UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

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

FOR THE QUARTERLY PERIOD ENDED JUNE 30, 2019

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

FOR THE TRANSITION PERIOD FROM TO

Commission file number: 001-38613

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)

(858) 888-7600

(Registrant’s Telephone Number, Including Area Code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.0001 par value per share	BNGO	The Nasdaq Stock Market, LLC
Warrants to purchase Common Stock	BNGOW	The Nasdaq Stock Market, LLC

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes 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, 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	x
		Emerging growth company	x

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 registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No x

As of July 31, 2019, the registrant had 10,897,522 shares of Common Stock ($0.0001 par value) outstanding.

BIONANO GENOMICS, INC.
TABLE OF CONTENTS

PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

BIONANO GENOMICS, INC.
Condensed Consolidated Balance Sheets (Unaudited)

	June 30, 2019	December 31, 2018
Assets		
Current assets:		
Cash and cash equivalents	$ 15,294,526	$ 16,522,729
Accounts receivable, net	4,983,510	4,514,333
Inventory	3,022,090	1,068,557
Prepaid expenses and other current assets	631,853	919,500
Total current assets	23,931,979	23,025,119
Property and equipment, net	1,278,889	1,777,302
Total assets	$ 25,210,868	$ 24,802,421
Liabilities and stockholders' equity (deficit)		
Current liabilities:		
Accounts payable	$ 3,617,836	$ 1,351,736
Accrued expenses	2,702,015	2,900,129
Deferred revenue	421,342	270,998
Line of credit	799,815	—
Total current liabilities	7,541,008	4,522,863
Long-term debt	18,621,696	9,029,374
Long-term deferred revenue	219,202	304,467
Other non-current liabilities	173,772	808,366
Total liabilities	26,555,678	14,665,070
Commitments and contingencies (Note 9)		
Stockholders' equity (deficit):		
Common stock, $0.0001 par value, 200,000,000 and 200,000,000 shares authorized at June 30, 2019 and December 31, 2018, respectively; 10,897,522 and 10,055,072 shares issued and outstanding at June 30, 2019 and December 31, 2018, respectively	1,088	1,004
Additional paid-in capital	86,932,839	82,898,775
Accumulated deficit	(88,278,737)	(72,762,428)
Total stockholders' equity (deficit)	(1,344,810)	10,137,351
Total liabilities and stockholders' equity (deficit)	$ 25,210,868	$ 24,802,421

See accompanying notes to the condensed consolidated financial statements

BIONANO GENOMICS, INC.
Condensed Consolidated Statements of Operations
(Unaudited)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
Revenue:				
Product revenue	$ 2,020,398	$ 3,256,023	$ 3,707,984	$ 4,918,245
Other revenue	154,237	133,986	319,397	240,249
Total revenue	2,174,635	3,390,009	4,027,381	5,158,494
Cost of revenue:				
Cost of product revenue	1,525,334	1,803,461	2,644,885	2,644,043
Cost of other revenue	29,912	9,969	57,403	10,836
Total cost of revenue	1,555,246	1,813,430	2,702,288	2,654,879
Operating expense:				
Research and development	2,407,692	2,098,826	4,507,803	4,465,919
Selling, general and administrative	5,056,005	3,489,974	9,846,607	6,385,378
Total operating expense	7,463,697	5,588,800	14,354,410	10,851,297
Loss from operations	(6,844,308)	(4,012,221)	(13,029,317)	(8,347,682)
Other income (expense):				
Interest expense	(565,888)	(407,635)	(838,392)	(709,616)
Change in fair value of preferred stock warrants and expirations	—	1,517,723	—	2,470,921
Loss on debt extinguishment	—	(342,164)	(921,496)	(342,164)
Other expense	(249,884)	(61,673)	(718,132)	(221,015)
Total other income (expense)	(815,772)	706,251	(2,478,020)	1,198,126
Loss before income taxes	(7,660,080)	(3,305,970)	(15,507,337)	(7,149,556)
Provision for income taxes	(4,486)	(5,506)	(8,972)	(9,282)
Net loss	$ (7,664,566)	$ (3,311,476)	$ (15,516,309)	$ (7,158,838)
Net loss per share, basic and diluted	$ (0.71)	$ (0.98)	$ (1.47)	$ (1.37)
Weighted-average common shares outstanding basic and diluted	10,860,055	3,364,128	10,541,563	5,227,448

See accompanying notes to the condensed consolidated financial statements.

Table of Contents

BIONANO GENOMICS, INC.
Condensed Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit) (Unaudited)

	Series A Convertible Preferred Stock		Series B Convertible Preferred Stock		Series B-1 Convertible Preferred Stock		Series C Convertible Preferred Stock		Series D Convertible Preferred Stock		Series D-1 Convertible Preferred Stock		Common Stock		Additional		Total
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Paid-in Capital	Accumulated Deficit	Stockholders' Equity (Deficit)
Balance at January 1, 2018	345,587	$ 61,847	8,058,170	$ 842,845	3,437,950	$ 359,593	23,357,047	$ 5,547,841	20,652,486	$ 4,838,379	66,141,257	$ 31,359,632	77,257	$ 8	$ 4,038,817	$ (54,266,036)	$ (50,227,211)
Stock option exercises	—	—	—	—	—	—	—	—	—	—	—	—	237	—	305	—	305
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	—	—	—	54,444	—	54,444
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(3,847,362)	(3,847,362)
Balance at March 31, 2018	345,587	$ 61,847	8,058,170	$ 842,845	3,437,950	$ 359,593	23,357,047	$ 5,547,841	20,652,486	$ 4,838,379	66,141,257	$ 31,359,632	77,494	$ 8	$ 4,093,566	$ (58,113,398)	$ (54,019,824)
Stock option exercises	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	551	$ —	$ 707	$ —	$ 707
Stock-based compensation expense	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	—	52,982	—	52,982
Net loss	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	—	—	(3,311,476)	(3,311,476)
Balance at June 30, 2018	345,587	$ 61,847	8,058,170	$ 842,845	3,437,950	$ 359,593	23,357,047	$ 5,547,841	20,652,486	$ 4,838,379	66,141,257	$ 31,359,632	78,045	$ 8	$ 4,147,255	$ (61,424,874)	$ (57,277,611)
Balance at January 1, 2019	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	10,055,072	$ 1,004	$ 82,898,775	$ (72,762,428)	$ 10,137,351
Stock option exercises	—	—	—	—	—	—	—	—	—	—	—	—	41,521	4	53,972	—	53,976
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	—	—	—	289,395	—	289,395
Issue common stock	—	—	—	—	—	—	—	—	—	—	—	—	748,427	75	2,409,518	—	2,409,593
Issue warrants for debt	—	—	—	—	—	—	—	—	—	—	—	—	—	—	629,830	—	629,830
Issue stock for debt													—	—	201,789	—	201,789
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(7,851,743)	(7,851,743)
Balance at March 31, 2019	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	10,845,020	$ 1,083	$ 86,483,279	$ (80,614,171)	$ 5,870,191
Stock option exercises	—	—	—	—	—	—	—	—	—	—	—	—	8,526	$ 1	$ 11,083	$ —	$ 11,084
Stock-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	—	—	—	335,666	—	335,666
ESPP Purchases	—	—	—	—	—	—	—	—	—	—	—	—	43,976	4	102,811	—	102,815
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(7,664,566)	(7,664,566)
Balance at June 30, 2019	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	10,897,522 —	$ 1,088 —	$ 86,932,839 —	$ (88,278,737) —	$ (1,344,810)

See accompanying notes to the condensed consolidated financial statements

BIONANO GENOMICS, INC.
Condensed Consolidated Statements of Cash Flows
(Unaudited)

	Six Months Ended June 30,	
	2019	2018
Operating activities:		
Net loss	$ (15,516,309)	$ (7,158,838)
Adjustments to reconcile net loss to net cash used by operating activities:		
Depreciation	536,802	778,555
Change in fair value of preferred stock warrants and expirations	—	(2,470,921)
Interest payment-in-kind	166,524	—
Stock-based compensation	625,061	107,426
Provision for bad debt expense	—	238,000
Accretion of debt discount	128,518	60,655
Loss on debt extinguishment	921,496	342,164
Long-term debt prepayment fees	412,000	—
Employee stock purchase plan compensation	102,815	—
Changes in operating assets and liabilities:		
Accounts receivable	(469,177)	228,009
Inventory	(1,953,533)	(172,578)
Prepaid expenses and other current assets	287,647	(697,361)
Accounts payable	2,257,359	(1,058,391)
Accrued expenses and other liabilities	(367,628)	49,359
Net cash used in operating activities	(12,868,425)	(9,753,921)
Investing activities:		
Purchases of property and equipment	(29,649)	(189,401)
Net cash used in investing activities	(29,649)	(189,401)
Financing activities:		
Repayment of long-term debt	(10,812,000)	(7,447,571)
Proceeds from issuance of long-term debt, net of issuance costs	19,207,403	9,662,430
Proceeds from issuance of convertible note, net of issuance costs	—	14,329,843
Proceeds from borrowing on line of credit	1,105,745	—
Repayments of borrowing from line of credit	(305,930)	—
Proceeds from sale of common stock, net of offering costs	2,409,593	—
Proceeds from option exercises	65,060	1,012
Net cash provided by financing activities	11,669,871	16,545,714
Net (decrease) increase in cash and cash equivalents	(1,228,203)	6,602,392
Cash and cash equivalents at beginning of period	16,522,729	1,021,897
Cash and cash equivalents at end of period	$ 15,294,526	$ 7,624,289
Supplemental schedule on non-cash transactions:		
Property and equipment costs incurred but not paid included in accounts payable and accrued expenses	$ 8,740	$ 130,484
Transfer of instruments from property and equipment into inventory	$ —	$ 106,617
Fair value of warrants issued with debt classified as a liability	$ 629,830	$ 176,813
Fair value of stock issued with debt classified as a liability	$ 201,789	$ —
Final payment due in connection with the repayment of debt classified in other long-term liabilities	$ —	$ 400,000
Deferred equity issuance costs in accounts payable and accrued liabilities	$ —	$ 1,401,350
Debt issuance costs incurred but not paid	$ —	$ 129,474

See accompanying notes to the condensed consolidated financial statements

BIONANO GENOMICS, INC.
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

1. Organization and Basis of Presentation

Description of Business

Bionano Genomics, Inc. (the "Company") formed in January 2003 as BioNanomatrix LLC, a Delaware limited liability company. In August 2007, the Company became BioNanomatrix Inc., a Delaware corporation. In October 2011, the Company changed its name to BioNano Genomics, Inc., and in July 2018, it changed its name to Bionano Genomics, Inc.

The Company is a life sciences instrumentation company in the genome analysis space. The Company currently develops and markets the Saphyr system, a platform for ultra-sensitive and ultra-specific structural variation detection that enables researchers and clinicians to accelerate the search for new diagnostics and therapeutic targets and to streamline the study of changes in chromosomes, which is known as cytogenetics.

Initial Public Offering

In August 2018, the Company completed its initial public offering (the "IPO"), in which it sold an aggregate of 3,864,000 units (each unit consisting of one share of the Company's common stock and one warrant to purchase one share of the Company's common stock) at a public offering price of $6.125 per unit, which included the sale of 504,000 units pursuant to the exercise of the underwriters' over-allotment option. The Company received net cash proceeds of $19.4 million, after deducting underwriters' discounts and commissions of $2.2 million and other offering expenses of $2.1 million.

In addition, each of the following occurred in connection with the completion of the IPO in August 2018:

- The conversion of all outstanding shares of convertible preferred stock into an aggregate 2,850,280 shares of common stock.
- The automatic adjustment of preferred stock warrants into common stock warrants; the entire $84,676 balance of preferred stock warrant liability was reclassified as additional paid-in-capital. In addition, the Company issued warrants to the IPO underwriters to purchase up to 115,920 shares of its common stock at fair value of $0.4 million.
- The conversion of an aggregate of $14.9 million of outstanding convertible promissory notes and accrued interest into an aggregate of 3,239,294 shares of common stock.

Each unit offered in the IPO consisted of one share of common stock and one warrant to purchase one share common stock. Each warrant to purchase common stock contained in the unit entitled the holder to purchase one share of common stock at an initial exercise price of $6.125 per share (100% of the offering price per unit), subject to adjustment. The warrants and shares of common stock traded together as units for 30 days following the IPO. After 30 days of trading, the units automatically separated and the common stock and warrants began trading separately.

Reverse Stock Splits

On July 16, 2018, the Company effected a one-for-21.4 reverse stock split of its issued and outstanding shares of common stock and a proportional adjustment to the existing conversion ratios for each series of the Company's redeemable convertible preferred stock, and on August 15, 2018, the Company effected an additional one-for-two reverse stock split of its issued and outstanding shares of common stock and a proportional adjustment to the existing conversion ratios for each series of the Company's redeemable convertible preferred stock. Accordingly, all share and per share amounts for all periods presented in the accompanying financial statements and notes thereto have been adjusted retroactively, where applicable, to reflect these reverse stock splits and adjustments of the preferred stock conversion ratios.

Basis of Presentation

The interim condensed consolidated financial statements are unaudited. The unaudited condensed consolidated financial statements reflect, in the opinion of the Company's management, all adjustments, consisting of only normal recurring adjustments, necessary for a fair presentation of financial position, results of operations, changes in equity, and comprehensive loss and cash flows for each period presented in accordance with United States generally accepted accounting principles ("U.S. GAAP") for interim financial information and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, certain information and disclosures normally included in financial statements prepared in accordance with U.S. GAAP have been condensed or omitted. These interim condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and related notes thereto included in the Company's Annual Report on Form 10-K for the year ended December 31, 2018, filed with the Securities and Exchange Commission on March 14, 2019 (the "2018 Annual Report on Form 10-K"). The consolidated financial information as of December 31, 2018 has been derived from the audited 2018 consolidated financial statements included in the 2018 Annual Report on Form 10-K.

Going Concern

In accordance with Accounting Standards Update ("ASU") 2014-15, Presentation of Financial Statements - Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity’s Ability to Continue as a Going Concern, the Company is required to perform a two-step analysis regarding its ability to continue as a going concern. The Company must first evaluate whether there are conditions and events that raise substantial doubt about the Company’s ability to continue as a going concern and to meet its obligations as they become due within one year after the date that the financial statements are issued (step 1). If the Company concludes that substantial doubt is raised, the Company is also required to consider whether its plans alleviate that doubt (step 2).

The Company has experienced net losses and negative cash flows from operating activities since its inception and expects to continue to incur net losses into the foreseeable future. The Company had an accumulated deficit of $72.8 million and $88.3 million as of December 31, 2018 and June 30, 2019, respectively. The Company used $19.9 million cash in operations in 2018 and has used $12.9 million for the six months ended June 30, 2019. The Company had cash and cash equivalents of $16.5 million and $15.3 million as of December 31, 2018 and June 30, 2019, respectively. The Company expects operating losses and negative cash flows to continue for at least the next year as the Company continues to incur costs related to research and commercialization efforts. The Company has prepared cash flow forecasts which indicate that based on the Company’s expected operating losses and negative cash flows, there is substantial doubt about the Company’s ability to continue as a going concern within twelve months after the date that the financial statements for the year ended December 31, 2018 and the six months ended June 30, 2019, are issued.

The Company’s ability to continue as a going concern is dependent upon its ability to raise additional funding. The Company has plans to raise additional capital through equity offerings or debt financings to fulfill its operating and capital requirements for at least 12 months and to maintain compliance with the Innovatus LSA covenants. The Company’s plans include continuing to fund its operating losses and capital funding needs through equity or debt financings, strategic collaborations, licensing arrangements, asset sales, or other arrangements. However, the Company may not be able to secure such financing in a timely manner or on favorable terms, if at all. Furthermore, if the Company issues equity securities to raise additional funds, its existing stockholders may experience dilution, and the new equity securities may have rights, preferences and privileges senior to those of the Company’s existing stockholders. If the Company raises additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to its products or proprietary technologies or grant licenses on terms that are not favorable to the Company. If the Company does not have or is not able to obtain sufficient funds, it may have to reduce commercialization efforts or delay its development of new products. The Company also may have to reduce marketing, customer support or other resources devoted to its products or cease operations.

2. Summary of Significant Accounting Policies

Accounts Receivable

The Company extends credit to its customers in the normal course of business 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. A portion of our our receivables are with distributors who are slow payers and the Company is pursuing their collection. Based on ongoing dialog, the Company expects those receivables to be fully collected. As of June 30, 2019 and December 31, 2018, the Company did not record an allowance for doubtful accounts.

As of June 30, 2019 and December 31, 2018, two customers each represented greater than 10% of the Company's accounts receivable balances, specifically Ultravision Technology Ltd. represented 13% and 13% and BioStar Company represented 11% and 12%, respectively.

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 are as follows (unaudited):

	June 30, 2019	December 31, 2018
Materials and supplies	$ 908,755	$ 161,468
Finished goods	2,113,335	907,089
Total	$ 3,022,090	$ 1,068,557

Revenue Recognition

Product Revenue

Product revenue represents the sale of the Company’s instruments and consumables to third parties. Timing of revenue recognition on instrument sales is based upon when delivery has occurred, the price is fixed or determinable, and collectability is reasonably assured.

The majority of the Company’s instruments contain embedded operating systems and other software which is included in the purchase price of the instrument. The software is deemed incidental to the system as a whole as it is not sold or marketed separately and its production costs are minor compared to those of the hardware system. Hardware and software elements are both delivered when ownership is transferred to the customer. Hardware upgrades, which are made available to customers for purchase, are recognized as revenue when delivered and all revenue recognition criteria noted above have been met.

Installation services for direct sale customers are performed at the same time or shortly after the product is delivered and require only a minimal effort to complete. The Company believes installation is a perfunctory service and is not material to its obligations in the contract.

Other Revenue

Other revenue includes revenue from extended service contracts and other services that may be performed. Revenue for extended warranty contracts is recognized ratably over the service period. Revenue for other services is generally recognized based on proportional performance of the contract, when the Company’s ability to complete project requirements is reasonably assured. Deferred revenue represents amounts received in advance for on-going service arrangements. Most of these services are completed in a short period of time from the receipt of the customer’s order. When significant risk exists in the Company’s ability to fulfill project requirements, revenue is recognized upon completion of the contract.

Multiple Element Arrangements

The Company regularly enters into contracts where revenue is derived from multiple deliverables, including products or services. These contracts typically include an instrument, consumables, and extended service contracts. Revenue recognition for contracts with multiple deliverables is based on the individual units of accounting determined to exist in the contract. A delivered item is considered a separate unit of accounting when the delivered item has value to the customer on a stand-alone basis. Items are considered to have stand-alone value when they are sold separately by any vendor or when the customer could resell the item on a stand-alone basis.

For transactions with multiple deliverables, consideration is allocated at the inception of the contract to all deliverables based on their relative selling price. The relative selling price for each deliverable is determined using vendor-specific objective evidence (“VSOE”) of selling price or third-party evidence of selling price if VSOE does not exist. If neither VSOE nor third-party evidence exists, the Company uses its best estimate of the selling price using average selling prices over an appropriate period coupled with an assessment of current market conditions. If the product or service has no history of sales or if the sales volume is not sufficient, the Company considers its approved standard prices adjusted for applicable discounts.

In order to establish VSOE of selling price, the Company must regularly sell the product or service on a standalone basis with a substantial majority priced within a relatively narrow range. In cases where there is not a sufficient number of standalone sales and VSOE of selling price cannot be determined, then the Company utilizes third-party evidence to establish selling price.

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 title transfers to the distributor. 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.

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 and its chief operating decision-maker, the Chief Executive Officer, views the Company's operations and manages its business in 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 stock equivalents are only included when their effect is dilutive. The Company's potentially dilutive securities which include outstanding stock options under the Company's equity incentive plan have been excluded from the computation of diluted net loss per share as they would be anti-dilutive to the net loss per share. 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 attributable to common stockholders because to do so would be anti-dilutive are as follows (in common stock equivalent shares):

	June 30, 2019	June 30, 2018
Series A convertible preferred stock	—	8,074
Series B convertible preferred stock	—	188,275
Series B-1 convertible preferred stock	—	80,327
Series C convertible preferred stock	—	545,728
Series D convertible preferred stock	—	482,529
Series D-1 convertible preferred stock	—	1,545,347
Preferred warrants	—	869,814
Common stock options	1,716,719	416,937
Common warrants	4,224,494	—
Total	5,941,213	4,137,031

Recent Accounting Pronouncements

On April 5, 2012, the Jump-Start Our Business Startups Act (the "JOBS Act") was signed into law. The JOBS Act contains provisions that, among other things, reduce certain reporting requirements for an emerging growth company. As an emerging growth company, the Company may elect to adopt new or revised accounting standards when they become effective for non-public companies, which typically is later than when public companies must adopt the standards. The Company has elected to take advantage of the extended transition period afforded by the JOBS Act and, as a result, will comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for emerging growth companies, which are the dates included below.

In May 2014, the FASB issued ASU 2014-9, *Revenue from Contracts with Customers (Topic 606).* ASU 2014-9 completes the joint effort by the FASB and International Accounting Standards Board to improve financial reporting by creating common revenue recognition guidance for U.S. GAAP and International Financial Reporting Standards. ASU 2014-9 applies to all companies that enter into contracts with customers to transfer goods or services. Under the standard, revenue is recognized when a customer obtains control of promised goods or services in an amount that reflects the consideration the entity expects to receive in exchange for those goods or services. In addition, the standard requires disclosure of the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. The guidance permits two methods of adoption: retrospectively to each prior reporting period presented (full retrospective method), or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial application (modified retrospective method). The guidance is effective for reporting periods beginning after December 15, 2018, and interim periods beginning after December 15, 2019. The Company has adopted the new guidance during the current annual period and will reflect the effects of such adoption, including the additional required disclosures, in the Company's Annual Report on Form 10-K for the year ended December 31, 2019. The adoption will not have a significant impact on those financial statements.

In February 2015, the FASB issued ASU 2016-2, *Leases (Topic 842)*, which amends the FASB Accounting Standards Codification and creates Topic 842, “Leases.” The new topic supersedes Topic 840, “Leases,” and increases transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and requires disclosures of key information about leasing arrangements. The guidance is effective for reporting periods beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. ASU 2016-2 mandates a modified retrospective transition method. In July 2018, the FASB issued ASU 2018-11, *Leases (Topic 842): Targeted Improvements* which allows entities the option to adopt this standard prospectively with a cumulative-effect adjustment to opening equity and include required disclosures for prior period. The Company anticipates implementing the standard by taking advantage of the alternative transition method and will apply the transition approach as of the beginning of the period of adoption and will not be restating comparative periods. The Company is in the process of evaluating the impact of adoption of the ASU on the consolidated financial statements.

In January 2016, the FASB issued ASU No. 2016-1, *Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities (ASU 2016-1)*. This guidance changes how entities measure equity investments that do not result in consolidation and are not accounted for under the equity method. Entities will be required to measure these investments at fair value at the end of each reporting period and recognize changes in fair value in net income. A practicability exception will be available for equity investments that do not have readily determinable fair values, however; the exception requires the Company to consider relevant transactions that can be reasonably known to identify any observable price changes that would impact the fair value. This guidance also changes certain disclosure requirements and other aspects of current U.S. GAAP. This guidance is effective for the Company for the year ending December 31, 2019 and for interim periods effective the three months ending March 31, 2020. Early adoption is permitted. The Company is currently evaluating the requirements of ASU 2016-1 and has not yet determined whether the adoption of the standard will have a material impact on the consolidated financial statements.

In August 2016, the FASB issued ASU 2016-15, *Classification of Certain Cash Receipts and Cash Payments (Topic 230)*. ASU 2016-15 addresses eight specific cash flow issues with the objective of reducing the existing diversity in practice for certain cash receipts and cash payments. The standard is effective for annual reporting periods beginning after December 15, 2018 and interim periods reporting within fiscal years beginning after December 15, 2019, with early adoption permitted. The Company does not believe the adoption of this guidance will have a material impact on the consolidated financial statements.

3. 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).

		Fair Value Measurement Using		
	June 30, 2019	Quoted Prices in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Assets				
Cash and cash equivalents	$ 15,294,526	$ 15,294,526	$ —	$ —
Total assets	$ 15,294,526	$ 15,294,526	$ —	$ —

		Fair Value Measurements Using		
	December 31, 2018	Quoted Prices in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Assets				
Cash and cash equivalents	$ 16,522,729	$ 16,522,729	$ —	$ —
Total assets	$ 16,522,729	$ 16,522,729	$ —	$ —

As discussed in Note 2 above, there were no warrants exercisable for the Company's convertible preferred stock following the closing of the IPO. Of the 37.2 million warrants (pre-split) previously exercisable for preferred stock, 35.7 million warrants (pre-split) expired on the effective date of the IPO. The remaining 1.5 million warrants previously exercisable for preferred stock were adjusted to become exercisable for common stock. Prior to the IPO, the Company estimated fair value of the convertible preferred stock warrants at the time of issuance and subsequent remeasurement using the Black-Scholes-Merton model at each reporting date.

On the date of the IPO and going forward, all outstanding warrants are accounted for as equity and are not subject to remeasurement.

4. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consist of the following:

	June 30, 2019	December 31, 2018
Prepayment to supplier	$ —	$ 74,685
Prepaid insurance	166,342	460,684
Other current assets	465,511	384,131
Total	$ 631,853	$ 919,500

5. Property and Equipment, net

Property and equipment, net consist of the following:

	June 30, 2019	December 31, 2018
Computer and office equipment	$ 476,402	$ 476,402
Lab equipment	4,567,104	4,437,794
Service equipment placed at customer sites	58,902	149,823
Leasehold improvements	1,875,647	1,875,647
	6,978,055	6,939,666
Less accumulated depreciation and amortization	(5,699,166)	(5,162,364)
	$ 1,278,889	$ 1,777,302

The Company recorded depreciation expense of $266,963 and $387,104 for the three months ended June 30, 2019 and 2018, respectively, and $536,802 and $778,555 for the six months ended June 30, 2019 and 2018, respectively, in operating expenses.

6. Accrued Expenses

Accrued expenses consist of the following:

	June 30, 2019	December 31, 2018
Accrued compensation expenses	$ 1,553,276	$ 1,832,630
Accrued professional services	85,997	76,224
Accrued royalties	58,795	119,630
Accrued other	1,003,947	871,645
Total	$ 2,702,015	$ 2,900,129

7. Long-Term Debt

Western Alliance LSA

On March 8, 2016, the Company entered into a new term Loan and Security Agreement with Western Alliance Bank (the “Western Alliance LSA”) for $7.0 million. The loan proceeds were used to repay the outstanding $5.0 million loan with Square 1 Bank, as required by the twelfth amendment to that certain Loan and Security Agreement with Square 1 Bank.

Additionally, in conjunction with the entry into Western Alliance LSA, the Company issued to Western Alliance Bank a warrant to purchase 510,417 shares of Series D convertible preferred stock at an exercise price of $0.48 per share. The Company valued the warrant to purchase Series D convertible preferred stock using the Black-Scholes-Merton model, and the initial fair value of the warrant to purchase Series D convertible preferred stock of $65,384 was recorded as a debt discount and was being amortized to interest expense over the term of the loan. Upon the closing of the IPO in August 2018, the warrants exercisable for shares of Series D convertible preferred stock were adjusted to warrants exercisable for 11,925 shares of common stock for $20.56 per share. The warrants expire on March 8, 2026.

On December 9, 2016, the Western Alliance LSA was amended, and in conjunction with this amendment, the Company issued to Western Alliance Bank a warrant to purchase 291,667 shares of Series D-1 convertible preferred stock. The Company valued the warrant to purchase Series D-1 convertible preferred stock using the Black-Scholes-Merton model, and the initial fair value of the warrant to purchase Series D-1 convertible preferred stock of $34,300 was recorded as a debt discount and was being amortized to interest expense over the term of the loan. Upon the closing of the IPO in August 2018, the warrants exercisable for shares of Series D-1 convertible preferred stock were adjusted to warrants exercisable for 6,814 shares of common stock for $20.56 per share. The warrants expire on December 9, 2026.

In February 2018, the Western Alliance LSA was amended requiring the Company to secure $21.0 million in funding prior to June 30, 2018. As part of the amendment, Western Alliance Bank agreed to forbear from exercising any of its default remedies set forth in the Western Alliance LSA as a result of the Company’s previous loan default as of December 31, 2017.

On June 13, 2018, the Western Alliance LSA was amended, replacing previously amended funding requirements and requiring the Company to secure $5.0 million in funding prior to August 3, 2018. Additionally, the amendment restricted the Company’s use of all cash collected from customers, received on and after amendment date, until the Company collected a total of $2.5 million. As part of this amendment, Western Alliance Bank waived the existing default.

On June 29, 2018, the Company repaid the Western Alliance LSA in connection with the MidCap Financial CSA (as defined below).

On November 19, 2018, the Company entered into an Amendment Agreement with Western Alliance Bank to amend (i) that certain Warrant to Purchase Stock, dated March 8, 2016, (ii) that certain Warrant to Purchase Stock, dated December 9, 2016 ((i) and (ii) collectively, the “Bank Warrants”) and (iii) the Western Alliance LSA. Pursuant to Section 2.6(g) of the Western Alliance LSA, the Company was obligated to pay Western Alliance Bank a success fee of $210,000 in connection with the IPO. As part of the Amendment Agreement, this success fee was decreased from $210,000 to $160,000 and the exercise price of the Bank Warrants was decreased to $6.99 per share.

MidCap Financial CSA

On June 29, 2018, the Company entered into a Credit and Security Agreement with MidCap Financial Trust (the "MidCap Financial CSA") which provided a $15.0 million term loan facility available in a first tranche of $10 million (“Tranche 1”), a second tranche of $2.5 million and a third tranche of $2.5 million. The Company borrowed $10.0 million from Tranche 1 immediately upon execution of the MidCap Financial CSA. Proceeds from the loan were used to repay the outstanding $7.0 million due to Western Alliance LSA.

On March 14, 2019, the Company repaid the MidCap Financial CSA in connection with the Innovatus LSA (as defined below).

The MidCap Financial CSA bore interest at an annual rate of one month LIBOR plus 7.5%, subject to a LIBOR floor of 1.5%. The loan had a 60-month term, with interest only for the first 18 months and straight-line amortization of principal and interest for the remaining 42 months. The MidCap Financial CSA was secured by substantially all of the assets of the Company and was scheduled to mature on July 1, 2023.

The Company paid issuance fees of approximately $0.3 million at the inception of the loan, which was recorded as a debt discount and was recognized as additional interest expense over the term of the loan. Subject to certain limited exceptions, amounts prepaid in relation to the MidCap Financial CSA are subject to a prepayment fee determined by multiplying the amount being prepaid by 4% in the first year of the term, 3% in year two, and 2% thereafter. When the Company paid-off the MidCap Financial CSA, it incurred a prepayment fee of $0.4 million. The prepayment fee is recognized as loss on debt extinguishment during the three months ended March 31, 2019. In addition, upon repayment of the total amounts borrowed, the Company was required to pay an end of term charge equal to 4% of the total amount borrowed. Accordingly, an end of term charge of $0.4 million was included in other long-term liabilities on the balance sheet as of December 31, 2018. The end of term charge was being recognized as additional interest expense over the term of the loan. The unamortized portion of the end of term charge was written-off as loss on debt extinguishment during the three months ended March 31, 2019 in conjunction with the Company's repayment of the MidCap Financial CSA.

In conjunction with entering into the MidCap Financial CSA, the Company issued to MidCap a warrant to purchase 625,000 shares of Series D-1 convertible preferred stock at an exercise price of $0.48 per share that was immediately exercisable. The Company valued the warrant to purchase Series D convertible preferred stock using the Black-Scholes-Merton model, and the initial fair value of the warrant to purchase Series D-1 convertible preferred stock of $0.2 million was recorded as a debt discount and was being amortized to interest expense over the term of the loan. The assumptions used in the model were: the fair value of the Series D-1 convertible preferred stock, which was determined using an OPM analysis, an expected life of 10 years, a risk-free interest rate of 2.83% and an expected volatility of 59%. Upon the closing of the IPO in August 2018, the warrant was adjusted from being exercisable for shares of Series D convertible preferred stock to exercisable for 14,602 shares of common stock for $20.56. The warrant expires on June 29, 2028.

In addition, MidCap invested $1.0 million in the convertible note offering at terms identical to other investors described in the Convertible Notes section below.

Innovatus LSA

On March 14, 2019, the Company entered into a Loan and Security Agreement (the “Innovatus 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 "Bank", and together with the lenders, the "Lenders"). Under the Innovatus LSA, Innovatus agreed, among other things, to make a first term loan of $17.5 million to the Company (the “Term A-1 Loan”), a second term loan of $2.5 million to the Company (the “Term A-2 Loan”) and a third term loan of $5.0 million to the Company (the "Term B Loan"), each upon satisfaction of certain funding conditions. In addition, the Bank has agreed to make available to the Company a revolving line of credit in an amount not to exceed $5.0 million (the "Revolver").

Under the Innovatus LSA, interest is payable, at the Company’s option (i) in cash at a rate of 10.25% per annum or (ii) at a discounted rate of 7.25% in cash, with 3.0% of the 10.25% per annum rate (the “PIK Loan”) added to the principal of the loan and subject to accruing interest through the end of the interest only payment period. Interest only payments are due on the first of each month through March 1, 2022. Thereafter, in addition to interest accrued during such period, the monthly payments will include an amount equal to the outstanding principal at March 1, 2022 divided by 24 months. At maturity (or earlier prepayment), the Company is also required to make a final payment equal to 3.75% of the original principal amount borrowed. 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.

The Innovatus LSA provides 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, 1.0% 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 repayment of the total amounts borrowed, the Company is required to pay an end of term charge of $0.8 million. This end of term charge is being recognized as additional interest expense over the term of the Innovatus LSA.

The Innovatus LSA is collateralized by all of the Company’s assets. The Innovatus LSA also imposes various affirmative and negative covenants on the Company. On June 25, 2019, the Innovatus LSA was amended to among other things: (i) extend the deadline for the Company to maintain its domestic depository and operating accounts with 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 $150,000. At June 30, 2019, the Company was in compliance with all of the covenants in the Innovatus LSA.

Additionally, in connection with the Innovatus LSA, on March 14, 2019, the Company entered into a Common Stock Purchase Agreement (the “Innovatus Purchase Agreement”) with certain entities affiliated with Innovatus (the “Innovatus Investors”), pursuant to which the Company agreed to issue and sell 406,504 shares of common stock at $3.69 per share for proceeds of $1.5 million. Upon execution of the Innovatus Purchase Agreement, the Company sold all of such shares to the Innovatus Investors. Because the shares were issued at a discount to the fair market value of the Company’s common stock on the issuance date, the Company recorded the difference of $0.2 million between the issuance price and fair value which was allocated to the debt on a relative fair value basis.

On March 22, 2019, in connection with the receipt of $20.0 million in funding with respect to the Term A-1 Loan and Term A-2 Loan, the Company issued to Innovatus a warrant to purchase up to 161,987 shares of common stock at an exercise price of $4.63 per share, which has a term of 10 years. The Company applied the Black-Scholes option pricing model to estimate the fair value of the warrants, with the following assumptions: a) risk-free rate of 2.43%; b) expected volatility of 66.93%; c) no dividend would be payable; and d) expected life of 10 years. Based on this model, the aggregate relative fair value of the warrants was determined to be $0.6 million. Subject to the terms of the Innovatus LSA, the warrant to be issued in connection with funding of the Term B Loan will entitle the Lender to purchase up to 40,496 shares of the Company’s common stock and will have an exercise price of $4.63 per share.

The Company paid issuance fees of approximately $0.8 million which was recorded as part of the debt discount. The issuance fee will be amortized as additional interest expense over the life of the debt using the effective interest method. The Company recognized the fair value of the warrants and the discount of the common stock as a debt discount and along with the issuance costs will amortize these amounts using the effective interest rate method over the life of the applicable term loan. The effective interest rate as of June 30, 2019 was 13.4%.

On May 23, 2019, the Company drew down $1.1 million under its $5.0 million revolving line of credit (the Revolver) and in June 2019, the Company repaid $0.3 million of this borrowed amount. The Company may repay and reborrow amounts borrowed under the Revolver at any time prior to the March 1, 2024 maturity date without penalty or premium, at which time such amounts will become immediately due and payable. The Company’s obligation to repay amounts borrowed under the Revolver is subject to acceleration upon the occurrence of certain specified events, including an event of default and a permitted prepayment of the term loans borrowed under the Loan Agreement. The outstanding balance of amounts borrowed under the Revolver bear interest at a rate equal to 2.0% above the variable rate of interest, per annum, most recently announced by the Bank as its “prime rate,” whether or not such announced rate is the lowest rate available from the Bank.

As of June 30, 2019, the Company had $20.2 million borrowed in term loans and $0.8 million borrowed under the Revolver pursuant to the Innovatus LSA.

Convertible Notes

On February 9, 2018, the Company entered into a Note Purchase Agreement (the “Note Purchase Agreement”) with various investors, which included related parties (the “Investors”), pursuant to which the Company agreed to sell to the Investors convertible promissory notes (the “Convertible Notes”) in the original principal amount of up to $16.0 million. On April 2, 2018, the Company amended the Note Purchase Agreement to, among other things, increase the principal amount available for issuance under the Note Purchase Agreement to $18.4 million. The Convertible Notes had a maturity date of September 30, 2018 and were convertible either into the Company’s common stock or convertible preferred stock, dependent on the conversion events.

On June 29, 2018, the Note Purchase Agreement was amended to increase the principal amount available for issuance from $18.4 million to $19.4 million.

In August 2018, the outstanding convertible promissory notes of $14.9 million of principal and interest were converted into 3,239,294 shares of common stock upon completion of the IPO. As of June 30, 2019, there are no convertible notes outstanding.

Summary

Debt and unamortized discount balances relating to the MidCap Financial CSA are as follows:

	December 31, 2018
Term loan face value	$ 10,000,000
Fair value of warrant	(176,813)
End of term charge	(400,000)
Capitalized debt issuance costs	(499,354)
Accretion of debt issuance costs and end of term charge	87,859
Accretion of warrant fair value	17,682
Balance	9,029,374
Less current portion	—
Long-term debt	$ 9,029,374

Non-cash interest expense related to debt discount amortization and accretion of end of term fees was $79,388 and $48,461, for the three months ended June 30, 2019 and 2018, and $128,518 and $69,791 for the six months ended June 30, 2019 and 2018, respectfully.

Debt and unamortized discount balances relating to the Innovatus LSA are as follows:

	June 30, 2019
Term loan face value	$ 20,000,000
Warrants issued	(629,830)
Stock discount issued	(201,789)
Capitalized debt issuance costs	(792,597)
Interest payment-in-kind	166,524
Accretion of debt discount	79,388
Balance	18,621,696
Less current portion	—
Long-term debt	$ 18,621,696

Future minimum payments including interest under the Innovatus LSA are as follows as of June 30, 2019:

2019	$	615,959
2020		1,505,249
2021		1,964,030
2022		9,875,878
2023-2024		14,941,449
Total minimum loan payments	$	28,902,565
Unamortized interest		(7,986,041)
Accretion of debt discount		79,388
End of term charge		(750,000)
Warrants issued		(629,830)
Stock discount issued		(201,789)
Capitalized debt issuance costs and end of term charge		(792,597)
Term loan		18,621,696
Less current portion		—
Long-term debt	$	18,621,696

8. Convertible Preferred Stock and Stockholders' Equity (Deficit)

Common Stock

On August 23, 2018, the Company amended and restated its Certificate of Incorporation in connection with the IPO. The Company's Amended and Restated Certificate of Incorporation authorizes 200,000,000 shares of common stock, $0.0001 par value per share, and 10,000,000 shares of preferred stock, $0.0001 par value per share, all of which shares of preferred stock are undesignated. Of the 200,000,000 authorized shares of common stock, 10,897,522 shares were issued and outstanding as of June 30, 2019.

During the three months ended June 30, 2019 and 2018, the company issued 8,526 and 551 shares of common stock in connection with the exercise of stock options for net proceeds of $11,084 and $707, respectively. During the six months ended June 30, 2019 and 2018, the company issued 50,047 and 788 shares of common stock in connection with the exercise of stock options for net proceeds of $65,060 and $1,012, respectively.

Sale of Common Stock

In March 2019, the Company entered into a Common Stock Purchase Agreement (the "Aspire Purchase Agreement") with Aspire Capital Fund, LLC (Aspire Capital) which provides that, upon the terms and subject to the conditions and limitations therein, Aspire Capital is committed to purchase up to an aggregate of $10.0 million of shares of the Company's common stock. Concurrently with entering into the Aspire Purchase Agreement, the Company also entered into a registration rights agreement with Aspire Capital, in which the Company agreed to file one or more registration statements, as permissible and necessary to register under the Securities Act of 1933, as amended, the sale of the shares of the Company's common stock that have been and may be issued to Aspire Capital under the Aspire Purchase Agreement.

Upon execution of the Aspire Purchase Agreement, the Company sold 272,479 shares of the Company's common stock to Aspire Capital at $3.67 per share for net proceeds of approximately $1.0 million. Aspire Capital is committed to purchase up to $9.0 million of additional shares of common stock solely at the Company's request from time to time during a 30 month period beginning on April 23, 2019 and at a per share purchase price equal to the lesser of:

- the lowest sale price of the Company's common stock on the purchase date; or
- the average of the three lowest closing sale prices for the Company's common stock during the ten consecutive trading days ending on the trading day immediately preceding the purchase date.

In consideration for entering into the Aspire Purchase Agreement and concurrently with the execution of the Aspire Purchase Agreement, the Company issued 69,444 shares of its common stock to Aspire Capital. The value of these shares was netted against the proceeds received as issuance costs.

Convertible Preferred Stock

Prior to the IPO, there were 121,992,497 shares of convertible preferred stock outstanding. The Company's convertible preferred stock had been classified as temporary equity in accordance with authoritative guidance for the classification and measurement of redeemable securities.

In August 2018, due to completion of a public offering meeting certain requirements, each 42.8 shares of the Company's convertible preferred stock was converted into one share of common stock at a conversion price of $1.3995 for each share of Series A, B and B-1 convertible preferred stock, $1.4043 for each share of Series C convertible preferred stock and $0.48 for each share of Series D and D-1 convertible preferred stock. The Company's convertible preferred stock had been classified as temporary equity on the accompanying balance sheets in accordance with authoritative guidance for the classification and measurement of redeemable securities. As of June 30, 2019, there are no shares of the Company's convertible preferred stock outstanding.

Stock Options

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 1,499,454 shares of common stock for issuance under the 2018 Plan, which is the sum of (1) 1,000,000 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 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 June 30, 2019, there were 1,716,719 shares of common stock subject to outstanding options and 432,935 shares of common stock reserved for future stock awards under the 2018 Plan.

A summary of the Company's stock option activity under the 2018 Plan and 2006 Plan is as follows:

	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term	Aggregate Intrinsic Value
Outstanding at January 1, 2019	1,282,847	$ 6.90	9.2	
Granted	545,374	4.15		
Exercised	(50,047)	1.30		
Cancelled/Expired	(61,455)	15.06		
Outstanding at June 30, 2019	1,716,719	$ 5.99	9.0	$ 366,055
Vested and exercisable at June 30, 2019	566,997	$ 6.86	8.4	$ 248,379

For the three months ended June 30, 2019 and 2018, the Company granted to its employees options to purchase 42,114 shares with a weighted average exercise price of $3.00 per share. The Company did not grant employee options during the three months ended June 30, 2018.

For the six months ended June 30, 2019 and 2018, the Company granted to its employees options to purchase 545,374 shares and 385 shares of its common stock with a weighted average exercise price of $4.15 per share and $1.28 per share, respectively.

For the three months ended June 30, 2019, the weighted-average grant date fair value of employee option grants was $1.71 per option. The Company did not grant employee options during the three months ended June 30, 2018.

For the six months ended June 30, 2019 and 2018, the weighted-average grant date fair value of employee option grants was $2.37 and $1.28 per option, respectively.

Stock-Based Compensation Expense

The Company recognized stock-based compensation expense for the three and six months ended June 30, 2019 and 2018 as follows:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
Research and development	$ 57,687	$ 9,253	$ 110,590	$ 18,867
General and administrative	277,979	43,728	514,471	88,559
Total stock-based compensation expense	$ 335,666	$ 52,981	$ 625,061	$ 107,426

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
Risk-free interest rate	2.0%	—	2.4%	2.5%
Expected volatility	65.2-66.1%	—	64.3-67.3%	63.0%
Expected term (in years)	5.4	—	5.0	4.0
Expected dividend yield	0.0%	—	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.

As of June 30, 2019 the unrecognized compensation cost related to outstanding employee options was $3.3 million and is expected to be recognized as expense over the remaining weighted-average vesting period of approximately 2.7 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 175,000 shares of common stock are initially reserved for issuance under the ESPP. In addition, the number shares of common stock reserved for issuance under the ESPP will automatically increase each 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 June 30, 2019, 66,155 shares of common stock have been purchased under the ESPP.

Common Stock Reserved for Future Issuance

Common stock reserved for future issuance consist of the following:

	June 30, 2019
Stock options issued and outstanding	1,716,719
Authorized for future stock awards, option grants, or employee stock purchase program	432,935
Common Warrants	4,224,494
Total	6,374,148

9. Commitments and Contingencies

Leases

The Company leases certain office and lab space in San Diego, California under a non-cancelable operating lease, which was amended July 1, 2015 to add laboratory space and office space and extend its terms through December 2020. Rent expense for the three months ended June 30, 2019 and 2018 was $42,949 and $147,522, respectively, including the offset for amortization of leasehold incentive obligation of $56,263 each period and sublease rental income of $105,529 for the three months ended June 30, 2019. Rent expense for the six months ended June 30, 2019 and 2018 was $85,898 and $295,044, respectively, including the offset for amortization of leasehold incentive obligation of $112,526 each period and sublease rental income of $211,058 for the six months ended June 30, 2019.

The future minimum lease payments required under non-cancelable leases as of June 30, 2019, are summarized as follows:

Year Ending December 31,	Gross Payments	Scheduled Sublease Payments	Net Payments
2019 (6 months remaining)	$ 431,328	$ (222,170)	$ 209,158
2020	902,412	(464,334)	438,078
Total minimum lease payments	$ 1,333,740	$ (686,504)	$ 647,236

Royalty Agreements

The Company has entered into agreements to market and distribute chips and kits used in its instruments. Pursuant to these agreements, the Company is obligated to pay royalties based on sales during each annual license period and is obligated to make minimum payments regardless of the level of sales achieved. The Company accrued $58,795 and $74,580 as of June 30, 2019 and 2018, respectively.

Such royalty agreements extend through the life of underlying intellectual property which is affected by patent filing date and jurisdiction. As of December 31, 2018, annual future minimum royalty payments under the Company's royalty agreements total $90,000 through December 31, 2019 and increase to $110,000 through November 29, 2026.

Purchase Commitments

The Company has a contractual commitment with a supplier to purchase $165,000 of products each quarter for an initial term of two years beginning March 1, 2019. The contract can be terminated on 90 days written notice by either party.

Litigation

The Company is 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 intends to continue to defend itself vigorously in such matters. 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 amount accrued as it is not a defendant in any claims or legal actions.

10. Income Taxes

The Company is subject to taxation in the United States, United Kingdom and various state jurisdictions. The Company computes its quarterly income tax provision by using a forecasted annual effective tax rate and adjusts for any discrete items arising during the quarter. The primary difference between the effective tax rate and the federal statutory tax rate relates to the full valuation allowance on the Company's U.S. net operating losses.

At June 30, 2019 and 2018 the provision for income taxes reflected on the statements of operations reflect an effective tax rate of (0.06)% and (0.13)% respectively. Federal, state, and foreign income tax expense was $4,486 and $5,506 for the three months ended June 30, 2019, and 2018, respectively, and $8,972 and $9,282 for the six months ended June 30, 2019, and 2018, respectively.

As of June 30, 2019 and 2018, management assessed the realizability of deferred tax assets and evaluated the need for a valuation allowance on deferred tax assets on a jurisdictional basis. This evaluation utilizes the framework contained in ASC 740, Income Taxes, wherein management analyzes all positive and negative evidence available at the balance sheet date to determine whether all or some portion of the Company's deferred tax assets will not be realized. Under this guidance, a valuation allowance must be established for deferred tax assets when it is more likely than not (a probability level of more than 50 percent) that they will not be realized. Because of the Company's history of losses and the uncertainty as to the realization of those deferred tax assets, a full valuation allowance has been recognized for the U.S. federal and state jurisdictions.

Utilization of the net operating losses and research and development (“R&D”) credit carryforwards are subject to annual limitations due to ownership change limitations that have occurred or that could occur in the future, as required by Section 382 of the Internal Revenue Code of 1986, as amended (the “Code”), as well as similar state and foreign provisions. These ownership changes may 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 the outstanding stock of a company by certain stockholders.

During 2013, the Company completed a Section 382/383 analysis, from inception through December 31, 2012, regarding the limitation of the net operating losses and R&D credits. Based upon the analysis, the Company determined that no ownership changes occurred during that period. However, there may have been ownership changes subsequent to December 31, 2012, that could limit the Company’s ability to utilize the net operating loss and R&D credit carryforwards. The Company plans to complete an analysis prior to using any of the net operating losses and R&D credits.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our unaudited consolidated financial statements and related notes included in this Quarterly Report on Form 10-Q and the audited consolidated financial statements and notes thereto as of and for the year ended December 31, 2018 and the related Management's Discussion and Analysis of Financial Condition and Results of Operations, both of which are contained in our Annual Report on Form 10-K, or our Annual Report, filed with the Securities and Exchange Commission, or the SEC, on March 14, 2019. Unless the context requires otherwise, references in this Quarterly Report on Form 10-Q to "we," "us," and "our" refer to Bionano Genomics, Inc.

Forward-Looking Statements

The information in this discussion contains forward-looking statements and information within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, which are subject to the "safe harbor" created by those sections. These forward-looking statements include, but are not limited to, statements concerning our strategy, future operations, future financial position, future revenues, projected costs, prospects and plans and objectives of management. The words "anticipates," "believes," "estimates," "expects," "intends," "may," "plans," "projects," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. 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. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements that we make. These forward-looking statements involve risks and uncertainties that could cause our actual results to differ materially from those in the forward-looking statements, including, without limitation, the risks set forth in our filings with the SEC. The forward-looking statements are applicable only as of the date on which they are made, and we do not assume any obligation to update any forward-looking statements.

Overview

We are a life sciences instrumentation company in the genome analysis space. We develop and market the Saphyr system, a platform for ultra-sensitive and ultra-specific structural variation detection that enables researchers and clinicians to accelerate the search for new diagnostics and therapeutic targets and to streamline the study of changes in chromosomes, which is known as cytogenetics. Our Saphyr system comprises an instrument, chip consumables, reagents and a suite of data analysis tools.

Structural variation refers to large-scale structural differences in the genomic DNA of one individual compared to another. Each structural variation involves the rearrangement or repetition of as few as hundreds to as many as tens of millions of DNA base pairs. Those rearrangements may be insertions, deletions, duplications, inversions or translocations of segments of one or more chromosomes. Structural variations may be inherited or arise spontaneously and many cause genetic disorders and diseases. Until our commercial launch of the Saphyr system in February 2017, and since, we believe no products existed or exist that could more comprehensively and cost and time-efficiently detect structural variation.

Our Saphyr system comprises an instrument, chip consumables, reagents and a suite of data analysis tools. Our customers include researchers and clinicians who seek to uncover and understand the biological or clinical impact of genome variation to improve the diagnosis and treatment of patients with better clinical tests and new medicines or to replace existing cytogenetic tests that are expensive, slow and labor-intense, with a modern solution that simplifies workflow and reduces costs and that has the potential to significantly increase diagnostic yields across the industry. Our customers also include researchers in non-human segments such as agricultural genomics where they seek to advance their understanding of how structural variation impacts industrial applications of plants and animals.

Through the date of our IPO, we raised net proceeds of $143.6 million to fund our operations from the issuance of equity and convertible promissory notes. We have incurred losses in each year since our inception. Our net losses were $7.7 million and $3.3 million for the three months ended June 30, 2019 and 2018, respectively, and $15.5 million and $7.2 million for the six months ended June 30, 2019 and 2018, respectively. As of June 30, 2019, we had an accumulated deficit of $88.3 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.

Initial Public Offering

In August 2018, we completed our initial public offering of our common stock, or the IPO, in which we sold an aggregate of 3,864,000 units (each unit consisting of one share of our common stock and one warrant to purchase one share of our common stock) at a public offering price of $6.125 per unit for net proceeds of $19.4 million, after deducting underwriters' discounts and commissions of $2.2 million and other offering expenses of $2.1 million.

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. Sales of our consumables have consistently increased due to an increasing number of our instruments being installed in the field, all of which require certain of our consumables to run customers' specific tests. 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.

Other revenue consists of warranty and other service-based revenue.

The following table presents our revenue for the periods indicated:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
Product revenue	$ 2,020,398	$ 3,256,023	$ 3,707,984	$ 4,918,245
Other revenue	154,237	133,986	319,397	240,249
Total	$ 2,174,635	$ 3,390,009	$ 4,027,381	$ 5,158,494

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.

	Three Months Ended June 30,				Six Months Ended June 30,			
	2019		2018		2019		2018	
	$	%	$	%	$	%	$	%
North America	$ 1,379,346	64%	$ 1,518,347	45%	$ 2,218,654	55%	$ 2,553,428	49%
EMEIA	506,583	23%	1,029,380	30%	1,424,913	35%	1,128,510	21%
Asia Pacific	288,706	13%	842,282	25%	383,814	10%	1,476,556	30%
Total	$ 2,174,635	100%	$ 3,390,009	100%	$ 4,027,381	100%	$ 5,158,494	100%

Cost of Revenue

Cost of revenue for our instruments and consumables includes cost from the manufacturer, raw material parts costs and associated freight, shipping and handling costs, contract manufacturer costs, salaries and other personnel costs, overhead and other direct costs related to those sales recognized as product revenue in the period.

Cost of other revenue consists of salaries and other personnel costs and costs related to warranties 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, 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, 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

Comparison of the Three Months Ended June 30, 2019 and 2018

The following table sets forth our results of operations for the three months ended June 30, 2019 and 2018:

	Three Months Ended June 30,		Period-to-Period Change	
	2019	2018	$	%
Revenues:				
Product revenue	$ 2,020,398	$ 3,256,023	$ (1,235,625)	(37.9)%
Other revenue	154,237	133,986	20,251	15.1 %
Total revenue	2,174,635	3,390,009	(1,215,374)	(35.9)%
Cost of revenue:				
Cost of product revenue	1,525,334	1,803,461	(278,127)	(15.4)%
Cost of other revenue	29,912	9,969	19,943	200.1 %
Total cost of revenue	1,555,246	1,813,430	(258,184)	(14.2)%
Operating expense:				
Research and development	2,407,692	2,098,826	308,866	14.7 %
Selling, general and administrative	5,056,005	3,489,974	1,566,031	44.9 %
Total operating expense	7,463,697	5,588,800	1,874,897	33.5 %
Loss from operations	(6,844,308)	(4,012,221)	(2,832,087)	70.6 %
Other income (expense):				
Interest expense	(565,888)	(407,635)	(158,253)	38.8 %
Change in fair value of preferred stock warrants and expirations	—	1,517,723	(1,517,723)	(100.0)%
Loss on debt extinguishment	—	(342,164)	342,164	100.0 %
Other expense	(249,884)	(61,673)	(188,211)	305.2 %
Total other income (expense)	(815,772)	706,251	(1,522,023)	(215.5)%
Loss before income taxes	(7,660,080)	(3,305,970)	(4,354,110)	131.7 %
Provision for income taxes	(4,486)	(5,506)	1,020	(18.5)%
Net loss	$ (7,664,566)	$ (3,311,476)	$ (4,353,090)	131.5 %

Revenue

Total revenue decreased by $1.2 million, or 35.9%, to $2.2 million for the three months ended June 30, 2019 compared to $3.4 million for the same period in 2018. The decrease in revenue is driven by a significant decrease in international sales. Below is a summary of changes for the three months ended June 30, 2019 as compared to the same period in 2018:

- North America revenue decreased by $0.1 million, or 9%;
- EMEIA revenue decreased by $0.5 million, or 51%; and

- Asia Pacific revenue decreased by $0.6 million, or 66%.

Cost of Revenue

Total cost of revenue decreased by $0.3 million, or 14.2%, to $1.6 million for the three months ended June 30, 2019 compared to $1.8 million for the same period in 2018. The decrease resulted from a reduction in the number of instruments shipped to fulfill new customer orders received and a reduction in the number of consumables sold during the three months ended June 30, 2019 as compared to the same period in 2018.

Research and Development Expenses

Research and development expenses increased $0.3 million, or 14.7%, to $2.4 million for the three months ended June 30, 2019 compared to $2.1 million for the same period in 2018. The increase is primarily related to increased employee compensation costs resulting from headcount additions to our Assays and Reagents, Genome Informatics, and Engineering teams in an effort to expand our product offerings and innovation.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased by $1.6 million, or 44.9%, to $5.1 million for the three months ended June 30, 2019 compared to $3.5 million for the same period in 2018. This is primarily the result of increased employee compensation costs resulting from headcount additions to our global sales and marketing teams as well as back-office support teams to assist with the growth of our world-wide product distribution. In addition, we have incurred increased professional fees to support ongoing business operations and to comply with obligations associated with being a publicly-traded company. Lastly, we have increased our marketing and promotional spending in order to help drive sales.

Interest Expense

Interest expense increased $0.2 million, or 38.8%, to $0.6 million for the three months ended June 30, 2019 compared to $0.4 million for the same period in 2018, driven by changes in our long-term debt. During that time, the principal balance of our debt increased from $7 million under the Western Alliance LSA to $20 million under our Loan and Security Agreement with Innovatus Life Sciences Lending Fund I, LP, as further discussed below.

Change in Fair Value of Preferred Stock Warrants and Expirations

Change in fair value of preferred stock warrants and expirations decreased to zero for the three months ended June 30, 2019 from $1.5 million for the same period 2018. There were no warrants exercisable for our convertible preferred stock following the closing of the IPO in August 2018. Prior to the IPO, we estimated fair value of the convertible preferred stock warrants at the time of issuance and subsequent remeasurement using the Black-Scholes-Merton model at each reporting date. On the date of the IPO and going forward, all outstanding warrants are accounted for as equity and are not subject to remeasurement.

Loss on Debt Extinguishment

There was no loss on debt extinguishment recognized during the three months ended June 30, 2019; however, we recognized $0.3 million loss during the same period in 2018 when we paid-off the Western Alliance LSA.

Other Expense

Other expense increased to $0.2 million for the three months ended June 30, 2019 compared to $0.1 million for the same period in 2018. The increase is attributed to increased accretion of the debt discount and increased state and local tax expenses.

Comparison of the Six months ended June 30, 2019 and 2018

The following table sets forth our results of operations for the six months ended June 30, 2019 and 2018:

	Six Months Ended June 30,		Period-to-Period Change	
	2019	2018	$	%
Revenue:				
Product revenue	$ 3,707,984	$ 4,918,245	$ (1,210,261)	(24.6)%
Other revenue	319,397	240,249	79,148	32.9 %
Total revenue	4,027,381	5,158,494	(1,131,113)	(21.9)%
Cost of revenue:				
Cost of product revenue	2,644,885	2,644,043	842	— %
Cost of other revenue	57,403	10,836	46,567	429.7 %
Total cost of revenue	2,702,288	2,654,879	47,409	1.8 %
Operating expense:				
Research and development	4,507,803	4,465,919	41,884	0.9 %
Selling, general and administrative	9,846,607	6,385,378	3,461,229	54.2 %
Total operating expense	14,354,410	10,851,297	3,503,113	32.3 %
Loss from operations	(13,029,317)	(8,347,682)	(4,681,635)	56.1 %
Other income (expense):				
Interest expense	(838,392)	(709,616)	(128,776)	18.1 %
Change in fair value of preferred stock warrants and expirations	—	2,470,921	(2,470,921)	(100.0)%
Loss on debt extinguishment	(921,496)	(342,164)	(579,332)	169.3 %
Other expense	(718,132)	(221,015)	(497,117)	224.9 %
Total other income (expense)	(2,478,020)	1,198,126	(3,676,146)	(306.8)%
Loss before income taxes	(15,507,337)	(7,149,556)	(8,357,781)	116.9 %
Provision for income taxes	(8,972)	(9,282)	310	(3.3)%
Net loss	$ (15,516,309)	$ (7,158,838)	$ (8,357,471)	116.7 %

Revenue

Total revenue decreased by $1.1 million, or 21.9%, to $4.0 million for the six months ended June 30, 2019 compared to $5.2 million for the same period in 2018. The decrease in revenue is driven by decreases in our North America and Asia Pacific sales, offset by an increase in our EMEIA sales. Below is a summary of changes for the six months ended June 30, 2019 as compared to the same period in 2018:

- North America revenue decreased by $0.3 million, or 13%;
- EMEIA revenue increased by $0.3 million, or 26%; and
- Asia Pacific revenue decreased by $1.1 million, or 74%.

Cost of Revenue

Total cost of revenue had an insignificant change for the six months ended June 30, 2019 compared to the same period in 2018. In 2019, the total number of instruments shipped to fulfill new customer orders received during the six months ended June 30 increased 17% compared to the same period in 2018. However, consumables represent a lower proportion of cost of sales than they did in the same period in 2018. When combined, these two factors result in an insignificant change in total cost of sales for the six months ended June 30, 2019 compared to the same period in 2018.

Research and Development Expenses

Research and development expenses had an insignificant change for the six months ended June 30, 2019 compared to the same period in 2018. We incurred increased employee compensation costs due to headcount additions to our Assays and

Regents, Genome Informatics, and Engineering teams in an effort to expand our product offerings and innovation. These expenses were offset by a decrease in foundry-related expenses to design our consumable production line.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased by $3.5 million, or 54.2%, to $9.8 million for the six months ended June 30, 2019 compared to $6.4 million for the same period in 2018. This is primarily the result of increased employee compensation costs resulting from headcount additions to our global sales and marketing teams as well as back-office support teams to assist with the growth of our world-wide product distribution. In addition, we have incurred increased professional fees to support ongoing business operations and to comply with obligations associated with being a publicly-traded company. Lastly, we have increased our marketing and promotional spending in order to help drive sales.

Change in Fair Value of Preferred Stock Warrants and Expirations

Change in fair value of preferred stock warrants and expirations decreased to zero for the six months ended June 30, 2019 from $2.5 million for the same period in 2018. Prior to the IPO, we estimated fair value of the convertible preferred stock warrants at the time of issuance and subsequent remeasurement using the Black-Scholes-Merton model at each reporting date. On the date of the IPO and going forward, all outstanding warrants are accounted for as equity and are not subject to remeasurement.

Loss on Debt Extinguishment

A loss on debt extinguishment of $0.9 million was recognized during the six months ended June 30, 2019 resulting from the decision to pay-off the Credit and Security Agreement with MidCap Financial Trust prior to its maturity date. Similarly, we recognized a loss of $0.3 million for the same period in 2018 when we paid-off the Western Alliance LSA.

Other Expense

Other expense increased $0.5 million, or 224.9%, to $0.7 million for the six months ended June 30, 2019 compared to $0.2 million for the same period in 2018. The increase is attributed to a prepayment charge recorded in March 2019 as a result of our decision to pay-off the Credit and Security Agreement with MidCap Financial Trust prior to its maturity date.

Liquidity

Since our inception, we have incurred net losses and negative cash flows from operations. We incurred net losses of $7.7 million and $3.3 million for the three months ended June 30, 2019 and 2018, respectively, and $15.5 million and $7.2 million for the six months ended June 30, 2019 and 2018, respectively. As of June 30, 2019, we had an accumulated deficit of $88.3 million and cash and cash equivalents of $15.3 million.

Sources of Liquidity

Prior to August 2018, we financed our operations principally through private placements of our convertible preferred stock, borrowings from credit facilities, and revenue from our commercial operations.

In August 2018, we completed the IPO, in which we sold 3,864,000 units (each unit consisting of one share of common stock and one warrant to purchase one share of our common stock) at a public offering price of $6.125 per unit for net cash proceeds of $19.4 million after deducting underwriters' discounts and commissions of $2.2 million and other offering expenses of $2.1 million.

In March 2019, we entered into a common stock purchase agreement, or the Aspire Purchase Agreement, with Aspire Capital Fund, LLC, or Aspire Capital, which provides that, subject to the terms, conditions and limitations thereto, Aspire Capital is committed to purchase up to an aggregate of $10.0 million of shares of our common stock. Upon execution of the Aspire Purchase Agreement, we sold to Aspire Capital 272,479 shares of common stock at $3.67 per share for proceeds of $1.0 million and Aspire Capital is committed to purchase up to $9.0 million of additional shares of our common stock at our request from time to time during the 30 month period beginning on April 23, 2019 and at prices based on the market price at the time of each sale, subject to certain conditions. In consideration for entering into the Aspire Purchase Agreement and concurrently with the execution of the

Aspire Purchase Agreement, we issued to Aspire Capital 69,444 shares of our common stock. As of June 30, 2019, we had issued 341,923 shares of our common stock to Aspire Capital under the Aspire Purchase Agreement for net proceeds of approximately $0.9 million after offering expenses.

In March 2019, we entered into a common stock purchase agreement, or the Innovatus Purchase Agreement, with certain entities affiliated with Innovatus Life Sciences Lending Fund I, LP, or the Innovatus Investors, pursuant to which we agreed to issue and sell to the Innovatus Investors 406,504 shares of our common stock at $3.69 per share for proceeds of $1.5 million. Upon execution of the Innovatus Purchase Agreement, we sold all of such shares to the Innovatus Investors.

Preferred stock financings

Through the date of our IPO, we raised approximately $129.3 million in net equity proceeds through sales of our preferred stock.

Loan facilities

On March 8, 2016, we entered into a new term Loan and Security Agreement with Western Alliance Bank, or the Western Alliance LSA, for $7.0 million. The loan proceeds were used to repay the outstanding $5.0 million loan with Square 1 Bank, as required by the amended Loan and Security agreement between Square 1 Bank and us.

In February 2018, the Western Alliance LSA was amended requiring us to secure $21.0 million in funding prior to June 30, 2018. As part of the amendment, Western Alliance Bank agreed to forbear from exercising any of its default remedies set forth in the LSA as a result of our loan default.

On June 13, 2018, the Western Alliance LSA was amended, replacing previously amended funding requirements and requiring us to secure $5.0 million in funding prior to August 3, 2018. Additionally, the amendment restricted our use of all cash collected from customers, received on and after the amendment date, until a total of $2.5 million of collections. As part of the amendment, Western Alliance Bank waived the existing default.

On June 29, 2018, we entered into a new Credit and Security Agreement with MidCap Financial Trust, or the MidCap Financial CSA, which provides for a five-year, $15 million term loan facility. The MidCap Financial CSA was secured by a lien covering substantially all of our assets, including intellectual property. Upon executing the agreement, we drew down a $10.0 million term loan from the credit facility. The loan proceeds were used to repay the outstanding $7.0 million balance on the Western Alliance LSA.

On March 14, 2019, we entered into a new Loan and Security Agreement, or the Innovatus LSA, with Innovatus Life Sciences Lending Fund I, LP, or Innovatus, and certain lenders, which provides for borrowings up to $25.0 million pursuant to certain term loans and an additional $5.0 million under a revolving credit line. The Innovatus LSA is secured by a lien covering substantially all of our assets, including our intellectual property. On March 22, 2019, we drew down $20.0 million in term loans from the Innovatus LSA. These loan proceeds were used to repay the outstanding balance under the MidCap Financial CSA. On May 23, 2019, we drew down an additional $1.1 million under the revolving credit line, and in June 2019, we repaid $0.3 million of this borrowed amount. On June 25, 2019, the Innovatus LSA was amended to among other things: (i) extend the deadline for us to maintain our domestic depository and operating accounts with East West Bank, subject to a control agreement in favor of Innovatus, to July 31, 2019 and (ii) permit us to incur credit card indebtedness in an amount not to exceed $150,000. As of June 30, 2019, we had $20.2 million borrowed in term loans and $0.8 million borrowed under the revolving credit line pursuant to the Innovatus LSA.

See Note 7 to our consolidated financial statements for a discussion of terms and provisions to the Western Alliance LSA, the MidCap Financial CSA, and the Innovatus LSA.

Note purchase agreement

On February 9, 2018, we entered into a Note Purchase Agreement with various investors, which included related parties, or the Investors, pursuant to which we agreed to sell the Investors 8% Convertible Promissory Notes, or the Convertible Notes, in the original principal amount up to approximately $16.0 million. On April 2, 2018, we amended the Note Purchase Agreement to, among other things, increase the principal amount available for issuance under the Note Purchase Agreement to approximately $18.4 million. In addition, in connection with the MidCap Financial CSA, we again amended the Note Purchase Agreement to increase the amount available for issuance under the Note Purchase Agreement to approximately $19.4 million. The Convertible Notes had a maturity date of September 30, 2018 and were convertible either into our common stock or preferred stock, dependent on the conversion events as described in Note 8 to our condensed consolidated financial statements.

In August 2018 the outstanding convertible promissory notes of $14.3 million and accrued interest was converted into 3,239,294 shares of common stock upon completion of the IPO.

Cash Flows

The following table sets forth the cash flow from operating, investing and financing activities for the periods presented:

	Six Months Ended June 30,	
	2019	**2018**
Net cash provided by (used in):		
Operating activities	$ (12,868,425)	$ (9,753,921)
Investing activities	(29,649)	(189,401)
Financing activities	11,669,871	16,545,714

Operating Activities

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.

Net cash used in operating activities was $12.9 million during the six months ended June 30, 2019 as compared to $9.8 million during the same period in 2018. The increase in cash used in operating activities of $3.1 million is attributed to increased headcount across all business segments, increased professional fees to support ongoing business operations and to comply with obligations associated with being a publicly-traded company, and increased investments in marketing and promotions. These increases are partly offset by lower rent expense as a result of us subleasing one of our leased facilities in the fourth quarter of 2018.

Investing Activities

Historically, our primary investing activities have consisted of capital expenditures for the purchase of capital equipment to support our expanding infrastructure. We expect to continue to incur additional costs for capital expenditures related to these efforts in future periods.

There was no significant cash used in investing activities during the six months ended June 30, 2019 as well as for the same period in 2018.

Financing Activities

Historically, we have financed our operations principally through private placements of our convertible preferred stock and promissory notes and borrowings from credit facilities, as well as gross profits from our commercial operations. In August 2018, we completed the IPO.

Net cash provided by financing activities was $11.7 million during the six months ended June 30, 2019 as compared to $16.5 million during the same period in 2018, a decrease of $4.9 million. During the six months ended June 30, 2019 we had net proceeds of $11.0 million from the issuance of the Innovatus LSA and Innovatus Purchase Agreement, as well as from the Aspire Purchase Agreement. During the same period in 2018 we raised convertible notes of $14.3 million.

Capital Resources

We performed an analysis of our ability to continue as a going concern. We believe, based on our current business plan, that our existing cash, cash equivalents, and short-term investments will not be sufficient to meet our anticipated cash requirements for at least the next 12 months, which raises substantial doubt about our ability to continue as a going concern. See Note 1 to our condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for more information.

We plan to continue to fund our operations through cash and cash equivalents on hand, as well as through public or private equity or debt financings, strategic collaborations, licensing arrangements, asset sales, or other arrangements. There can be no assurance that additional funds will be available when needed from any source or, if available, will be available on terms that are acceptable to us. Even if we raise additional capital, we may also be required to modify, delay or abandon some of our plans which could have a material adverse effect on our business, operating results and financial condition and our ability to achieve our intended business objectives. Any of these actions could materially harm our business, results of operations and future prospects.

Off-Balance Sheet Arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined under SEC rules, and similarly did not and do not have any holdings in variable interest entities.

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. The preparation of our consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements and accompanying notes. We evaluate these estimates and judgments on an ongoing basis. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

There were no material changes in our critical accounting policies and estimates during the three months ended June 30, 2019.

Recent Accounting Pronouncements

See Note 2 to our condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for information concerning recent accounting pronouncements.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

As a smaller reporting company, we are not required to provide the information required by this Item.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain "disclosure controls and procedures," as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act. Disclosure controls and procedures are controls and other procedures designed to ensure that the information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our principal executive officer and our principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

As of June 30, 2019, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities and Exchange Act of 1934). Our 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 principal executive officer and principal financial officer have concluded, based upon the evaluation described above, that as of June 30, 2019 our disclosure controls and procedures were effective at the reasonable assurance level.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

None.

ITEM 1A. RISK FACTORS

Except for the risk factors set forth below, there have been no material changes to the risk factors previously disclosed under the heading “Risk Factors” in our Annual Report on Form 10-K for the year ended December 31, 2018, filed with the Securities and Exchange Commission on March 14, 2019. The risks described in this Quarterly Report on Form 10-Q and in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018 are not the only risks facing our company. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition or future results.

The terms of our debt facility place restrictions on our operating and financial flexibility, and failure to comply with covenants or to satisfy certain conditions of the agreement governing the debt facility may result in acceleration of our repayment obligations and foreclosure on our pledged assets, which could significantly harm our liquidity, financial condition, operating results, business and prospects and cause the price of our securities to decline.

On March 14, 2019, we entered into a new Loan and Security Agreement, or the Innovatus LSA, with Innovatus Life Sciences Lending Fund I, LP, or Innovatus, and certain lenders, which provides for borrowings up to $25.0 million pursuant to certain term loans and an additional $5.0 million under a revolving credit line. The Innovatus LSA is secured by a lien covering substantially all of our assets, including our intellectual property. On March 22, 2019, we drew down $20.0 million in term loans from the Innovatus LSA. The remaining $5 million may be drawn upon satisfaction of certain conditions. On May 23, 2019, we drew down an additional $1.1 million under the revolving credit line, and in June 2019, we repaid $0.3 million of this borrowed amount. As of June 30, 2019, we had $20.2 million borrowed in term loans and $0.8 million borrowed under the revolving credit line pursuant to the Innovatus LSA.

The loan and security agreement governing the Innovatus LSA requires us to comply with a number of covenants (affirmative and negative), including restrictive covenants that limit our ability to: incur additional indebtedness; encumber the collateral securing the loan; acquire, own or make investments; repurchase or redeem any class of stock or other equity interest; declare or pay any cash dividend or make a cash distribution on any class of stock or other equity interest; transfer a material portion of our assets; acquire other businesses; and merge or consolidate with or into any other organization or otherwise suffer a change in control, in each case subject to exceptions. Our intellectual property is also subject to customary negative covenants. In addition, subject to limited exceptions, Innovatus could declare an event of default upon the occurrence of any event that it interprets as having a material adverse effect upon our business, operations, properties, assets, or financial condition or upon our ability to perform or pay the secured obligations under the Innovatus LSA or upon the collateral or Innovatus’ liens on the collateral under the agreement, thereby requiring us to repay the loan immediately, together with a prepayment fee and other applicable fees.

If we default under the Innovatus LSA, Innovatus may accelerate all of our repayment obligations and, if we are unable to access funds to meet those obligations or to renegotiate our agreement, Innovatus could take control of our pledged assets and we could immediately cease operations. If we were to renegotiate our agreement under such circumstances, the terms may be significantly less favorable to us. If we were liquidated, Innovatus’ right to repayment would be senior to the rights of our stockholders to receive any proceeds from the liquidation. Any declaration by Innovatus of an event of default could significantly harm our liquidity, financial condition, operating results, business, and prospects and cause the price of our securities to decline.

We may incur additional indebtedness in the future. The debt instruments governing such indebtedness may contain provisions that are as, or more, restrictive than the provisions governing our existing indebtedness under the Innovatus LSA. If we are unable to repay, refinance or restructure our indebtedness when payment is due, the lenders could proceed against the collateral or force us into bankruptcy or liquidation.

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. In addition, the Innovatus LSA contains a negative covenant which prohibits us from paying dividends without the prior written consent of Innovatus.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

Unregistered Sales of Equity Securities

Use of Proceeds

On August 21, 2018, we completed our initial public offering, or our IPO, pursuant to a registration statement on Form S-1 (File No. 333-225970), which was declared effective by the SEC on August 20, 2018, in which we sold an aggregate of 3,864,000 units (each unit consisting of one share of our common stock and one warrant to purchase one share of our common stock) at a public offering price of $6.125 per unit, which included the sale of 504,000 units pursuant to the exercise of the underwriters' over-allotment option. Roth Capital Partners served as the sole book-running manager for the offering, Maxim Group acted as the lead manager, and LifeSci Capital acted as the co-manager. We received net cash proceeds of $19.4 million, after deducting underwriters' discounts and commissions of $2.2 million and other offering expenses of $2.1 million. None of these expenses consisted of payments made by us to directors, officers or persons owning 10% or more of our common stock or to their associates, or to our affiliates.

There has been no material change in the expected use of the net proceeds from our IPO as described in our final prospectus filed with the SEC on August 22, 2018 pursuant to Rule 424(b) under the Securities Act of 1933, as amended. Since the effective date of our registration statement through June 30, 2019, we have used all of the net proceeds from the IPO.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

None.

ITEM 6. EXHIBITS

Exhibit Number	Description
3.1 (1)	Amended and Restated Certificate of Incorporation.
3.2 (1)	Amended and Restated Bylaws.
4.1 (2)	Form of Common Stock Certificate.
4.2 (2)	Form of Warrant to Purchase Series B-1 Preferred Stock issued to Square 1 Bank.
4.3 (2)	Form of Warrant to Purchase Series D Preferred Stock issued to Western Alliance Bank.
4.4 (2)	Warrant to Purchase Series D-1 Preferred Stock issued to Western Alliance Bank.
4.5 (2)	Form of Warrant to Purchase Series D-1 Preferred Stock issued to MidCap Financial Trust.
4.6 (2)	Form of Warrant to Purchase Common Stock issued to Underwriters.
4.7 (3)	Form of Warrant to Purchase Common Stock for Service Providers.
4.8 (4)	Form of Warrant to Purchase Common Stock for Innovatus.
4.9 (4)	Registration Rights Agreement, dated March 14, 2019, between the Company and Aspire Capital Fund, LLC.
4.10 (4)	Registration Rights Agreement, dated March 14, 2019, by and among the Company and the Innovatus Investors.
10.1	Waiver and First Amendment to Loan and Security Agreement, dated June 25, 2019, by and among the Company, Innovatus Life Sciences Lending Fund I, LP and East West Bank.
31.1	Certification of Chief Executive Officer pursuant to Rules 13a-14 and 15d-14 promulgated pursuant to the Securities Exchange Act of 1934, as amended.
31.2	Certification of Chief Financial Officer pursuant to Rules 13a-14 and 15d-14 promulgated pursuant to the Securities Exchange Act of 1934, as amended.
32.1*	Certification of Principal Executive Officer and Principal Financial Officer pursuant to Rule 13a-14(b) or 15d-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. Section 1350.
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.

(1) Incorporated by reference to the Registrant’s Current Report on Form 8-K, filed with the SEC on August 24, 2018.
(2) Incorporated by reference to the Registrant’s Registration Statement on Form S-1 (File No. 333-225970), as amended.
(3) Incorporated by reference to the Registrant’s Current Report on Form 8-K, filed with the SEC on November 21, 2018.
(4) Incorporated by reference to the Registrant’s Current Report on Form 8-K, filed with the SEC on March 14, 2019.
* 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.

SIGNATURES

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

	BIONANO GENOMICS, INC.
Date: August 8, 2019	By: /s/ R. Erik Holmlin, Ph.D.
	R. Erik Holmlin, Ph.D.
	President and Chief Executive Officer (Principal Executive Officer)
Date: August 8, 2019	By: /s/ Mike Ward
	Mike Ward
	Chief Financial Officer (Principal Financial and Accounting Officer)

WAIVER AND FIRST AMENDMENT TO LOAN AND SECURITY AGREEMENT

THIS WAIVER AND FIRST AMENDMENT TO LOAN AND SECURITY AGREEMENT (the "Amendment") is made and entered into as of the 25th day of June, 2019, by and among INNOVATUS LIFE SCIENCES LENDING FUND I, LP, a Delaware limited partnership ("Innovatus"), as collateral agent (in such capacity, together with its successors and assigns in such capacity, "Collateral Agent" and a Lender and EAST WEST BANK ("Bank" collectively, with Innovatus, "Lender") and BIONANO GENOMICS, INC., a Delaware corporation ("Borrower").

W I T N E S S E T H:

WHEREAS, Borrower, Agent and Lender have entered into that certain Loan and Security Agreement dated as of March 14, 2019 (as the same has been amended, supplemented or otherwise modified to date, including hereby the "Loan Agreement");

WHEREAS, Borrower has requested that Lender waive certain defaults and make certain amendments to the Loan Agreement; and

WHEREAS, Lender has agreed to waive such defaults and make such amendments subject to the terms and conditions of this Amendment.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the parties hereto, the parties hereto agree as follows:

1. Definitions. All capitalized terms not otherwise defined herein are used herein with the respective definitions given them in the Loan Agreement.

2. Waiver; Effect of Waiver. Subject to the terms and conditions of this Amendment, Lender hereby waives the Defaults and Events of Default arising from Borrower's failure to comply with the requirements of Section 6.6(a) of the Loan Agreement to maintain all of its and its Domestic Subsidiaries' domestic depository and operating accounts with Bank and subject to a Control Agreement in favor of, and in form and content acceptable to, Collateral Agent on or prior to the date that is 90 days after the Effective Date. The specific waiver contemplated hereby does not constitute a waiver of any provision of the Loan Documents other than as expressly set forth herein, whether now existing or hereafter arising. Neither this Amendment nor any other indulgences that may have been granted to Borrower by Lender shall constitute a course of dealing or otherwise obligate Lender to modify, expand or extend the agreements contained herein, to agree to any other amendments to the Loan Agreement or to grant any consent to, waiver of or indulgence with respect to any other noncompliance with any provision of the Loan Documents.

3. Amendments to Loan Agreement.

(a) Section 6.6(a) (Operating Accounts) of the Loan Agreement is hereby amended and restated as follows:

(a) From and after July 31, 2019, Borrower shall maintain its, and its Domestic Subsidiaries', domestic depository and operating accounts with Bank, subject to a Control Agreement in favor of, and in form and content acceptable to, Collateral Agent; provided, however, until July 31, 2019, all Collateral Accounts maintained with any bank or financial institution shall be subject to one or more Control are in such form and substance as are acceptable to Collateral Agent.

(b) Section 13 of the Loan Agreement is hereby amended as follows:

(i) The definition of "Permitted Indebtedness" therein is hereby amended by (A) deleting the word "and" at the end of clause (g) thereof; (B) deleting the period at the end of clause (h) thereof and replacing it with "; and" and (C) adding a new clause (i) thereof as follows:

(i) Indebtedness consisting of credit cards in an aggregate amount not to exceed $150,000 at any time outstanding.

(ii) The definition of "Permitted Liens" therein is hereby amended by (A) deleting the word "and" at the end of clause (i) thereof; (B) deleting the period at the end of clause (j) thereof and replacing it with "; and" and (C) adding a new clause (k) thereof as follows:

(k) Liens securing Indebtedness permitted under clause (i) of the definition of "Permitted Indebtedness".

4. Conditions. Notwithstanding any other provision of this Amendment and without affecting in any manner the rights of Lender hereunder, it is understood and agreed that this Amendment shall not become effective, and Borrower shall have no rights under this Amendment, until the following conditions have been satisfied:

(a) Borrower and Lender shall have executed and delivered a counterpart of this Amendment;

(b) each of the representations and warranties of Borrower contained in Sections 5 and 7 below shall be true and correct in all material respects as of the date hereof (except to the extent that such representations and warranties relate solely to an earlier date).

5. Authorization. To induce Lender to enter into this Amendment, Borrower hereby represents and warrants to Lender that it has taken all necessary organizational action to authorize the execution and delivery of this Amendment and its performance of this Amendment and the Loan Agreement, as amended by this Amendment. This Amendment constitutes a legal, valid and binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting the enforcement of creditors' rights generally and by general equitable principles (whether enforcement is sought by proceedings in equity or at law). This Amendment has been duly executed and delivered on behalf of Borrower.

6. Ratification and Reaffirmation. Borrower hereby ratifies and reaffirms all of its covenants, duties, indebtedness and liabilities under the Loan Documents to which it is a party.

7. Representations and Warranties. Borrower hereby represents and warrants to Lender that the representations and warranties contained in the Loan Agreement and the other Loan Documents are true and correct in all material respects on and as of the date hereof, except for representations and warranties that expressly relate to an earlier date, which remain true and correct in all material respects as of said earlier date.

8. Certain References. Each reference to the Loan Agreement in any of the Loan Documents shall be deemed to be a reference to the Loan Agreement, as amended by this Amendment.

9. Costs and Expenses. Borrower agrees to promptly pay all costs and expenses of Lender actually incurred in connection with the preparation, negotiation and execution and delivery of this Amendment and the other agreements and documents executed and delivered in connection herewith, including, without limitation, the reasonable fees and expenses of counsel for Lender with respect thereto.

10. Binding Nature. This Amendment shall be binding upon and inure to the benefit of the parties hereto, their respective successors, successors-in-titles, and assigns.

11. GOVERNING LAW. THIS AMENDMENT SHALL BE GOVERNED BY, AND CONSTRUED AND INTERPRETED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK.

12. Effect of Amendment. Except as set forth expressly herein, all terms of the Loan Agreement, as amended hereby, and the other Loan Documents shall be and remain in full force and effect and shall constitute the legal, valid, binding and enforceable obligations of Borrower to Lender. The execution, delivery and effectiveness of this Amendment shall not, except as expressly provided herein, operate as a waiver of any right, power or remedy of Lender under the Loan Agreement or the other Loan Documents, nor constitute a waiver of any provision of the Loan Agreement or the other Loan Documents. This Amendment shall constitute a Loan Document for all purposes of the Loan Agreement.

13. No Novation. This Amendment is not intended by the parties to be, and shall not be construed to be, a novation of the Loan Agreement or an accord and satisfaction in regard thereto.

14. Counterparts. This Amendment may be executed by one or more of the parties hereto in any number of separate counterparts, each of which shall be deemed an original and all of which, taken together, shall be deemed to constitute one and the same instrument. Delivery of an executed counterpart of this Amendment by facsimile transmission or by electronic mail in pdf form shall be as effective as delivery of a manually executed counterpart hereof.

15. Entire Understanding. This Amendment sets forth the entire understanding of the parties with respect to the matters set forth herein, and shall supersede any prior negotiations or agreements, whether written or oral, with respect thereto.

[*Signature Pages Follow*]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed by their duly authorized representatives as of the date first above written.

BORROWER:

BIONANO GENOMICS, INC.

By: /s/ R. Erik Holmlin, Ph.D.
Name: R. Erik Holmlin, Ph.D.
Title: CEO

COLLATERAL AGENT AND LENDER:

INNOVATUS LIFE SCIENCES LENDING FUND I, LP

By: Innovatus Life Sciences GP, LP, its general partner

By: /s/ Andrew Dym
Name: Andrew Dym
Title: Authorized Signatory

EAST WEST BANK:

EAST WEST BANK

By: /s/ James Tai
Name: James Tai
Title: Managing Director / Head of Life Sciences

Exhibit 31.1

CERTIFICATION

I, R. Erik Holmlin, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) 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) 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

(c) 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: August 8, 2019

/s/ R. Erik Holmlin, Ph.D.

R. Erik Holmlin, Ph.D.
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Mike Ward, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) 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) 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

(c) 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.

Dated: August 8, 2019

/s/ Mike Ward

Mike Ward
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”), and Mike Ward, Chief Financial Officer of the Company, each hereby certifies that, to the best of his knowledge:

1. the Company’s Quarterly Report on Form 10-Q for the period ended June 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the “Periodic 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 Periodic Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: August 8, 2019

/s/ R. Erik Holmlin, Ph.D.	/s/ Mike Ward
R. Erik Holmlin, Ph.D.	Mike Ward
President and Chief Executive Officer	Chief Financial Officer
(Principal Executive Officer)	*(Principal Financial and Accounting Officer*

This certification accompanies and is being “furnished”with this Periodic 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 Periodic Report, irrespective of any general incorporation language contained in such filing.