASp). have undergone an inspection by a Certified Access Specialist (CASp) and it was determined that the Premises met all applicable construction-related accessibility standards pursuant to California Civil Code §55.51 et seq. have undergone an inspection by a Certified Access Specialist (CASp) and it was determined that the Premises did not meet all applicable construction-related accessibility standards pursuant to California Civil Code §55.51 et seq.

(b) Since compliance with the Americans with Disabilities Act (ADA) is dependent upon Lessee's specific use of the Premises, Lessor makes no warranty or representation as to whether or not the Premises comply with ADA or any similar legislation. In the event that Lessee's use of the Premises requires modifications or additions to the Premises in order to be in ADA compliance, Lessee agrees to make any such necessary modifications and/or additions at Lessee's expense.

LESSOR AND LESSEE HAVE CAREFULLY READ AND REVIEWED THIS LEASE AND EACH TERM AND PROVISION CONTAINED HEREIN, AND BY THE EXECUTION OF THIS LEASE SHOW THEIR INFORMED AND VOLUNTARY CONSENT THERETO. THE PARTIES HEREBY AGREE THAT, AT THE TIME THIS LEASE IS EXECUTED, THE TERMS OF THIS LEASE ARE COMMERCIALLY REASONABLE AND EFFECTUATE THE INTENT AND PURPOSE OF LESSOR AND LESSEE WITH RESPECT TO THE PREMISES.

ATTENTION: NO REPRESENTATION OR RECOMMENDATION IS MADE BY THE AIR COMMERCIAL REAL ESTATE ASSOCIATION OR BY ANY BROKER AS TO THE LEGAL SUFFICIENCY, LEGAL EFFECT, OR TAX CONSEQUENCES OF THIS LEASE OR THE TRANSACTION TO WHICH IT RELATES. THE PARTIES ARE URGED TO:

1. SEEK ADVICE OF COUNSEL AS TO THE LEGAL AND TAX CONSEQUENCES OF THIS LEASE.

2. RETAIN APPROPRIATE CONSULTANTS TO REVIEW AND INVESTIGATE THE CONDITION OF THE PREMISES. SAID INVESTIGATION SHOULD INCLUDE BUT NOT BE LIMITED TO: THE POSSIBLE PRESENCE OF HAZARDOUS SUBSTANCES, THE ZONING OF THE PREMISES, THE STRUCTURAL INTEGRITY, THE CONDITION OF THE ROOF AND OPERATING SYSTEMS, AND THE SUITABILITY OF THE PREMISES FOR LESSEE'S INTENDED USE.

The parties hereto have executed this Lease at the place and on the dates specified above their respective signatures.

Executed at: Feb. 28, 2016 On: /s/ Soheil Shams **By Lessor**: TESA Beach, LLC Name Printed: Soheil Shams, PhD Title: Owner Address: Telephone:( ) Facsimile:( ) Email: Federal ID No.	Executed at: Feb. 28, 2016 On: /s/ Soheil Shams By **LESSEE:** BioDiscovery, Inc. Name Printed: Soheil Shams, PhD Title: President Address: 715 N. Douglas St. El Segundo, CA 90245 Telephone:( ) Facsimile:( ) Email: Federal ID No.

Rent Adjustment(s)

Standard Lease Addendum

Dated March 1, 2016

By and Between (Lessor) Tesa Beach, LLC

(Lessee) BioDiscovery, Inc.

Address of the Premises: 715 N. Douglas Street, El Segundo CA 90245

Paragraph 51

A. Rent Adjustments:

The base rent shall be increased yearly by 2.5% starting the March 1, 2021

FIFTH AMENDMENT

THIS FIFTH AMENDMENT (the "**Amendment**") is made and entered into as of January 12, 2022, by and between **IRVINE EASTGATE OFFICE I LLC,** a Delaware limited liability company, hereafter called "**Landlord**," and **BIONANO GENOMICS, INC.**, a Delaware corporation, hereafter called "**Tenant**."

RECITALS

A. Landlord (as successor in interest to The Irvine Company LLC) and Tenant are parties to that certain lease dated January 16, 2012, which lease has been previously amended by a First Amendment to Lease dated September 10, 2013, a Second Amendment dated July 1, 2015, a Third Amendment dated December 19, 2019 ("**Third Amendment**") and a Fourth Amendment dated February 15, 2021 (collectively, the "**Lease**"). Pursuant to the Lease, Landlord has leased to Tenant space currently containing approximately 35,823 rentable square feet (the "**Original Premises**") described as Suites 100 and 155 on the 1st floor of the building located at 9540 Towne Centre Drive, San Diego, California (the "**9540 Building**") and Suite 100 on the first floor of the building located at 9640 Towne Centre Drive, San Diego, California (the "**9640 Building**").

B. Tenant has requested that additional space containing approximately 5,278 rentable square feet (the "**Suite 150 Expansion Space**") on the first floor of the 9540 Building as shown on **Exhibit A** (attached hereto) be added to the Original Premises and that the Lease be appropriately amended and Landlord is willing to do the same on the following terms and conditions.

NOW, THEREFORE, in consideration of the above recitals which by this reference are incorporated herein, the mutual covenants and conditions contained herein and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

I. **Suite 150 Expansion and Effective Date.**

A. The Term for the Suite 150 Expansion Space shall commence on January 17, 2022 ("**Suite 150 Expansion Effective Date**"). Effective as of the Suite 150 Expansion Effective Date, the Premises, as defined in the Lease, shall be increased from 35,823 rentable square feet consisting of 19,216 rentable square feet in Suites 100 and 155 of the 9540 Building and 16,607 rentable square feet in Suite 100 of the 9640 Building to **41,101** rentable square feet by the addition of the Suite 150 Expansion Space.

B. Delay in Possession. If Landlord, for any reason whatsoever, cannot deliver possession of Suite 150 Expansion Space to Tenant on or before the Suite 150 Expansion Effective Date set forth in Section I.A above, this Amendment shall not be void or voidable nor shall Landlord be liable to Tenant for any resulting loss or damage. However, Tenant shall not be liable for any rent for the Suite 150 Expansion Space and the Suite 150 Expansion Effective Date shall not occur until Landlord delivers possession of the Suite 150 Expansion Space and the Suite 150 Expansion Space is in fact ready for occupancy as defined below, except that if Landlord's failure to so deliver possession is attributable to any action or inaction by Tenant (including without limitation any Tenant Delay described in the Work Letter, if any, attached to this Amendment), then the Suite 150 Expansion Space shall be deemed ready for occupancy, and Landlord shall be entitled to full performance by Tenant (including the payment of rent), as of the date Landlord would have been able to deliver the Suite 150 Expansion Space to Tenant but for Tenant's delay(s). Subject to the foregoing, the Suite 150 Expansion Space shall be deemed ready for occupancy if and when Landlord, to the extent applicable, (a) has put into operation all building services essential for the use of the Suite 150 Expansion Space by Tenant, (b) has provided reasonable access to the Suite 150 Expansion Space for Tenant so that it may be used without unnecessary interference, and (c) Landlord and Tenant agree that Landlord shall use commercially reasonable efforts to complete all work required to be done by Landlord in this Amendment by the Suite 150 Expansion Effective Date.

II. **Basic Rent.** In addition to Tenant's obligation to pay Basic Rent for the Original Premises, Tenant shall pay Landlord Basic Rent for the Suite 150 Expansion Space as follows:

Months of Term or Period	Monthly Rate Per Square Foot	Monthly Basic Rent
1 to 12	**$**3.00	**$**15,834.00
13 to 24	**$**3.14	**$**16,572.92
25 to 36	**$**3.28	**$**17,311.84
37 to 48	**$**3.43	**$**18,103.54

Notwithstanding the above schedule of Basic Rent to the contrary, as long as Tenant is not in Default (as defined in Section 14.1) under the Lease, Tenant shall be entitled to an abatement of 3 full calendar months of Basic Rent in the aggregate amount of $47,502.00 (i.e. $15,834.00 per month) (the "**Abated Basic Rent**") for the first 3 full calendar months following the Suite 150 Expansion Effective Date (the "**Abatement Period**"). In the event Tenant Defaults at any time during the Term, all Abated Basic Rent shall immediately become due and payable. The payment by Tenant of the Abated Basic Rent in the event of a Default shall not limit or affect any of Landlord's other rights, pursuant to this Lease or at law or in equity. Only Basic Rent shall be abated during the Abatement Period and all other additional rent and other costs and charges

specified in this Lease shall remain as due and payable pursuant to the provisions of this Lease. All such Basic Rent shall be payable by Tenant in accordance with the terms of the Lease.

III. **Project Costs and Property Taxes**. For the period commencing on the Suite 150 Expansion Effective Date and ending on the Expiration Date, Tenant shall be obligated to pay Tenant's Share of Project Costs and Property Taxes accruing in connection with the Suite 150 Expansion Space in accordance with the terms of the Lease.

IV. **Additional Security Deposit**. Concurrently with Tenant's delivery of this Amendment, Tenant shall deliver the sum of $19,914.00 to Landlord, which sum shall be added to the Security Deposit presently being held by Landlord in accordance with Section 4.3 of the Lease. Accordingly, the Security Deposit is increased from $88,236.00 to $108,150.00.

V. **Improvements to Suite 150 Expansion Space**.

A. Condition of Suite 150 Expansion Space. Tenant has inspected the Suite 150 Expansion Space and agrees to accept the same "as is" without any agreements, representations, understandings or obligations on the part of Landlord to perform any alterations, repairs or improvements, except as may be expressly provided otherwise in this Amendment.

B. Tenant Improvements. Landlord hereby agrees to complete the Tenant Improvements for the Suite 150 Expansion Space in accordance with the provisions of **Exhibit B**, Work Letter, attached hereto.

VI. **Parking.** Notwithstanding any contrary provision in **Exhibit F** to the Lease, "Parking," effective as of the Suite 150 Expansion Effective Date, Landlord shall lease to Tenant, and Tenant shall lease from Landlord, an additional 21 unreserved parking passes free of charge through the Expiration Date. Thereafter, the parking charge shall be at Landlord's scheduled parking rates from time to time. Tenant shall have the right to designate 6 reserved parking spaces adjacent to the 9540 Building entry as reserved for Tenant and Tenant's visitors utilizing signage approved by Landlord.

VII. **SDN List**. Tenant hereby represents and warrants that neither Tenant nor any officer, director, employee, partner, member or other principal of Tenant (collectively, "**Tenant Parties**") is listed as a Specially Designated National and Blocked Person ("**SDN**") on the list of such persons and entities issued by the U.S. Treasury Office of Foreign Assets Control (OFAC). In the event Tenant or any Tenant Party is or becomes listed as an SDN, Tenant shall be deemed in breach of this Lease and Landlord shall have the right to terminate the Lease immediately upon written notice to Tenant.

VIII. **Deleted Provisions.** Section VII.C of the Third Amendment entitled "Right of First Refusal" is hereby deleted in its entirety and of no further force or effect.

IX. **GENERAL.**

A. Effect of Amendments. The Lease shall remain in full force and effect except to the extent that it is modified by this Amendment.

B. Entire Agreement. This Amendment embodies the entire understanding between Landlord and Tenant and can be changed only by a writing signed by Landlord and Tenant. There have been no additional oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any rent abatement, improvement allowance, leasehold improvements, or any similar economic incentives that may have been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment.

C. Counterparts; Digital Signatures. If this Amendment is executed in counterparts, each is hereby declared to be an original; all, however, shall constitute but one and the same amendment. In any action or proceeding, any photographic, photostatic, or other copy of this Amendment may be introduced into evidence without foundation. The parties agree to accept a digital image (including but not limited to an image in the form of a PDF, JPEG, GIF file, or other e-signature) of this Amendment, if applicable, reflecting the execution of one or both of the parties, as a true and correct original.

D. Defined Terms. All words commencing with initial capital letters in this Amendment and defined in the Lease shall have the same meaning in this Amendment as in the Lease, unless they are otherwise defined in this Amendment.

E. Authority. If Tenant is a corporation, limited liability company or partnership, or is comprised of any of them, each individual executing this Amendment for the corporation, limited liability company or partnership represents that he or she is duly authorized to execute and deliver this Amendment on behalf of such entity and that this Amendment is binding upon such entity in accordance with its terms.

F. California Certified Access Specialist Inspection. Pursuant to California Civil Code § 1938, Landlord hereby states that the Premises have not undergone inspection by a Certified Access Specialist (CASp) (defined in California Civil Code § 55.52(a)(3)). Pursuant to Section 1938 of the California Civil Code, Landlord hereby provides the following notification to Tenant: "A Certified Access Specialist (CASp) can inspect the subject premises and determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of the CASp inspection, the payment of the fee for the CASp

inspection, and the cost of making any repairs necessary to correct violations of construction related accessibility standards within the premises."

G. Attorneys' Fees. The provisions of the Lease respecting payment of attorneys' fees shall also apply to this Amendment.

H. Brokers. Article 18 of the Lease is amended to provide that the parties recognize the following parties as the brokers who negotiated this Amendment, and agree that Landlord shall be responsible for payment of brokerage commissions to such brokers pursuant to its separate agreements with such brokers: Irvine Management Company ("**Landlord's Broker**") is the agent of Landlord exclusively and Hughes Marino, Inc. / San Diego, ("**Tenant's Broker**") is the agent of Tenant exclusively. By the execution of this Amendment, each of Landlord and Tenant hereby acknowledge and confirm (a) receipt of a copy of a Disclosure Regarding Real Estate Agency Relationship conforming to the requirements of California Civil Code 2079.16, and (b) the agency relationships specified herein, which acknowledgement and confirmation is expressly made for the benefit of Tenant's Broker. If there is no Tenant's Broker so identified herein, then such acknowledgement and confirmation is expressly made for the benefit of Landlord's Broker. By the execution of this Amendment, Landlord and Tenant are executing the confirmation of the agency relationships set forth herein. The warranty and indemnity provisions of Article 18 of the Lease, as amended hereby, shall be binding and enforceable in connection with the negotiation of this Amendment.

I. Execution of Amendment. Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Landlord shall not be bound by this Amendment until Landlord has executed and delivered the same to Tenant.

J. Nondisclosure of Terms. Tenant agrees that neither Tenant nor its agents or any other parties acting on behalf of Tenant shall disclose any matters set forth in this Amendment or disseminate or distribute any information concerning the terms, details or conditions hereof to any person, firm or entity without obtaining the express written consent of Landlord.

[SIGNATURES ON FOLLOWING PAGE]

IN WITNESS WHEREOF, Landlord and Tenant have duly executed this Amendment as of the day and year first above written.

LANDLORD:

IRVINE EASTGATE OFFICE I LLC,
a Delaware limited liability company

By: /s/ Steven M. Case

Steven M. Case
Executive Vice President, Leasing & Marketing
Office Properties

By: /s/ Christopher Gash

Christopher Gash
Vice President, Operations
Office Properties

TENANT:

BIONANO GENOMICS, INC.,
a Delaware corporation

By: /s/ Erik Holmlin

Erik Holmlin
CEO

By: /s/ Mark Oldakowski

Mark Oldakowski
COO

EXHIBIT A

OUTLINE AND LOCATION OF SUITE 150 EXPANSION SPACE

9540 Towne Centre Drive
Suite 150

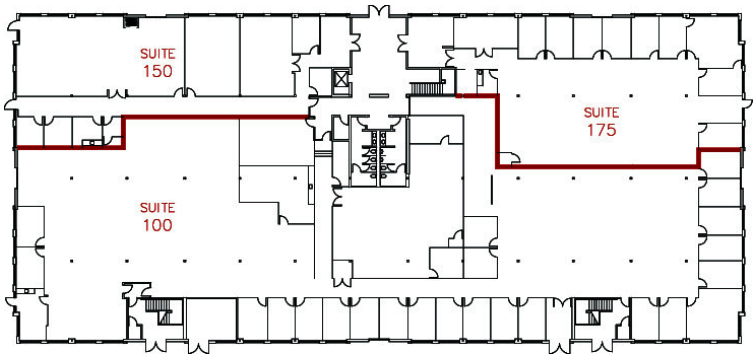

EXHIBIT B

WORK LETTER

DOLLAR ALLOWANCE
[SECOND GENERATION SPACE]

As used in this Work Letter, the "**Premises**" shall be deemed to refer to the Suite 150 Expansion Space, as defined in the attached Amendment.

The Tenant Improvement work (herein "**Tenant Improvements**") shall consist of any work required to complete the Premises pursuant to plans and specifications approved by both Landlord and Tenant. All of the Tenant Improvement work shall be performed by a contractor engaged by Landlord. Landlord may require that one or more designated subtrades be union contractors. The work shall be undertaken in accordance with the procedures and requirements set forth below. Landlord will endeavor to diligently perform the construction of the Tenant Improvements.

I. ARCHITECTURAL AND CONSTRUCTION PROCEDURES

A. Tenant has approved, or shall approve within the time period set forth below, a detailed space plan for the Premises, prepared by the architect engaged by Landlord for the work described herein ("**Landlord's Architect**"), which includes interior partitions, ceilings, interior finishes, interior office doors, suite entrance, floor coverings, window coverings, lighting, electrical and telephone outlets, plumbing connections, heavy floor loads and other special requirements ("**Preliminary Plan**"), and (ii) an estimate, prepared by the contractor engaged by Landlord for the work herein ("**Landlord's Contractor**"), of the cost for which Landlord will complete or cause to be completed the Tenant Improvements ("**Preliminary Cost Estimate**"). To the extent applicable, the Preliminary Plan shall include Landlord's building standard tenant improvements, materials and specifications for the Project. Tenant shall approve or disapprove the Preliminary Plan by signing and delivering same to Landlord within 3 business days of its receipt by Tenant. If Tenant disapproves any matter, Tenant shall specify in detail the reasons for disapproval and Landlord shall attempt to modify the Preliminary Plan to incorporate Tenant's suggested revisions in a mutually satisfactory manner; provided that in no event shall Tenant have the right to request changes or additions to the Preliminary Plan for the purpose of utilizing any unused portion of the Landlord Contribution (as defined below). Notwithstanding the foregoing, however, Tenant shall approve in all respects a Preliminary Plan not later than March 21, 2022 ("**Plan Approval Date**"), it being understood that Tenant's failure to do so shall constitute a "Tenant Delay" for purposes of this Amendment.

B. On or before the Plan Approval Date, Tenant shall provide in writing to Landlord or Landlord's Architect all specifications and information requested by Landlord for the preparation of final construction documents and costing, including without limitation Tenant's final selection of wall and floor finishes, complete specifications and locations (including load and HVAC requirements) of Tenant's equipment, and details of all other non-building standard improvements to be installed in the Premises (collectively, "**Programming Information**"). Tenant's failure to provide the Programming Information by the Plan Approval Date shall constitute a Tenant Delay for purposes of this Amendment. Tenant understands that final construction documents for the Tenant Improvements shall be predicated on the Programming Information, and accordingly that such information must be accurate and complete.

C. Upon Tenant's approval of the Preliminary Plan and Preliminary Cost Estimate and delivery of the complete Programming Information, Landlord's Architect and engineers shall prepare and deliver to the parties working drawings and specifications ("**Working Drawings and Specifications**"), and Landlord's Contractor shall prepare a final construction cost estimate ("**Final Cost Estimate**") for the Tenant Improvements in conformity with the Working Drawings and Specifications. Tenant shall have 3 business days from the receipt thereof to approve or disapprove the Working Drawings and Specifications and the Final Cost Estimate, and any disapproval or requested modification shall be limited to items not contained in the approved Preliminary Plan or Preliminary Cost Estimate; provided that in no event shall Tenant have the right to request changes or additions to the Working Drawings and Specifications for the purpose of utilizing any unused portion of the Landlord Contribution. In no event shall Tenant disapprove the Final Cost Estimate if it does not exceed the approved Preliminary Cost Estimate. Should Tenant disapprove the Working Drawings and Specifications and the Final Cost Estimate, such disapproval shall be accompanied by a detailed list of revisions. Any revision requested by Tenant and accepted by Landlord shall be incorporated by Landlord's Architect into a revised set of Working Drawings and Specifications and Final Cost Estimate, and Tenant shall approve same in writing within 3 business days of receipt without further revision. Tenant's failure to comply in a timely manner with any of the requirements of this paragraph shall constitute a Tenant Delay.

D. It is understood that the Preliminary Plan and the Working Drawings and Specifications, together with any Changes thereto, shall be subject to the prior approval of Landlord. Landlord shall identify any disapproved items within 3 business days (or 2 business days in the case of Changes) after receipt of the applicable document. Should Landlord approve work that would necessitate any ancillary Building modification or other expenditure by Landlord, then except to the extent of any remaining balance of the "Landlord Contribution" as described below, Tenant shall, in addition to its other obligations herein, promptly fund the cost thereof to Landlord.

E. In the event that Tenant requests in writing a revision in the approved Working Drawings and Specifications ("**Change**"), then provided such Change is acceptable to Landlord, Landlord shall advise Tenant by written change order as soon as is practical of any

increase in the Completion Cost and/or any Tenant Delay such Change would cause. Tenant shall approve or disapprove such change order in writing within 2 business days following its receipt from Landlord. Tenant's approval of a Change shall be accompanied by Tenant's payment of any resulting increase in the Completion Cost regardless of any unutilized portion of the Landlord Contribution. It is understood that Landlord shall have no obligation to interrupt or modify the Tenant Improvement work pending Tenant's approval of a change order.

F. Notwithstanding any provision in the Lease to the contrary, if Tenant fails to comply with any of the time periods specified in this Work Letter, fails otherwise to approve or reasonably disapprove any submittal within 3 business days, fails to approve in writing the Preliminary Plan by the Plan Approval Date, fails to provide all of the Programming Information requested by Landlord by the Plan Approval Date, fails to approve in writing the Working Drawings and Specifications within the time provided herein, requests any Changes, fails to make timely payment of any sum due hereunder, furnishes inaccurate or erroneous specifications or other information, or otherwise delays in any manner the completion of the Tenant Improvements (including without limitation by specifying materials that are not readily available) or the issuance of an occupancy certificate (any of the foregoing being referred to in this Amendment as "**Tenant Delay**"), then Tenant shall bear any resulting additional construction cost or other expenses.

G. Landlord shall permit Tenant and its agents to enter the Premises prior to the Suite 150 Expansion Effective Date in order that Tenant may perform any work to be performed by Tenant hereunder through its own contractors, subject to Landlord's prior written approval, and in a manner and upon terms and conditions and at times satisfactory to Landlord's representative. The foregoing license to enter the Premises prior to the Suite 150 Expansion Effective Date is, however, conditioned upon Tenant's contractors and their subcontractors and employees working in harmony and not interfering with the work being performed by Landlord. If at any time that entry shall cause disharmony or interfere with the work being performed by Landlord, this license may be withdrawn by Landlord upon 24 hours written notice to Tenant. That license is further conditioned upon the compliance by Tenant's contractors with all requirements imposed by Landlord on third party contractors and subcontractors, including without limitation the maintenance by Tenant and its contractors and subcontractors of workers' compensation and public liability and property damage insurance in amounts and with companies and on forms satisfactory to Landlord, with certificates of such insurance being furnished to Landlord prior to proceeding with any such entry. The entry shall be deemed to be under all of the provisions of the Lease except as to the covenants to pay Rent unless Tenant commences business activities within the Premises. Landlord shall not be liable in any way for any injury, loss or damage which may occur to any such work being performed by Tenant, the same being solely at Tenant's risk. In no event shall the failure of Tenant's contractors to complete any work in the Suite 150 Suite 150 Expansion Space extend the Suite 150 Expansion Effective Date.

I. Tenant hereby designates Dave Mas, Telephone No. (610) 764-5848, as its representative, agent and attorney-in-fact for the purpose of receiving notices, approving submittals and issuing requests for Changes, and Landlord shall be entitled to rely upon authorizations and directives of such person(s) as if given directly by Tenant. Tenant may amend the designation of its construction representative(s) at any time upon delivery of written notice to Landlord.

II. COST OF TENANT IMPROVEMENTS

A. Landlord shall complete, or cause to be completed, the Tenant Improvements, at the construction cost shown in the Final Cost Estimate (subject to the provisions of this Work Letter), in accordance with final Working Drawings and Specifications approved by both Landlord and Tenant. Landlord shall pay towards the final construction costs ("**Completion Cost**") as incurred a maximum of $142,506.00 ("**Landlord Contribution**"), based on $27.00 per usable square foot of the Premises, and Tenant shall be fully responsible for the remainder ("**Tenant Contribution**"). If the actual cost of completion of the Tenant Improvements is less than the maximum amount provided for the Landlord Contribution, such savings shall inure to the benefit of Landlord and Tenant shall not be entitled to any credit or payment or to apply the savings toward additional work.

B. The Completion Cost shall include all direct costs of Landlord in completing the Tenant Improvements, including but not limited to the following: (i) payments made to architects, engineers, contractors, subcontractors and other third party consultants in the performance of the work, (ii) permit fees and other sums paid to governmental agencies, (iii) costs of all materials incorporated into the work or used in connection with the work (excluding any furniture, fixtures and equipment relating to the Premises), and (iv) keying and signage costs. The Completion Cost shall also include an administrative/supervision fee to be paid to Landlord in the amount of 3% of all such direct costs.

C. Prior to start of construction of the Tenant Improvements, Tenant shall pay to Landlord the amount of the Tenant Contribution set forth in the approved Final Cost Estimate. In addition, if the actual Completion Cost of the Tenant Improvements is greater than the Final Cost Estimate because of modifications or extras requested by Tenant and not reflected on the approved working drawings, or because of Tenant Delays, then notwithstanding any unused portion of the Landlord Contribution, Tenant shall pay to Landlord, within 10 days following submission of an invoice therefor, all such additional costs, including any additional architectural fee. If Tenant defaults in the payment of any sums due under this Work Letter, Landlord shall (in addition to all other remedies) have the same rights as in the case of Tenant's failure to pay rent under the Lease.

Exhibit 21.1

Subsidiaries of Bionano Genomics, Inc.

Bionano Genomics UK, Ltd., a private limited company organized under the laws of the United Kingdom

Bionano Genomics (Shanghai) Trading Co., Ltd., a private limited company organized under the laws of the China

BioDiscovery, LLC, a California limited liability company

Lineagen, Inc., a Delaware corporation

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statements on Form S-3 (File Nos. 333-237070, 333-239360, 333-245762, 333-251956 and 333-252216) and Form S-8 (Nos. 333-227073, 333-230589, 333-237069, 333-245764, 333-248468, 333-254654 and 333-260762) of Bionano Genomics, Inc. (the "Company") of our reports dated March 1, 2022, relating to the consolidated financial statements, and the effectiveness of the Company's internal controls over financial reporting, which appear in this Annual Report on Form 10-K.

/s/ BDO USA, LLP

San Diego, California
March 1, 2022

Exhibit 31.1

CERTIFICATION

I, R. Erik Holmlin, certify that:

1. I have reviewed this Annual Report on Form 10-K of Bionano Genomics, Inc., a Delaware corporation (the "registrant");
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2022

/s/ R. Erik Holmlin, Ph.D.
R. Erik Holmlin, Ph.D.
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Christopher Stewart, certify that:

1. I have reviewed this Annual Report on Form 10-K of Bionano Genomics, Inc., a Delaware corporation (the "registrant");
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2022

/s/ Christopher Stewart
Christopher Stewart
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 32.1

CERTIFICATION

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, R. Erik Holmlin, Chief Executive Officer of Bionano Genomics, Inc., a Delaware corporation (the "Company"), hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Annual Report"), and to which this Certification is attached as Exhibit 32.1, fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

2. The information contained in the Annual Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2022

/s/ R. Erik Holmlin, Ph.D.
R. Erik Holmlin, Ph.D.

President and Chief Executive Officer
(Principal Executive Officer)

This certification accompanies and is being "furnished" with this Annual Report, shall not be deemed "filed" by the Company for purposes of Section 18 of the Exchange Act, or otherwise subject to liability under that Section and shall not be deemed to be incorporated by reference into any filing of the Company 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, irrespective of any general incorporation language contained in such filing.

Exhibit 32.2

CERTIFICATION

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, Christopher Stewart, Chief Financial Officer of Bionano Genomics, Inc., a Delaware corporation (the "Company"), hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Annual Report"), and to which this Certification is attached as Exhibit 32.2, fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

2. The information contained in the Annual Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2022

/s/ Christopher Stewart
Christopher Stewart
Chief Financial Officer
(Principal Financial and Accounting Officer)

This certification accompanies and is being "furnished" with this Annual Report, shall not be deemed "filed" by the Company for purposes of Section 18 of the Exchange Act, or otherwise subject to liability under that Section and shall not be deemed to be incorporated by reference into any filing of the Company 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, irrespective of any general incorporation language contained in such filing.