UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 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 March 31, 2020
or
☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from to

Commission file number: 001-34180

FLUIDIGM CORPORATION

(Exact name of registrant as specified in its charter)

Delaware	**77-0513190**
State or other jurisdiction of incorporation or organization	I.R.S. Employer Identification No.

2 Tower Place, Ste 2000	**South San Francisco,**	**CA**	**94080**
Address of principal executive offices			Zip Code

Registrant's telephone number, including area code: **(650) 266-6000**

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, $0.001 par value per share	**FLDM**	**The Nasdaq Global Select Market**

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

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

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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

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

As of April 30, 2020, there were 70,706,062 shares of the registrant's common stock, $0.001 par value per share, outstanding.

FLUIDIGM CORPORATION

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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

FLUIDIGM CORPORATION
CONDENSED CONSOLIDATED BALANCE SHEETS
(In thousands)
(Unaudited)

	March 31, 2020	December 31, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	$ 34,992	$ 21,661
Short-term investments	13,493	36,978
Accounts receivable (net of allowances of $104 and $6, at March 31, 2020 and December 31, 2019, respectively)	14,410	18,981
Inventories	16,294	13,884
Prepaid expenses and other current assets	3,244	4,592
Total current assets	82,433	96,096
Property and equipment, net	8,143	8,056
Operating lease right-of-use asset, net	39,499	4,860
Other non-current assets	5,204	5,492
Developed technology, net	48,612	46,200
Goodwill	106,328	104,108
Total assets	$ 290,219	$ 264,812
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 9,440	$ 6,510
Accrued compensation and related benefits	5,616	5,160
Operating lease liabilities, current	1,185	1,833
Other accrued liabilities	6,456	7,515
Deferred revenue, current	12,667	11,803
Total current liabilities	35,364	32,821
Convertible notes, net	53,920	53,821
Deferred tax liability	10,929	11,494
Operating lease liabilities, non-current	39,611	4,323
Deferred revenue, non-current	8,438	8,168
Other non-current liabilities	461	573
Total liabilities	148,723	111,200
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.001 par value, 10,000 shares authorized, no shares issued and outstanding at either March 31, 2020 or December 31, 2019	—	—
Common stock: $0.001 par value, 200,000 shares authorized at March 31, 2020 and December 31, 2019; 70,697 and 69,956 shares issued and outstanding at March 31, 2020 and December 31, 2019, respectively	71	70
Additional paid-in capital	782,031	777,765
Accumulated other comprehensive loss	(885)	(582)
Accumulated deficit	(639,721)	(623,641)
Total stockholders' equity	141,496	153,612
Total liabilities and stockholders' equity	$ 290,219	$ 264,812

See accompanying notes

FLUIDIGM CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except per share amounts)
(Unaudited)

	Three Months Ended March 31,	
	2020	**2019**
Revenue:		
Product revenue	$ 18,981	$ 24,827
Service revenue	5,186	5,284
Grant revenue	350	—
License revenue	3,100	—
Total revenue	27,617	30,111
Costs and expenses:		
Cost of product revenue	9,640	11,389
Cost of service revenue	1,525	1,732
Research and development	8,699	8,372
Selling, general and administrative	22,695	22,824
Total costs and expenses	42,559	44,317
Loss from operations	(14,942)	(14,206)
Interest expense	(900)	(2,701)
Loss from extinguishment of debt	—	(9,000)
Other income (loss), net	(818)	484
Loss before income taxes	(16,660)	(25,423)
Income tax benefit (expense)	680	(42)
Net loss	$ (15,980)	$ (25,465)
Net loss per share, basic and diluted	$ (0.23)	$ (0.44)
Shares used in computing net loss per share, basic and diluted	70,458	58,411

See accompanying notes

FLUIDIGM CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

(In thousands)

(Unaudited)

	Three Months Ended March 31,	
	2020	**2019**
Net loss	$ (15,980)	$ (25,465)
Other comprehensive income (loss), net of tax		
Foreign currency translation adjustment	(303)	8
Net change in unrealized gain (loss) on investments	—	2
Other comprehensive income (loss), net of tax	(303)	10
Comprehensive loss	$ (16,283)	$ (25,455)

See accompanying notes

FLUIDIGM CORPORATION
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)
(Unaudited)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance as of December 31, 2019	69,956	$ 70	$ 777,765	$ (582)	$ (623,641)	$ 153,612
Issuance of restricted stock, net of shares withheld for taxes, and other	255	—	(146)	—	—	(146)
Cumulative-effect of new accounting standard for Topic 326 Credit Losses	—	—	—	—	(100)	(100)
Stock-based compensation expense	—	—	2,364	—	—	2,364
Acquisition of InstruNor AS	485	1	2,048	—	—	2,049
Net loss	—	—	—	—	(15,980)	(15,980)
Other comprehensive loss, net of tax	—	—	—	(303)	—	(303)
Balance as of March 31, 2020	70,696	$ 71	$ 782,031	$ (885)	$ (639,721)	$ 141,496

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance as of December 31, 2018	49,338	$ 49	$ 631,605	$ (687)	$ (558,851)	$ 72,116
Issuance of common stock on bond conversion	19,460	19	133,279	—	—	133,298
Issuance of restricted stock, net of shares withheld for taxes, and other	140	1	(177)	—	—	(176)
Issuance of common stock from option exercises	53	—	255	—	—	255
Stock-based compensation expense	—	—	2,207	—	—	2,207
Net loss	—	—	—	—	(25,465)	(25,465)
Other comprehensive income, net of tax	—	—	—	10	—	10
Balance as of March 31, 2019	68,991	$ 69	$ 767,169	$ (677)	$ (584,316)	$ 182,245

See accompanying notes

FLUIDIGM CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)

(Unaudited)

	Three Months Ended March 31,	
	2020	**2019**
Operating activities		
Net loss	$ (15,980)	$ (25,465)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	1,092	1,191
Stock-based compensation expense	2,366	2,271
Amortization of developed technology	2,968	2,800
Amortization of debt discounts, premiums and issuance costs	140	2,037
Loss on extinguishment of debt	—	9,000
Provision for excess and obsolete inventory	195	135
Loss on disposal of property and equipment	—	70
Other non-cash items	264	(25)
Changes in assets and liabilities:		
Accounts receivable, net	4,730	(2,483)
Inventories	(2,280)	(874)
Prepaid expenses and other assets	112	(1,234)
Accounts payable	3,124	2,649
Deferred revenue	1,040	650
Other liabilities	(2,066)	(10,852)
Net cash used in operating activities	(4,295)	(20,130)
Investing activities		
Acquisition, net of cash acquired	(5,154)	—
Purchases of investments	—	(9,491)
Proceeds from maturities of investments	23,644	—
Purchases of property and equipment	(1,030)	(266)
Net cash provided by (used in) investing activities	17,460	(9,757)
Financing activities		
Payments of debt issuance cost	(357)	—
Proceeds from exercise of stock options	—	255
Payments for taxes related to net share settlement of equity awards and other	(146)	(108)
Net cash provided by (used in) financing activities	(503)	147
Effect of foreign exchange rate fluctuations on cash and cash equivalents	(331)	(27)
Net increase (decrease) in cash, cash equivalents and restricted cash	12,331	(29,767)
Cash, cash equivalents and restricted cash at beginning of period	23,736	95,401
Cash, cash equivalents and restricted cash at end of period	$ 36,067	$ 65,634
Supplemental disclosures of cash flow information		
Cash paid for interest	$ 44	2,752
Cash paid for income taxes, net of refunds	$ 87	29
Asset retirement obligations	$ 303	316

See accompanying notes

1. Description of Business

Fluidigm Corporation (the Company, Fluidigm, we, our or us) creates, manufactures, and markets technologies and tools for life sciences research, including preparatory and analytical instruments for Mass Cytometry, PCR, Library Prep, Single Cell Genomics, and consumables, including integrated fluidic circuits (IFC), assays, and reagents. Our focus is on the most pressing needs in translational and clinical research, including cancer, immunology and immunotherapy. We sell our instruments, consumables and services to academic institutions, clinical research laboratories, and contract research organizations, as well as biopharmaceutical, biotechnology, and agricultural biotechnology companies. The Company was formerly known as Mycometrix Corporation and changed its name to Fluidigm Corporation in April 2001. Fluidigm Corporation was founded in 1999 and is headquartered in South San Francisco, California.

2. Summary of Significant Accounting Policies

Basis of Presentation and Consolidation

The accompanying consolidated financial statements have been prepared in conformity with U.S. generally accepted accounting principles (U.S. GAAP) and include the accounts of our wholly owned subsidiaries. As of March 31, 2020, we had wholly owned subsidiaries in Singapore, Canada, the Netherlands, Japan, France, the United Kingdom, China, Germany and Norway. All subsidiaries, except for Singapore, use their local currency as their functional currency. The Singapore subsidiary uses the U.S. dollar as its functional currency. All intercompany transactions and balances have been eliminated in consolidation.

Certain prior period amounts in the condensed consolidated statements of income and condensed consolidated statements of cash flows were reclassified to conform with the current period presentation. These reclassifications were immaterial and did not affect prior period total assets, total liabilities, stockholders' equity, total revenue, total costs and expenses, loss from operations or net loss.

Use of Estimates

The preparation of financial statements in accordance with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions believed to be reasonable, which together form the basis for making judgments about the carrying values of assets and liabilities. The full extent to which the COVID-19 pandemic impacts our business, results of operations and financial condition will depend on numerous evolving factors including, but not limited to, the magnitude and duration of COVID-19, the extent to which it will impact worldwide macroeconomic conditions, including the speed of recovery, and governmental and business reactions to the pandemic. We assessed certain accounting matters that generally require consideration of forecasted financial information in the context of information available to us and the unknown impact of COVID-19 as of March 31, 2020. These accounting matters included, but were not limited to, our allowance for doubtful accounts and credit losses, inventory and related reserves and the carrying value of goodwill and other long lived assets. Actual results could differ materially from these estimates and could have a material adverse effect on our consolidated financial statements.

Foreign Currency

Assets and liabilities of non-U.S. subsidiaries that use the local currency as their functional currency are translated into U.S. dollars at exchange rates in effect on the balance sheet date. The adjustments resulting from the foreign currency translations are recorded in accumulated other comprehensive loss, a separate component of stockholders' equity. Income and expense accounts are translated at monthly average exchange rates during the year.

Revenue Recognition

We generate revenue primarily from the sale of our products and services. Product revenue is derived from the sale of instruments and consumables, including IFCs, assays and reagents. Service revenue is derived from the sale of instrument service contracts, repairs, installation, training and other specialized product support services. We receive grants from various

entities to perform research and development activities over contractually defined periods. Revenue is generally recognized provided that the conditions under which the grants were provided have been met and any remaining performance obligations are perfunctory. Revenue is reported net of any sales, use and value-added taxes we collect from customers as required by government authorities.

We recognize revenue based on the amount of consideration we expect to receive in exchange for the goods and services we transfer to the customer. Our commercial arrangements typically include multiple distinct products and services, and we allocate revenue to these performance obligations based on their relative standalone selling prices. Standalone selling prices (SSP) are generally determined using observable data from recent transactions. In cases where sufficient data is not available, we estimate a product's SSP using a cost plus a margin approach or by applying a discount to the product's list price.

Product Revenue

We recognize product revenue at the point in time when control of the goods passes to the customer and we have an enforceable right to payment. This generally occurs either when the product is shipped from one of our facilities or when it arrives at the customer's facility, based on the contractual terms. Customers generally do not have a unilateral right to return products after delivery. Invoices are generally issued at shipment and generally become due in 30 to 60 days.

We sometimes perform shipping and handling activities after control of the product passes to the customer. We have made an accounting policy election to account for these activities as product fulfillment activities rather than as separate performance obligations.

Service Revenue

We recognize revenue from repairs, maintenance, installation, training and other specialized product support services at the point in time the work is completed. Installation and training services are generally billed in advance of service. Repairs and other services are generally billed at the point the work is completed.

Revenue associated with instrument service contracts is recognized on a straight-line basis over the life of the agreement, which is generally one to three years. We believe this time-elapsed approach is appropriate for service contracts because we provide services on demand throughout the term of the agreement. Invoices are generally issued in advance of service on a monthly, quarterly, annual or multi-year basis. Payments made in advance of service are reported on our condensed consolidated balance sheet as deferred revenue.

License Revenue

In March 2020, we reached a settlement agreement for intellectual property infringement claims, in which we received a $3.5 million payment in exchange for a perpetual license under certain Fluidigm intellectual property.

The settlement is considered a multiple-element arrangement with each element accounted for individually. Accordingly, $3.1 million of the proceeds was recognized as license revenue and $0.4 million was offset against legal costs.

Contract Costs

Incremental sales commission costs incurred to obtain instrument service contracts are capitalized and amortized to selling, general and administrative expense over the life of the contract, which is generally one to three years. As a practical expedient, we expense sales commissions associated with product support services that are delivered in less than one year as they are incurred. Sales commissions associated with the sale of products are expensed as they are incurred. To date, capitalized contract costs have been immaterial.

Product Warranties

We generally provide a one-year warranty on our instruments. We accrue for estimated warranty obligations at the time of product shipment. We periodically review our warranty liability and record adjustments based on the terms of warranties provided to customers, and historical and anticipated warranty claim experience. This expense is recorded as a component of cost of product revenue in the condensed consolidated statements of operations.

Significant Judgments

Applying the revenue recognition practices discussed above often requires significant judgment. Judgment is required when identifying performance obligations, estimating SSP and allocating purchasing consideration in multi-element arrangements and estimating the future amount of our warranty obligations. Moreover, significant judgment is required when interpreting commercial terms and determining when control of goods and services passes to the customer. Any material changes created by errors in judgment could have a material effect on our operating results and overall financial condition.

Accounts Receivable

Trade accounts receivable are recorded at net invoice value. We review our exposure to accounts receivable and provide allowances of specific amounts if collectability is no longer reasonably assured based on historical experience and specific customer collection issues. We evaluate such allowances on a regular basis and adjust them as needed.

Concentrations of Business and Credit Risk

Financial instruments that potentially subject us to credit risk consist of cash, cash equivalents, investments, and accounts receivable. Our cash, cash equivalents, and investments may consist of deposits held with banks, money market funds, and other highly liquid investments that may at times exceed federally insured limits. Cash equivalents and investments are financial instruments that potentially subject us to concentrations of risk. Under our investment policy, we invest primarily in securities issued by the U.S. government. The goals of our investment policy, in order of priority, are as follows: preserve capital, meet liquidity needs, and optimize returns.

We generally do not require collateral to support credit sales. To reduce credit risk, we perform credit evaluations of our customers. Excluding the impact of the settlement agreement, no single customer represented more than 10% of total revenue for three months ended March 31, 2020 or 2019 and no single customer represented more than 10% of total accounts receivable at March 31, 2020, or December 31, 2019.

Our products include components that are currently procured from a single source or a limited number of sources. We believe that other vendors would be able to provide similar components; however, the qualification of such vendors may require start-up time. In order to mitigate any adverse impacts from a disruption of supply, we attempt to maintain an adequate supply of critical limited-source components.

Leases

We determine if an arrangement is a lease, or contains a lease, at inception. Operating leases are included in operating lease right-of-use (ROU) assets and current and non-current operating lease liabilities in our condensed consolidated balance sheets. ROU assets represent our right-to-use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. As most of our leases do not provide an implicit rate, we generally use our incremental borrowing rate based on the estimated rate of interest for collateralized borrowing over a similar term of the lease payments at commencement date. Significant judgment is required in determining the incremental collateralized borrowing rate. Lease expense for lease payments is recognized on a straight-line basis over the lease term.

We elected the short-term lease recognition exemption for all leases that qualify. This means that, for those leases that qualify, we will not recognize ROU assets or lease liabilities for leases with an initial lease term of one year or less. We also elected to not separate lease and nonlease components for our building leases. The nonlease components are generally variable in nature and are expected to represent most of our variable lease costs. Variable costs are expensed as incurred. We have taken a portfolio approach for our vehicle leases by country.

Goodwill, Intangible Assets and Other Long-Lived Assets

Goodwill, which has an indefinite useful life, represents the excess of cost over fair value of net assets acquired. Our intangible assets include developed technology, patents and licenses. The cost of identifiable intangible assets with finite lives is generally amortized on a straight-line basis over the assets' respective estimated useful lives.

Goodwill and intangible assets with indefinite lives are not subject to amortization but are tested for impairment on an annual basis during the fourth quarter or whenever events or changes in circumstances indicate the carrying amount of these assets may not be recoverable. Events or changes in circumstances that could affect the likelihood that we will be required to

recognize an impairment charge include, but are not limited to, declines in our stock price or market capitalization, economic downturns and other macroeconomic events, including the current COVID-19 pandemic, declines in our market share or revenues, and an increase in our losses, rapid changes in technology, failure to achieve the benefits of capacity increases and utilization, significant litigation arising out of an acquisition, or other matters. Any impairment charges could have a material adverse effect on our operating results and net asset value in the quarter in which we recognize the impairment charge.

In evaluating our goodwill and intangible assets with indefinite lives for indications of impairment, we first conduct an assessment of qualitative factors to determine whether it is more likely than not that the fair value of our reporting unit is less than its carrying amount. If we determine that it is more likely than not that the fair value of our reporting unit is less than its carrying amount, we compare the fair value of our reporting unit to its carrying value. If the fair value of our reporting unit exceeds its carrying value, goodwill is not considered impaired and no further analysis is required. If the carrying value of the reporting unit exceeds its fair value, then an impairment loss equal to the difference would be recorded to goodwill. We did not recognize any impairment of goodwill for any of the periods presented herein.

We evaluate our long-lived assets, including finite-lived intangibles, for indicators of possible impairment when events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. If any indicator of impairment exists, we assess the recoverability of the affected long-lived assets by determining whether the carrying value of the asset can be recovered through undiscounted future operating cash flows. If impairment is indicated, we estimate the asset's fair value using future discounted cash flows associated with the use of the asset and adjust the carrying value of the asset accordingly. We did not recognize any impairment of intangibles for any of the periods presented herein.

Convertible Notes

In February 2014, we closed an underwritten public offering of $201.3 million aggregate principal amount of our 2.75% Senior Convertible Notes due 2034 (2014 Notes). In March 2018, we entered into separate privately negotiated transactions with certain holders of our 2014 Notes to exchange $150.0 million in aggregate principal amount of the 2014 Notes for our 2.75% Exchange Convertible Senior Notes due 2034 (2018 Notes). As the 2018 Notes were convertible, at our election, into cash, shares of our common stock, or a combination of cash and shares of our common stock, we accounted for the 2018 Notes under the cash conversion guidance in ASC 470, whereby the embedded conversion option in the 2018 Notes was separated and accounted for in equity. In the first quarter of 2019, the 2018 Notes were converted into 19.5 million shares of our common stock and the 2018 Notes were retired. We recorded a loss of $9.0 million on the retirement of the 2018 Notes. We determined the fair value of the 2018 Notes using valuation techniques that required us to make assumptions related to the implied discount rate.

In November 2019, we closed a private placement to qualified institutional buyers pursuant to Rule 144A under the Securities Act of $55.0 million aggregate principal amount of our 5.25% Senior Convertible Notes due 2024 (2019 Notes). The majority of the issuance proceeds were used to retire approximately $50.2 million of aggregate principal amount of our 2014 Notes, leaving approximately $1.1 million of aggregate principal amount of our 2014 Notes outstanding.

As the 2019 Notes do not provide for a cash conversion feature, the 2019 Notes are recorded for as debt in their entirety in accordance with ASC 470. For the 2014, 2018 and 2019 Notes, offering-related costs, including underwriting costs, were capitalized as debt issuance costs, recorded as an offset to the carrying value of the related Notes, and are amortized over the expected term of the related Notes using the effective interest method.

See Note 7 for a detailed discussion of the accounting treatment of the transactions and additional information.

Comprehensive Loss

Comprehensive loss is comprised of net loss and other comprehensive income (loss). Other comprehensive income (loss) consists of unrealized gains and losses on our investments and foreign currency translation adjustments. Total comprehensive loss for all periods presented has been disclosed in the condensed consolidated statements of comprehensive loss.

The components of accumulated other comprehensive loss, net of tax, for the three months ended March 31, 2020 is as follows (in thousands):

	Foreign Currency Translation Adjustment	Unrealized Gain (Loss) on Investments	Accumulated Other Comprehensive Income (Loss)
Ending balance at December 31, 2019	$ (618)	$ 36	$ (582)
Other comprehensive income (loss)	(303)	—	(303)
Ending balance at March 31, 2020	$ (921)	$ 36	$ (885)

Immaterial amounts of unrealized gains and losses have been reclassified into the condensed consolidated statement of operations for the three months ended March 31, 2020 and 2019.

Net Loss per Share

Our basic and diluted net loss per share is calculated by dividing net loss by the weighted-average number of shares of common stock outstanding for the period. Restricted stock units, performance share units, and stock options to purchase our common stock are considered to be potentially dilutive common shares but have been excluded from the calculation of diluted net loss per share as their effect is anti-dilutive for all periods presented.

The following potentially dilutive common shares were excluded from the computations of diluted net loss per share for the periods presented because including them would have been anti-dilutive (in thousands):

	Three Months Ended March 31,	
	2020	2019
Stock options, restricted stock units and performance awards	6,652	4,881
2019 Convertible Notes	18,966	—
2019 Convertible Notes potential make-whole shares	4,707	—
2014 Convertible Notes	19	916
Total	30,344	5,797

Recent Accounting Changes and Accounting Pronouncements

Adoption of New Accounting Guidance

In August 2018, the U.S.-based Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2018-15-Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40), which establishes new guidance on the accounting for costs incurred to implement a cloud computing arrangement that is considered a service arrangement. The new guidance requires the capitalization of such costs, aligning it with the accounting for costs associated with developing or obtaining internal-use software. The new guidance is effective for fiscal years beginning after December 15, 2019. The adoption of the new guidance did not have a significant impact on our financial results.

In January 2017, the FASB issued ASU 2017-04, Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment. The ASU eliminates the requirement for an entity to calculate the implied fair value of goodwill to measure a goodwill impairment charge. Instead, an entity performs its annual, or interim, goodwill impairment testing by comparing the fair value of a reporting unit with its carrying amount and recording an impairment charge for the amount by which the carrying amount exceeds the fair value. The ASU is effective for annual and interim goodwill impairment testing performed for our fiscal year beginning January 1, 2020. The adoption of the new guidance did not have a significant impact on our financial results.

The FASB issued two ASUs related to financial instruments – credit losses. The ASUs issued were: (1) in June 2016, ASU 2016-13, Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, and (2) in November 2018, ASU 2018-19-Codification Improvements to Topic 326, Financial Instruments-Credit Losses. ASU 2016-13 is intended to improve financial reporting by requiring more timely recording of credit losses on loans and other financial instruments held by financial institutions and other organizations. ASU 2018-19 clarifies that receivables arising from operating leases are not within the scope of the credit losses standard, but rather, should be accounted for in accordance with

the leasing standard. These ASUs are effective for fiscal years beginning after December 15, 2019, and interim periods within those years, with early adoption permitted. The modified retrospective method is required upon adoption. The adoption of the new guidance resulted in an adjustment of approximately $0.1 million to reduce the accumulated deficit component of stockholders' equity and decrease current assets by the same amount in our condensed consolidated balance sheet.

Recent Accounting Pronouncements

In November 2019, the FASB issued ASU 2019-12-Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes. The amendments in this update improve consistent application of and simplifies U.S. GAAP for Topic 740 by clarifying and amending existing guidance including intra-period allocation, reporting tax law changes and losses in interim periods, state and local taxes not fully based on income and recognition of deferred tax liability related to certain transactions. There is also new guidance related to consolidated group reporting and tax impacts resulting from business combinations. The new guidance is effective for fiscal years beginning after December 15, 2020. We are currently evaluating the impact of adoption on our condensed consolidated financial statements.

3. Business Combination

On January 17, 2020, we completed the acquisition of all of the outstanding shares of InstruNor AS, a privately held Norwegian company (InstruNor).

InstruNor is a provider of the only fully integrated sample preparation system for flow and mass cytometry. The acquisition of InstruNor supports our entry into the sample preparation market for cytometry analysis and expands our capabilities to include fully automated sample preparation for flow and mass cytometry. The value of this technology is reflected in the intangible asset for developed technology. The developed technology was valued using a discounted cash flow model for which the most sensitive assumption is the revenue growth rate.

The purchase price of $7.2 million included approximately $5.2 million in cash and 485,451 shares of our common stock valued at the closing price on the effective date of $4.22.

A summary of the net cash flows is summarized below (in thousands):

	January 17, 2020
Cash consideration paid to former equity holders	$ 5,165
Less: cash and cash equivalents acquired	(11)
Acquisition of InstruNor, net of cash acquired	$ 5,154

The acquisition was accounted for in accordance with ASC 805, Business Combinations. The assets acquired and liabilities assumed were recorded at their estimated fair values at the InstruNor acquisition date. Goodwill of $2.2 million was calculated as purchase price less the fair value of the net assets acquired as follows (in thousands):

	January 17, 2020
Purchase price:	
Cash consideration paid on closing to former equity holders	$ 5,165
Non-cash consideration common shares	2,049
Total purchase price	$ 7,214
Assets acquired:	
Cash and cash equivalents	$ 11
Accounts receivable	32
Other receivables	13
Inventories, net	153
Developed technology	5,380
Liabilities assumed:	
Accounts payable	14
Other current liabilities	15
Deferred tax liability	566
Fair value of identifiable net assets acquired	4,994
Goodwill acquired on acquisition	$ 2,220

4. Revenue

Disaggregation of Revenue

The following table presents our revenue for the three months ended March 31, 2020 and 2019, respectively, based on geographic area and by source (in thousands):

	Three Months Ended March 31,	
	2020	2019
Geographic Markets:		
Americas	$ 14,844	$ 12,971
EMEA	8,096	8,156
Asia-Pacific	4,677	8,984
Total	$ 27,617	$ 30,111

	Three Months Ended March 31,	
	2020	2019
Source:		
Instruments	$ 9,471	$ 12,840
Consumables	9,510	11,987
Product revenue	18,981	24,827
Service revenue	5,186	5,284
Grant revenue	350	—
License revenue	3,100	—
Total	$ 27,617	$ 30,111

Performance Obligations

We reported $20.0 million of deferred revenue on our December 31, 2019 consolidated balance sheet. During the three months ended March 31, 2020, $3.4 million of the opening balance was recognized as revenue and $4.5 million of net additional advance payments were received from customers, primarily associated with instrument service contracts. At March 31, 2020, we reported $21.1 million of deferred revenue.

The following table summarizes the expected timing of revenue recognition for unfulfilled performance obligations associated with instrument service contracts that were partially completed at March 31, 2020 (in thousands):

Fiscal Year	Expected Revenue [1]
2020 (remainder of the year)	$ 9,657
2021	7,500
2022	4,358
Thereafter	2,778
Total	$ 24,293

[1] Expected revenue includes both billed amounts included in deferred revenue and unbilled amounts that are not reflected in our condensed consolidated financial statements and are subject to change if our customers decide to cancel or modify their contracts. Purchase orders for instrument service contracts can generally be canceled before the service period begins without penalty.

We apply the practical expedient that permits us to not disclose information about unsatisfied performance obligations for service contracts with an expected term of one year or less.

5. Goodwill and Intangible Assets, net

In connection with our acquisition of DVS Sciences, Inc. in February 2014, we recognized goodwill of $104.1 million and $112.0 million of developed technology. In the first quarter of 2020, we recognized $2.2 million of goodwill from the InstruNor acquisition and $5.4 million of developed technology (see Note 3). We are amortizing InstruNor developed technology over 8.0 years.

Goodwill and intangible assets with indefinite lives are not subject to amortization but are tested for impairment on an annual basis during the fourth quarter or whenever events or changes in circumstances indicate the carrying amount of these assets may not be recoverable. Qualitative assessment includes assessing significant events and circumstances such as our current results, assumptions regarding future performance, strategic initiatives and overall economic factors, including the current global outbreak of the COVID-19 pandemic and macroeconomic developments to determine the existence of potential indicators of impairment and assess if it is more likely than not that the fair value of our reporting unit or intangible assets is less than their carrying value. If indicators of impairment are identified, a quantitative impairment test is performed.

During the first quarter of fiscal 2020, the Company assessed if the current and potential future impact of COVID-19 represented an event which necessitated an impairment review. This assessment included an update of the qualitative and quantitative factors affecting our business. As a result of this assessment, we determined that a triggering event had occurred and a quantitative impairment test was performed. As a result of this quantitative analysis, we determined that fair value of our goodwill and developed technology intangibles were not less than their carrying value and no impairment was recognized.

Intangible assets also include other patents and licenses, which are included in other non-current assets. Intangible assets, net, were as follows (in thousands):

	March 31, 2020			
	Gross Amount	Accumulated Amortization	Net	Weighted-Average Amortization Period
Developed technology	$ 117,380	$ (68,768)	$ 48,612	9.9 years
Patents and licenses	$ 11,274	$ (8,576)	$ 2,698	7.8 years

	December 31, 2019			
	Gross Amount	Accumulated Amortization	Net	Weighted-Average Amortization Period
Developed technology	$ 112,000	$ (65,800)	$ 46,200	10.0 years
Patents and licenses	$ 11,274	$ (8,342)	$ 2,932	7.8 years

Total amortization expense for the three months ended March 31, 2020 and 2019 was $3.2 million and $3.1 million, respectively.

Based on the carrying value of intangible assets, net, as of March 31, 2020, the amortization expense is expected to be as follows (in thousands):

Fiscal Year	Developed Technology Amortization Expense	Patents and Licenses Amortization Expense	Total
2020 (remainder of the year)	$ 8,904	$ 686	$ 9,590
2021	11,873	759	12,632
2022	11,873	676	12,549
2023	11,873	570	12,443
2024	2,073	7	2,080
Thereafter	2,016	—	2,016
Total	$ 48,612	$ 2,698	$ 51,310

6. Balance Sheet Details

Cash, Cash Equivalents and Restricted Cash

Cash, cash equivalents and restricted cash consisted of the following as of March 31, 2020 and December 31, 2019 (in thousands):

	March 31, 2020	December 31, 2019
Cash and cash equivalents	$ 34,992	$ 21,661
Restricted cash	1,075	2,075
Total cash, cash equivalents and restricted cash	$ 36,067	$ 23,736

Short-term restricted cash of approximately $75 thousand included in prepaid expenses and other current assets and $1.0 million of non-current restricted cash is included in other non-current assets in the condensed consolidated balance sheet as of March 31, 2020.

Inventories

Inventories consisted of the following as of March 31, 2020 and December 31, 2019 (in thousands):

	March 31, 2020	December 31, 2019
Raw materials	$ 7,911	$ 6,133
Work-in-process	639	659
Finished goods	7,744	7,092
Total inventories	$ 16,294	$ 13,884

Property and Equipment, net

Property and equipment consisted of the following as of March 31, 2020 and December 31, 2019 (in thousands):

	March 31, 2020	December 31, 2019
Computer equipment and software	$ 4,335	$ 3,997
Laboratory and manufacturing equipment	19,354	19,325
Leasehold improvements	7,706	7,788
Office furniture and fixtures	2,003	1,824
Property and equipment, gross	33,398	32,934
Less accumulated depreciation and amortization	(25,517)	(24,954)
Construction-in-progress	262	76
Property and equipment, net	$ 8,143	$ 8,056

Warranties

Activity for our warranty accrual for the three months ended March 31, 2020 and 2019, which are included in other accrued liabilities, is summarized below (in thousands):

	Three Months Ended March 31,	
	2020	2019
Beginning balance	$ 1,390	$ 863
Accrual for current period warranties	227	286
Warranty costs incurred	(162)	(219)
Ending balance	$ 1,455	$ 930

7. Convertible Notes and Credit Facility

2014 Senior Convertible Notes (2014 Notes)

In February 2014, we closed an underwritten public offering of $201.3 million aggregate principal amount of our 2014 Notes. We received $195.2 million, net of underwriting discounts, from the issuance of the 2014 Notes and incurred approximately $1.1 million in offering-related expenses. The underwriting discount of $6.0 million and the debt issuance costs of $1.1 million were recorded as offsets to the proceeds. The underwriting discount and offering-related expenses are being amortized to interest expense using the effective-interest rate method. The effective interest rate on the 2014 Notes, reflecting the impact of debt discounts and issuance costs, is 3.0%. The 2014 Notes will mature on February 1, 2034, unless earlier converted, redeemed, or repurchased in accordance with the terms of the 2014 Notes.

We have retired the majority of the 2014 Notes through the issuance of the 2018 Notes and 2019 Notes, as discussed below. As of March 31, 2020, there is $1.1 million aggregate principal of the 2014 Notes outstanding.

2018 Senior Convertible Notes (2018 Notes)

In March 2018, we entered into separate privately negotiated transactions with certain holders of our 2014 Notes to exchange $150.0 million in aggregate principal amount of the 2014 Notes for 2018 Notes, leaving $51.3 million of aggregate

principal amount of 2014 Notes outstanding. As of the closing of the 2018 Notes on March 12, 2018, the estimated fair value was $145.5 million. The difference between the $150.0 million aggregate principal amount of the 2018 Notes and its fair value was being amortized over the expected term of the 2018 Notes using the effective interest method through the first note holder put date of February 6, 2023.

The 2018 Notes accrued interest at a rate of 2.75% payable semi-annually in arrears on February 1 and August 1 in arrears of each year. The 2018 Notes were set to mature on February 1, 2034, unless earlier converted, redeemed, or repurchased in accordance with the terms of the indenture governing the 2018 Notes. The initial conversion rate of the 2018 Notes was 126.9438 shares of our common stock, par value $0.001 per share, per $1,000 principal amount of the 2018 Notes (which is equivalent to an initial conversion price of approximately $7.88 per share). The conversion rate was subject to adjustment upon the occurrence of certain specified events. Those certain specified events included holders who converted their 2018 Notes voluntarily prior to our exercise of the issuer's conversion option described below or in connection with a make-whole fundamental change prior to February 6, 2023, entitling the holders, under certain circumstances, to a make-whole premium in the form of an increase in the conversion rate determined by reference to a make-whole table set forth in the indenture governing the 2018 Notes. Any time prior to the maturity of the 2018 Notes, we could convert the 2018 Notes, in whole but not in part, into cash, shares of our common stock, or combination thereof, if the closing price of our common stock equaled or exceeded 110% of the conversion price then in effect for a specified number of days.

Offering-related costs for the 2018 Notes were approximately $2.8 million. Offering-related costs of $2.2 million were capitalized as debt issuance costs, recorded as an offset to the carrying value of the 2018 Notes, and were being amortized over the expected term of the 2018 Notes using the effective interest method through the first note holder put date of February 6, 2023. The effective interest rate on the 2018 Notes was 12.3%. Offering-related costs of $0.6 million were accounted for as equity issuance costs, recorded as an offset to additional paid-in capital, and were not subject to amortization. Offering-related costs were allocated between debt and equity in the same proportion as the allocation of the 2018 Notes between debt and equity.

In the first quarter of 2019, we received notices from holders of the 2018 Notes electing to voluntarily convert approximately $138.1 million in aggregate principal amount of the 2018 Notes. In February 2019, we notified trustee U.S. Bank National Association of our intention to exercise our issuer's conversion option with respect to the remaining approximately $11.9 million in aggregate principal amount of 2018 Notes. In total, $150.0 million of the 2018 Notes were converted into 19.5 million shares of our common stock and the bonds were retired. We recognized a loss of $9.0 million on the retirement of the 2018 Notes, which represents the difference between the fair value of the bonds retired and their carrying costs. The net impact on equity was $133.3 million and represents the fair value of the bonds retired.

2019 Senior Convertible Notes (2019 Notes)

In November 2019, we issued $55.0 million aggregate principal amount of 2019 Notes. Net proceeds of the 2019 Notes issuance were $52.7 million, after deductions for commissions and other debt issuance costs of approximately $2.3 million. $51.8 million of the proceeds of the 2019 Notes were used to retire $50.2 million aggregate principal amount of our 2014 Notes, leaving $1.1 million of aggregate principal value of 2014 Notes outstanding. We accounted for the transaction as an extinguishment of debt due to the significance of the change in value of the embedded conversion option, resulting in a $3.0 million loss in the fourth quarter of 2019. The loss on extinguishment of debt was calculated as the difference between the reacquisition price (i.e., the fair value of the principal amount of 2019 Notes) and the net carrying value of the 2014 Notes exchanged.

The 2019 Notes bear interest at 5.25% per annum, payable semiannually on June 1 and December 1 of each year, beginning on June 1, 2020. The Notes will mature on December 1, 2024, unless earlier repurchased or converted pursuant to their terms. The 2019 Notes will be convertible at the option of the holder at any point prior to the close of business on the second scheduled trading day preceding the maturity date. The initial conversion rate of the Notes is 344.8276 shares of the Company's common stock per $1,000 principal amount of 2019 Notes (which is equivalent to an initial conversion price of approximately $2.90 per share). The conversion rate is subject to adjustment upon the occurrence of certain specified events. Those certain specified events include voluntary conversion of the 2019 Notes prior to our exercise of the Issuer's Conversion Option or in connection with a make-whole fundamental change, entitling the holders, under certain circumstances, to a make-whole premium in the form of an increase in the conversion rate determined by reference to a make-whole table set forth in the indenture governing the 2019 Notes. The conversion rate will not be adjusted for any accrued and unpaid interest.

The 2019 Notes will also be convertible at our option upon certain conditions in accordance with the terms of the indenture governing the 2019 Notes. On or after December 1, 2021 to December 1, 2022, if the price of the Company's common stock has equaled or exceeded 150% of the Conversion Price then in effect for a specified number of days (Issuer's

Conversion Option), we may, at our option, elect to convert the 2019 Notes in whole but not in part into shares of the Company, determined in accordance with the terms of the indenture. On or after December 1, 2022, if the price of the Company's common stock has equaled or exceeded 130% of the Conversion Price then in effect for a specified number of days, we may, at our option, elect to convert the 2019 Notes in whole but not in part into shares of the Company, determined in accordance with the terms of the indenture.

Offering-related costs for the 2019 Notes were capitalized as debt issuance costs and are recorded as an offset to the carrying value of the 2019 Notes. The debt issuance costs are being amortized over the expected term of the 2019 Notes using the effective interest method through the maturity date of December 1, 2024. The effective interest rate on the 2019 Notes is 6.2%.

The carrying values of the components of the 2014 Notes and the 2019 Notes are as follows (in thousands):

	March 31, 2020	December 31, 2019
2.75% 2014 Notes due 2034		
Principal amount	$ 1,079	$ 1,079
Unamortized debt discount	(17)	(18)
Unamortized debt issuance cost	(4)	(4)
	$ 1,058	$ 1,057
5.25% 2019 Notes due 2024		
Principal amount	$ 55,000	$ 55,000
Unamortized debt issuance cost	(2,138)	(2,236)
	$ 52,862	$ 52,764
Net carrying value of all Notes	$ 53,920	$ 53,821

2018 Revolving Credit Facility

In August 2018, we entered into a revolving credit facility with Silicon Valley Bank (Revolving Credit Facility) in an aggregate principal amount of up to the lesser of (i) $15.0 million (Maximum Amount) or (ii) the sum of (a) 85% of our eligible receivables and (b) 50% of our eligible inventory, in each case, subject to certain limitations (Borrowing Base), provided that the amount of eligible inventory that may be counted towards the Borrowing Base shall be subject to a cap as set forth in the Revolving Credit Facility. Subject to the level of this Borrowing Base, we may make and repay borrowings from time to time until the maturity of the Revolving Credit Facility. The Borrowing Base as of March 31, 2020 under the revolving credit facility was $8.6 million. There were no borrowings outstanding under the Revolving Credit Facility at March 31, 2020.

The Revolving Credit Facility was set to mature on August 2, 2020, and is collateralized by substantially all our property, other than intellectual property. Outstanding loans under the Revolving Credit Facility will bear interest, at the greater of (i) prime rate plus 0.50% or (ii) 5.50%. Interest on any outstanding loans is due and payable monthly and the principal balance is due at maturity though loans can be prepaid at any time without penalty. In addition, we pay a quarterly unused revolving line facility fee of 0.75% per annum on the average unused facility. Subsequent to March 31, 2020, the Revolving Credit Facility was amended and extended the maturity to August 2, 2022. See Note 15 for a detail discussion of the amendment.

Subject to certain exceptions, we must pay a prepayment fee equal to (i) 2.00% of the Maximum Amount if it prepays all advances and terminates the Loan Agreement prior to August 2, 2019, or (ii) 1.00% of the Maximum Amount if it prepays all advances and terminates the Loan Agreement on or after August 2, 2019, and prior to the maturity date.

We incurred approximately $335,000 of debt issuance costs in connection with the facility, including $225,000 in commitment fees. Debt issuance costs were capitalized and are being amortized to interest expense over the life of the Revolving Credit Facility.

The Revolving Credit Facility contains customary affirmative and negative covenants which, unless waived by the bank, limit our ability to, among other things, incur additional indebtedness, grant liens, make investments, repurchase stock, pay dividends, transfer assets, enter into affiliate transactions, undergo a change of control, or engage in merger and acquisition activity, including merging or consolidating with a third party. The Revolving Credit Facility also contains customary events of

default, subject to customary cure periods for certain defaults, that include, among other things, non-payment defaults, covenant defaults, material judgment defaults, bankruptcy and insolvency defaults, cross-defaults to certain other material indebtedness, and defaults due to inaccuracy of representation and warranties. Upon an event of default, the lender may declare all or a portion of the outstanding obligations payable by us to be immediately due and payable and exercise other rights and remedies provided for under the Revolving Credit Facility. During the existence of an event of default, interest on the obligations under the Revolving Credit Facility could be increased to 5.0% above the otherwise applicable rate of interest.

We were in compliance with all the terms and conditions of the Revolving Credit Facility at March 31, 2020.

8. Leases

We have operating leases for buildings, equipment and vehicles. Existing leases have remaining terms of less than one year to ten years. Some leases contain options to extend the lease, usually for up to five years, and termination options.

Supplemental balance sheet information related to leases was as follows as of March 31, 2020 and December 31, 2019 (in thousands, except for discount rate and lease term):

	March 31, 2020	December 31, 2019
Operating lease right-of-use buildings	$ 40,478	$ 6,234
Operating lease right-of-use equipment	66	69
Operating lease right-of-use vehicles	199	355
Total operating lease right-of-use assets, gross	40,743	6,658
Accumulated amortization	(1,244)	(1,798)
Total operating lease right-of-use assets, net	$ 39,499	$ 4,860
Operating lease liabilities, current	$ 1,185	$ 1,833
Operating lease liabilities, non-current	39,611	4,323
Total operating lease liabilities	$ 40,796	$ 6,156
Weighted average remaining lease term (in years)	9.4	4.7
Weighted average discount rate per annum	11.9%	5.0%

A new operating lease for our corporate headquarters in South San Francisco, California commenced on March 1, 2020. We recorded a ROU asset of $35.7 million at the inception of the lease and an operating lease liability of $35.3 million. The lease term is approximately 10 years. Future minimum lease payments over the life of the lease were discounted at a rate of 12.55%, which is our estimated incremental collateralized borrowing rate for the term of the lease at the inception of the lease.

The following table presents the components of lease expense for the three months ended March 31, 2020 and 2019, respectively (in thousands):

	Three Months Ended March 31,	
	2020	2019
Operating lease cost (including variable costs)	$ 2,199	$ 1,503
Variable costs including non-lease component	$ 621	$ 600

Supplemental cash flow information:		
Cash paid for amounts included in the measurement of operating lease liabilities (included in net cash used in operating activities)		
	Three Months Ended March 31,	
	2020	2019
Operating cash flows from operating leases	$ 868	$ 1,018

Future minimum lease payments under commenced non-cancelable operating leases, which are as of March 31, 2020 as follows (in thousands):

Fiscal Year		Minimum Lease Payments for Operating Leases
2020 (remainder of year)	$	4,107
2021		7,186
2022		6,926
2023		6,874
2024		7,095
Thereafter		39,193
Total future minimum payments	$	71,381
Less: imputed interest		(30,585)
Total	$	40,796

9. Fair Value of Financial Instruments

The following tables summarize our cash and available-for-sale securities that were measured at fair value by significant investment category within the fair value hierarchy (in thousands):

	March 31, 2020						
	Amortized Cost	Gross Unrealized Gain	Gross Unrealized Loss	Fair Value	Cash and Cash Equivalents	Short-Term Marketable Securities	Cash-Restricted
Assets:							
Cash-unrestricted	$ 19,290	$ —	$ —	$ 19,290	$ 19,290	$ —	$ —
Cash-restricted	1,075	—	—	1,075	—	—	1,075
Total cash	$ 20,365	$ —	$ —	$ 20,365	$ 19,290	$ —	$ 1,075
Available-for-sale:							
Level I:							
Money market funds	$ 15,702	$ —	$ —	$ 15,702	$ 15,702	$ —	$ —
US treasury securities	13,457	36	—	13,493	—	13,493	—
Subtotal	$ 29,159	$ 36	$ —	$ 29,195	$ 15,702	$ 13,493	$ —
Total	$ 49,524	$ 36	$ —	$ 49,560	$ 34,992	$ 13,493	$ 1,075

	December 31, 2019						
	Amortized Cost	Gross Unrealized Gain	Gross Unrealized Loss	Fair Value	Cash and Cash Equivalents	Short-Term Marketable Securities	Cash-Restricted
Assets:							
Cash-unrestricted	$ 16,614	$ —	$ —	$ 16,614	$ 16,614	$ —	$ —
Cash-restricted	2,075	—	—	2,075	—	—	2,075
Total cash	$ 18,689	$ —	$ —	$ 18,689	$ 16,614	$ —	$ 2,075
Available-for-sale:							
Level I:							
Money market funds	$ 5,047	$ —	$ —	$ 5,047	5,047	$ —	$ —
US treasury securities	36,942	36	—	36,978	—	36,978	—
Subtotal	$ 41,989	$ 36	$ —	$ 42,025	$ 5,047	$ 36,978	—
Total	$ 60,678	$ 36	$ —	$ 60,714	$ 21,661	$ 36,978	$ 2,075

There were no transfers between Level I and Level II measurements, and no changes in the valuation techniques used during the three months ended March 31, 2020.

Based on an evaluation of securities that were in a loss position, we did not recognize any other-than-temporary impairment charges for the three months ended March 31, 2020 and 2019. None of our investments have been in a continuous loss position for more than 12 months. We concluded that the declines in market value of our available-for-sale securities investment portfolio were temporary in nature and did not consider any of our investments to be other-than-temporarily impaired.

Convertible Notes

In 2019, we significantly reduced the amount of our debt outstanding. As a result, these securities are not traded frequently, so it is difficult to estimate a reliable and accurate market price and represent Level III valuations. A fair value for these assets cannot be determined by using readily observable inputs or measures, such as market prices or models. Fair values were estimated using pricing models and risk-adjusted value ranges.

The following table summarizes the par value, carrying value and the estimated fair value of the 2014 and 2019 Notes at March 31, 2020 and December 31, 2019, respectively (in thousands):

	March 31, 2020			December 31, 2019		
	Par Value	Carrying Value	Fair Value	Par Value	Carrying Value	Fair Value
2014 Notes	$ 1,079	$ 1,058	$ 1,122	$ 1,079	$ 1,057	$ 1,122
2019 Notes	55,000	52,862	57,174	55,000	52,764	73,975
Total	$ 56,079	$ 53,920	$ 58,296	$ 56,079	$ 53,821	$ 75,097

10. Shareholders' Equity

InstruNor Acquisition

On January 17, 2020, we completed the acquisition all of the outstanding shares of InstruNor (see Note 3). The purchase price was approximately $7.2 million, consisting of $5.2 million in cash and 485,451 shares of our common stock.

Conversion of 2018 Notes

In the first quarter of 2019, we issued 19,460,260 shares of our common stock in connection with the conversion of our 2018 Notes (see Note 7). As a result of this issuance of our common stock, we recorded a total of $133.3 million of equity, which was equivalent to the fair value of the bonds retired.

At March 31, 2020, we had reserved shares of common stock for future issuance under equity compensation plans as follows:

(in 000's)	Securities To Be Issued Upon Exercise Of Options	Securities To Be Issued Upon Release Of Restricted Stock and Performance Share Units	Number Of Remaining Securities Available For Future Issuance
2009 Equity Incentive Plan	28	—	—
2011 Equity Incentive Plan	1,606	4,490	3,559
DVS Sciences Inc. 2010 Equity Incentive Plan	23	—	—
2017 Inducement Award Plan	207	298	—
2017 Employee Stock Purchase Plan	—	—	401
	1,864	4,788	3,960

11. Stock-Based Plans

Our board of directors sets the terms, conditions, and restrictions related to our 2017 Employee Stock Purchase Plan (ESPP) and the grant of stock options, restricted stock units (RSUs) and performance-based awards under our various stock-based plans. Our board of directors determines the number of awards to grant and also sets vesting criteria.

In general, RSUs vest on a quarterly basis over a period of four years from the date of grant at a rate of either 25% on the first anniversary of the grant date and ratably each quarter over the remaining 12 quarters, or ratably each quarter over 16 quarters, subject to the employees' continued employment.

Incentive stock options and non-statutory stock options granted under the 2011 Plan have a term of no more than ten years from the date of grant and an exercise price of at least 100% of the fair market value of the underlying common stock on the date of grant. If a participant owns stock representing more than 10% of the voting power of all classes of our stock on the grant date, an incentive stock option awarded to the participant will have a term of no more than five years from the date of grant and an exercise price of at least 110% of the fair market value of the underlying common stock on the date of grant. Generally, options vest at a rate of either 25% on the first anniversary of the option grant date and ratably each month over the remaining period of 36 months, or ratably each month over 48 months. We may grant options with different vesting terms from time to time.

For performance-based share awards, our board of directors sets the performance objectives and other vesting provisions in determining the number of shares or value of performance units and performance shares that will be paid out. Such payout will be a function of the extent to which performance objectives or other vesting provisions have been achieved.

2011 Equity Incentive Plan

In January 2011, our board of directors adopted the 2011 Equity Incentive Plan (the 2011 Plan) under which incentive stock options, non-statutory stock options, RSUs, stock appreciation rights, performance stock units (PSUs), and performance shares may be granted to our employees, directors, and consultants. In April 2019, our board of directors authorized, and in June 2019, our stockholders approved, the amendment and restatement of the 2011 Plan to make various changes, including increasing the number of shares reserved for issuance by approximately 5.0 million shares and extending the term of the 2011 Plan until April 2029.

2009 Equity Incentive Plan and 2017 Inducement Award Plan

Our 2009 Equity Incentive Plan (the 2009 Plan) terminated on the date the 2011 Plan was adopted. Options granted, or shares issued under the 2009 Plan that were outstanding on the date the 2011 Plan became effective, remained subject to the terms of the 2009 Plan.

In January 2017, we adopted the Fluidigm Corporation 2017 Inducement Award Plan (Inducement Plan) and reserved 2 million shares of our common stock for issuance pursuant to equity awards granted under the Inducement Plan. The Inducement Plan provided for the grant of equity-based awards on terms substantially similar to the 2011 Plan. In accordance with Rule 5635(c)(4) of the Nasdaq Listing Rules, awards under the Inducement Plan were only be made to individuals not previously our employees or non-employee members of our board of directors (or following such individual's bona fide period of non-employment), as an inducement material to the individual's entry into employment with us or in connection with a merger or acquisition, to the extent permitted by Rule 5635(c)(3) of the Nasdaq Listing Rules. In June 2019, concurrently with the increase in shares available for grant under the 2011 Plan, the Inducement Plan was terminated such that no further grants could be made thereunder. Options granted and shares issued under the Inducement Plan that were outstanding when the Inducement Plan was terminated remain outstanding subject to their terms and the terms of the Inducement Plan.

Valuation and Expense Information

We use the Black-Scholes option-pricing model to estimate the fair value of stock options granted under our equity incentive plans. We grant stock options at exercise prices not less than the fair value of our common stock at the date of grant. The fair value of RSUs granted to employees was estimated on the date of grant by multiplying the number of shares granted by the fair market value of our common stock on the grant date.

Activity under the 2011 Plan, the 2009 Plan, and the Inducement Plan was as follows:

Restricted Stock Units:

	Number of Units (in 000's)		Weighted-Average Grant Date Fair Value per Unit
Balance at December 31, 2019	2,551	$	7.43
RSU granted	1,683	$	2.93
RSU released	(296)	$	7.96
RSU forfeited	(160)	$	7.70
Balance at March 31, 2020	3,778	$	5.37

As of March 31, 2020, the unrecognized compensation costs related to outstanding unvested RSUs under our equity incentive plans were $18.1 million. We expect to recognize those costs over a weighted average period of 3.2 years.

***Stock Options*:**

	Number of Options (000's)	Weighted-Average Exercise Price per Option	Weighted-Average Remaining Contractual Life (in Years)	Aggregate Intrinsic Value (1) in (000's)
Balance at December 31, 2019	2,027	$ 7.78	6.8	$ 81
Options granted	—	$ —		
Options exercised	—	$ —		
Options forfeited	(163)	$ 5.83		
Balance as of March 31, 2020	1,864	$ 7.95	6.1	$ 36
Vested at March 31, 2020	1,391	$ 8.58	5.6	$ 36
Unvested awards at March 31, 2020	473	$ 6.09	7.8	

(1) Aggregate intrinsic value as of March 31, 2020 was calculated as the difference between the closing price per share of our common stock on the last trading day of March 31, 2020, which was $2.54, and the exercise price of the options, multiplied by the number of in-the-money options.

As of March 31, 2020, the unrecognized compensation costs related to outstanding unvested options under our equity incentive plans were $1.6 million. We expect to recognize those costs over a weighted average period of 1.7 years.

Performance-based Awards

Performance Stock Units with Market Conditions

We have granted PSU awards to certain executive officers and senior level employees. The number of PSUs ultimately earned under these awards is calculated based on the Total Shareholder Return (TSR) of our common stock as compared to the TSR of a defined group of peer companies during the applicable three-year performance period. The percentage of PSUs that vest will depend on our relative position at the end of the performance period and can range from 0% to 200% of the number of units granted.

Under FASB ASC Topic 718, the provisions of the PSU awards related to TSR are considered a market condition, and the effects of that market condition are reflected in the grant date fair value of the awards. We used a Monte Carlo simulation pricing model to incorporate the market condition effects at our grant date.

Activity under the TSR-based PSUs is as follows:

	Number of Units (in 000s)	Weighted-Average Grant Date Fair Value per Unit
Balance at December 31, 2019	547	$ 15.09
PSU granted	509	$ 4.82
PSU released	—	$ —
PSU forfeited	(94)	$ 14.26
Balance at March 31, 2020	962	$ 9.74

As of March 31, 2020, the unrecognized compensation costs related to these awards were $6.5 million. We expect to recognize those costs over a weighted average period of 2.2 years.

Performance Stock Units with Performance Conditions

During 2019, we also granted PSUs to a certain employee. The number of PSUs that ultimately vest under these awards is dependent on achieving certain discrete operational milestones between September 30, 2019 and December 31, 2020. Activity under these PSUs is as follows:

	Number of Units (in 000s)	Weighted-Average Grant Date Fair Value per Unit
Balance at December 31, 2019	64	$ 7.05
PSU granted	—	$ —
PSU released	(4)	$ 7.05
PSU forfeited	(12)	$ 7.05
Balance at March 31, 2020	48	$ 7.05

2017 Employee Stock Purchase Plan

In August 2017, our stockholders approved our 2017 Employee Stock Purchase Plan (ESPP) at the annual meeting of stockholders. Our ESPP offers U.S. and some non-U.S. employees the right to purchase shares of our common stock. Our first ESPP offering period began on October 1, 2017 with a shorter offering period ending on November 30, 2017.

Prior to June 2019, our ESPP program had a six-month offering period, with a new period commencing on the first trading day on or after May 31 and November 30 of each year. Employees were eligible to participate through payroll deductions of up to 10% of their compensation. The purchase price at which shares were sold under the ESPP was 85% of the lower of the fair market value of a share of our common stock on the first day of the offering period or the last day of the offering period.

Effective in June 2019, our ESPP program was amended to offer a twelve-month offering period with two six-month purchase periods beginning on each of May 31 and November 30. Employees are eligible under the amended program to participate through payroll deductions of up to 15% of their compensation. Employees may not purchase more than $25 thousand of stock for any calendar year.

Under the updated ESPP program, the purchase price at which shares are sold for the first purchase period is 85% of the lower of the fair market value of a share of our common stock on the first day of the offering period or the last day of the first purchase period. For the second purchase period, the purchase price at which shares are sold is 85% of the lower of the fair market value of the common stock on the first day of the offering period and the last day of the offering period. In the event the fair market value of the common stock at the beginning of the second purchase period is less than the fair market value on the beginning of the offering period, the purchase price for the second offering period is reset to 85% of the lower of the fair value of the common stock at the beginning of the second purchase period and last day of the offering period.

The offering period of June 1, 2019 to May 31, 2020 has two purchase periods, with one ending November 30, 2019 and the other ending May 31, 2020. As the fair market value of the common stock at November 30, 2019 was lower than the fair value of the common stock at the beginning of the offering period, the purchase price for the second purchase period was reset based on the lower of the November 30, 2019 price and May 31, 2019 price. The resetting of the purchase price is considered to be a modification of the original terms of the award. Under ASC 718, the incremental fair value based on the difference between the fair value of the modified award and the fair value of the original award immediately before it was modified was approximately $0.3 million. This amount is being amortized over the remaining offering period.

Total stock-based compensation expense recognized was as follows (in thousands):

	Three Months Ended March 31,	
	2020	2019
Options, Performance Share Units, and Restricted Stock Units	$ 2,112	$ 2,145
Employee Stock Purchase Plan	254	126
Total Share-based Compensation	$ 2,366	$ 2,271

12. Income Taxes

The Company's quarterly provision for income taxes is based on an estimated effective annual income tax rate. The Company's quarterly provision for income taxes also includes the tax impact of certain unusual or infrequently occurring items, if any, including changes in judgment about valuation allowances and effects of changes in tax laws or rates, in the interim period in which they occur.

The Company recorded a tax benefit of $0.7 million for the three months ended March 31, 2020 and $42 thousand of tax expense for the three months ended March 31, 2019. The benefit in the current period was primarily attributable to the tax benefit from the amortization of our acquisition-related deferred tax liability, partially offset by a provision from our foreign operations. In the prior year, the provision from our foreign operations was larger than the tax benefit from the amortization of our acquisition-related deferred tax liability, resulting in a net expense.

The Company's tax benefit and tax expense for income taxes for the periods presented differ from the 21% U.S. Federal statutory rate for the three months ended March 31, 2020 and 2019, respectively, primarily due to maintaining a valuation allowance for deferred tax assets, which primarily consist of net operating loss carryforwards.

Tax positions taken by the Company are subject to audits by multiple tax jurisdictions. The Company believes that it has provided adequate reserves for its uncertain tax positions for all tax years still open for assessment. The Company also believes that it does not have any tax position that will significantly increase or decrease within the next year. For the three months ended March 31, 2020, and 2019, respectively, the Company did not recognize any material interest or penalties related to uncertain tax positions.

Recording deferred tax assets is appropriate when realization of these assets is more likely than not. Assessing the realizability of deferred tax assets is dependent upon several factors including historical financial results. The deferred tax assets have been offset by valuation allowances. In the future we may release valuation allowances and recognize deferred tax assets in certain of our foreign subsidiaries depending on the achievement of future profitability in the relevant jurisdictions. Any release of valuation allowances could have the effect of decreasing the income tax provision in the period the valuation allowance is released. We continue to monitor the likelihood that we will be able to recover our deferred tax assets, including those for which a valuation allowance is recorded. There can be no assurance that we will generate profits in the future periods enabling us to fully realize our deferred tax assets. The timing of recording a valuation allowance or the reversal of such valuation allowance is subject to objective and subjective factors that cannot be readily predicted in advance.

On March 27, 2020, the Coronavirus Aid, Relief and Economic Security (CARES) Act was signed into law. The CARES Act includes provisions relating to refundable payroll tax credits, deferment of the employer portion of certain payroll taxes, net operating loss carryback periods, alternative minimum tax credit refunds, modifications to the net interest deduction limitations and technical corrections to the tax deprecation methods for qualified improvement property. The Company is currently analyzing the impact of these changes and therefore, an estimate of the impact to income taxes is not yet available.

13. Information About Geographic Areas

We operate in one reporting segment that develops, manufacturers and commercializes tools for life sciences research. Our chief executive officer manages our operations and evaluates our financial performance on a consolidated basis. For purposes of allocating resources and evaluating regional financial performance, our chief executive officer reviews separate sales information for the different regions of the world. Our general and administrative expenses and our research and development expenses are not allocated to any specific region. Most of our principal operations, other than manufacturing, and our decision-making functions are located at our corporate headquarters in the United States.

A summary table of our total revenue by geographic areas of our customers and by product and services for the three months ended March 31, 2020 and 2019 is included in Note 4 to the condensed consolidated financial statements.

Sales to customers in the United States, which includes $3.1 million of license revenue, represented $14.1 million, or 51% of total revenues, for the three months ended March 31, 2020 (see Note 2). Sales to customers in the United States represented $12.5 million or 42% of total revenues for the three months ended March 31, 2019.

No foreign country or jurisdiction had sales in excess of 10% of our total revenue during the three months ended March 31, 2020. Sales to customers in China represented $3.5 million, or 12%, for the three months ended March 31, 2019. For the three months ended March 31, 2019, sales to customers in Japan represented $4.0 million, or 13%, of total revenue. No other countries had sales in excess of 10% of our total revenue for three months ended March 31, 2019.

Other than license revenue referenced above, no customer represented more than 10% of our total revenues for the three months ended March 31, 2020 and 2019, respectively. Revenues from our five largest customers were 24% and 22% of total revenue for three months ended March 31, 2020 and 2019, respectively. Excluding the license revenue, revenues from our five largest customers was 15% and 22% of total revenue for three months ended March 31, 2020 and 2019, respectively.

14. Commitments and Contingencies

Indemnification

From time to time, we have entered into indemnification provisions under certain of our agreements in the ordinary course of business, typically with business partners, customers, and suppliers. Pursuant to these agreements, we may indemnify, hold harmless, and agree to reimburse the indemnified parties on a case-by-case basis for losses suffered or incurred by the indemnified parties in connection with any patent or other intellectual property infringement claim by any third party with respect to our products. The term of these indemnification provisions is generally perpetual from the time of the execution of the agreement. The maximum potential amount of future payments we could be required to make under these indemnification provisions is typically not limited to a specific amount. In addition, we have entered into indemnification agreements with our officers, directors, and certain other employees. With certain exceptions, these agreements provide for indemnification for related expenses including, among others, attorneys' fees, judgments, fines and settlement amounts incurred by any of these individuals in any action or proceeding.

Contingencies

From time to time, we may be subject to various legal proceedings and claims arising in the ordinary course of business. These include disputes and lawsuits related to intellectual property, mergers and acquisitions, licensing, contract law, tax, regulatory, distribution arrangements, employee relations and other matters. Periodically, we review the status of each matter and assess its potential financial exposure. If the potential loss from any claim or legal proceeding is considered probable and a range of possible losses can be estimated, we accrue a liability for the estimated loss. Legal proceedings are subject to uncertainties, and the outcomes are difficult to predict. Because of such uncertainties, accruals are based only on the best information available at the time. As additional information becomes available, we continue to reassess the potential liability related to pending claims and litigation and may revise estimates.

15. Subsequent Event

On April 21, 2020, the Company and Silicon Valley Bank (SVB) entered into the Third Amendment to Loan and Security Agreement (the Amendment), which amended the Loan and Security Agreement dated as of August 2, 2018, between the Company and SVB (as amended by the Default Waiver and First Amendment to Loan and Security Agreement dated September 7, 2018, and the Second Amendment to Loan and Security Agreement dated November 20, 2019, the Revolving Credit Agreement).

The Amendment extended the maturity date of the Revolving Credit Agreement by two years, to August 2, 2022 and amends the interest rate to be the greater of (i) prime rate (as customarily defined), plus 0.50%, floating, and (ii) 5.25%. Interest on any outstanding loans continues to be due and payable monthly and the principal balance is due at maturity though loans can be prepaid at any time without penalty. Annual administration fees are unchanged and the quarterly unused revolving line facility fee remains at 0.75% per annum on the average unused facility. The Amendment also includes various administrative changes.

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

The following discussion and analysis should be read together with our condensed consolidated financial statements and the notes to those statements included elsewhere in this Form 10-Q. This Form 10-Q contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the Securities Act), and Section 21E of the Securities Exchange Act of 1934, as amended, or Exchange Act, that are based on our management's beliefs and assumptions and on information currently available to our management. The forward-looking statements are contained principally in the section entitled "Risk Factors" and this Management's Discussion and Analysis of Financial Condition and Results of Operations. Forward-looking statements include information concerning our possible or assumed future cash flow, revenue, sources of revenue and results of operations, cost of product revenue and product margin, operating and other expenses, unit sales and the selling prices of our products, business strategies, financing plans, expansion of our business, competitive position, industry environment, potential growth opportunities, market growth expectations, and the effects of competition and public health crises (including COVID-19) on our business. Forward-looking statements include statements that are not historical facts and can be identified by terms such as "anticipates," "believes," "could," "seeks," "estimates," "expects," "intends," "may," "plans," "potential," "predicts," "projects," "should," "will," "would," or similar expressions and the negatives of those terms.

Forward-looking statements involve known and unknown risks, uncertainties, and other factors that may cause our actual results, performance, or achievements to be materially different from any future results, performance, or achievements expressed or implied by the forward-looking statements. We discuss these risks in greater detail in Part II, Item 1A, "Risk Factors," elsewhere in this quarterly report on Form 10-Q, and in our annual report on Form 10-K filed with the Securities and Exchange Commission (SEC). Given these uncertainties, you should not place undue reliance on these forward-looking statements. Also, forward-looking statements represent our management's beliefs and assumptions only as of the date of this Form 10-Q.

Except as required by law, we assume no obligation to update these forward-looking statements, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future. You should read this Form 10-Q completely and with the understanding that our actual future results may be materially different from what we expect.

Unless the context requires otherwise, references in this Form 10-Q to "Fluidigm," the "Company," "we," "us," and "our" refer to Fluidigm Corporation and its subsidiaries.

Overview

Fluidigm is a global company that improves life through comprehensive health insight. Our innovative technologies and multi-omic tools are used by researchers to reveal meaningful insights into health and disease, identify biomarkers to inform decisions, and accelerate the development of more effective therapies. We create, manufacture, and market a range of products and services, including instruments, reagents and software that are used by researchers worldwide.

Our focus is on the most pressing needs in translational and clinical research, including cancer, immunology and immunotherapy. We use proprietary CyTOF® and microfluidics technologies to develop innovative end-to-end solutions that have the flexibility required to meet the needs of translational research and the robustness to support high-impact clinical research studies.

We sell our products to leading academic, government, pharmaceutical, biotechnology and plant and animal research laboratories worldwide. We distribute our systems through our direct sales force and support organizations located in North

America, Europe, and Asia-Pacific, and through distributors or sales agents in several European, Latin American, Middle Eastern, and Asia-Pacific countries.

Our manufacturing operations are located in Singapore and Canada. Our facility in Singapore manufactures our genomics instruments, which are assembled by our contract manufacturer located within our Singapore facility. All of our IFCs for commercial sale and some IFCs for our research and development purposes are also fabricated at our Singapore facility. Our mass cytometry instruments for commercial sale, as well as for internal research and development purposes, are manufactured at our facility in Canada. We also manufacture assays and reagents at our facilities in Canada.

Our total revenue for the three months ended March 31, 2020 was $27.6 million compared to $30.1 million for the three months ended March 31, 2019. Our total revenue was $117.2 million in 2019, and $113.0 million in 2018. We have incurred significant net losses since our inception in 1999 and, as of March 31, 2020, our accumulated deficit was $639.7 million.

Recent Developments

We have been actively responding to the COVID-19 pandemic by protecting our employees, supporting our customers, and managing our liquidity.

As Fluidigm is a designated essential business, our employees have been working from home offices or our laboratories and offices, and in some cases, at customer sites. We have implemented health and safety practices in accordance with evolving government and public health agency guidelines in all of our facilities around the world.

While Fluidigm is a designated essential business, widespread global adoption of work-from-home and shelter-in-place orders has resulted in a significant slowdown in customer activities. A majority of our customers is made up of academic research labs, including major medical centers, which are largely, if not fully, closed. Consequently, they have limited abilities to accept, or prepare facilities to accept, non-critical instrumentation. In addition, many are limited in their ability continue their lab research activities, which has had an impact on our consumables sales.

We are seeing and expect to continue to see near-term COVID-19-related priorities temporarily displacing longer term projects and research activities. Fluidigm has been working with a growing body of researchers around the world who are aggressively responding to the pandemic. We believe our microfluidics and mass cytometry capabilities can play a significant role in virus detection as well as in immune profiling of patients and populations. Furthermore, we believe our technologies and solutions will be important to the durable response from government and medical institutions to be prepared for future outbreaks.

In this period of uncertainty, we are actively managing our operating expenses and cash flows in response to the evolving market conditions. We have started implementing reductions in our operating expense structure including salary reductions and constrained hiring until the business returns to more normal volumes. We have improved the company’s capital structure over the last 18 months, reducing our overall debt levels and extending our debt maturities.

Critical Accounting Policies, Significant Judgments and Estimates

Our condensed consolidated financial statements and the related notes included elsewhere in this Form 10-Q are prepared in accordance with accounting principles generally accepted in the United States. The preparation of these condensed financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, costs and expenses and related disclosures. We base our estimates on historical experience and on various other assumptions believed to be reasonable, which together form the basis for making judgments about the carrying values of assets and liabilities. The full extent to which the COVID-19 pandemic impacts our business, results of operations and financial condition will depend on numerous evolving factors including, but not limited to, the magnitude and duration of COVID-19, the extent to which it will impact worldwide macroeconomic conditions, including the speed of recovery, and governmental and business reactions to the pandemic. We evaluate our estimates and assumptions on an ongoing basis. To the extent that there are material differences between these estimates and actual results, our future financial statement presentation, financial condition, results of operations, and cash flows will be affected.

There have been no material changes in our critical accounting policies and estimates in the preparation of our condensed consolidated financial statements during the three months ended March 31, 2020, compared to those disclosed in our annual report on Form 10-K for the year ended December 31, 2019, as filed with the SEC on February 27, 2020.

Recent Accounting Changes and Accounting Pronouncements

Adoption of New Accounting Guidance

In August 2018, the FASB issued ASU 2018-15-Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40) which establishes new guidance on the accounting for costs incurred to implement a cloud computing arrangement that is considered a service arrangement. The new guidance requires the capitalization of such costs, aligning it with the accounting for costs associated with developing or obtaining internal-use software. The new guidance is effective for fiscal years beginning after December 15, 2019. The adoption of the new guidance did not have a significant impact on our financial results.

In January 2017, the FASB issued ASU 2017-04, Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment. The ASU eliminates the requirement for an entity to calculate the implied fair value of goodwill to measure a goodwill impairment charge. Instead, an entity performs its annual, or interim, goodwill impairment testing by comparing the fair value of a reporting unit with its carrying amount and recording an impairment charge for the amount by which the carrying amount exceeds the fair value. The ASU is effective for annual and interim goodwill impairment testing performed for our fiscal year beginning January 1, 2020, with early adoption permitted, which we did not exercise. The adoption of the new guidance did not have a significant impact on our financial results.

The FASB issued two ASUs related to financial instruments – credit losses. The ASUs issued were: (i) in June 2016, ASU 2016-13, Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, and (ii) in November 2018, ASU 2018-19-Codification Improvements to Topic 326, Financial Instruments-Credit Losses. ASU 2016-13 is intended to improve financial reporting by requiring more timely recording of credit losses on loans and other financial instruments held by financial institutions and other organizations. ASU 2018-19 clarifies that receivables arising from operating leases are not within the scope of the credit losses standard, but rather, should be accounted for in accordance with the leasing standard. These ASUs are effective for fiscal years beginning after December 15, 2019, and interim periods within those years, with early adoption permitted. The modified retrospective method is required upon adoption. The adoption of the new guidance resulted in an adjustment of approximately $0.1 million to reduce the accumulated deficit component of stockholders' equity and decrease current assets by the same amount in the condensed consolidated balance sheet.

Recent Accounting Pronouncements

In November 2019, the FASB issued ASU 2019-12 Income Taxes (Topic 740)-Simplifying the Accounting for Income Taxes. The amendments in this update improve consistent application of and simplifies GAAP for Topic 740 by clarifying and amending existing guidance including intra-period allocation, reporting tax law changes and losses in interim periods, state and local taxes not fully based on income and recognition of deferred tax liability related to certain transactions. There is also new guidance related to consolidated group reporting and tax impacts resulting from business combinations. The new guidance is effective for fiscal years beginning after December 15, 2020. We are currently evaluating the impact of adoption on our condensed consolidated financial statements.

Results of Operations

The following table presents our historical consolidated statements of operations data for the three months ended March 31, 2020 and 2019, and as a percentage of total revenue for the respective periods (in thousands):

	Three Months Ended March 31,			
	2020		2019	
Revenue:				
Total revenue	$ 27,617	100 %	$ 30,111	100 %
Costs and expenses:				
Cost of product revenue	9,640	35	11,389	37
Cost of service revenue	1,525	6	1,732	6
Research and development	8,699	31	8,372	28
Selling, general and administrative	22,695	82	22,824	76
Total costs and expenses	42,559	154	44,317	147
Loss from operations	(14,942)	(54)	(14,206)	(47)
Interest expense	(900)	(3)	(2,701)	(9)
Loss from extinguishment of debt	—	—	(9,000)	(30)
Other income (loss), net	(818)	(3)	484	2
Loss before income taxes	(16,660)	(60)	(25,423)	(84)
Income tax benefit (expense)	680	2	(42)	—
Net loss	$ (15,980)	(58)%	$ (25,465)	(85)%

Revenue

We generate revenue primarily from sales of our products and services, and from license and grant agreements. Our product revenue consists of sales of instruments and consumables. Consumable revenues are largely driven by the size of our installed base of instruments and the annual level of pull-through per instrument. Service revenue is linked to our sales of instruments as our service revenue consists of post-warranty service contracts, preventive maintenance plans, instrument parts, installation and training. We also receive grants from various entities to perform research and development activities over contractually defined periods. Our license revenue is generated primarily in the United States and relates to licensing our technology to third parties.

We sell our products to leading academic, government, pharmaceutical, biotechnology and plant and animal research laboratories worldwide.

License revenue from a settlement agreement represented 11% of our total revenue and no other individual customer was more than 10% of our total revenue for three months ended March 31, 2020 and 2019, respectively. Excluding license revenue, revenue from our five largest customers was 15% and 22% of total revenue for the three months ended March 31, 2020 and 2019, respectively.

The following table presents our revenue by source for the three months ended March 31, 2020 and 2019, and as a percentage of total revenue for the respective period (in thousands):

	Three Months Ended March 31,				
	2020		2019		Change
Revenue:					
Instruments	$ 9,471	34%	$ 12,840	42%	(26)%
Consumables	9,510	34	11,987	40	(21)%
Product revenue	18,981	68%	24,827	82%	(24)%
Service revenue	5,186	20	5,284	18	(2)%
Product and service revenue	24,167	88%	30,111	100%	(20)%
Grant revenue	350	1	—	—	NA
License revenue	3,100	11	—	—	NA
Total revenue	$ 27,617	100%	$ 30,111	100%	(8)%

The following table presents our total revenue by geographic area of our customers and as a percentage of total revenue for the three months ended March 31, 2020 and 2019 (in thousands):

	Three Months Ended March 31,				
	2020		2019		Change
Americas	$ 14,844	54%	$ 12,971	43%	14 %
EMEA	8,096	29	8,156	27	(1)%
Asia-Pacific	4,677	17	8,984	30	(48)%
Total revenue	$27,617	100%	$ 30,111	100%	(8)%

The Americas revenue includes revenue generated in the United States of $14.1 million and $12.5 million for the three months ended March 31, 2020 and 2019, respectively. For the three months ended March 31, 2020, revenue generated in the United States includes $3.1 million of license revenue.

No foreign country or jurisdiction had sales in excess of 10% of our total revenue during the three months ended March 31, 2020. For the three months ended March 31, 2019, sales to China represented $3.5 million, or 12%, of total revenues; sales to Japan represented $4.0 million, or 13% of total revenues. No other countries had sales in excess of 10% of our total revenue for three months ended March 31, 2019.

Total Revenue

Total revenue decreased by $2.5 million or 8%, to $27.6 million for the three months ended March 31, 2020 compared to $30.1 million for the three months ended March 31, 2019, driven by COVID-19 and the ensuing shelter-in-place orders that effectively shuttered customer facilities around the world. Lower mass cytometry instruments and mass cytometry and microfluidics consumable revenues were partially offset by higher microfluidics instrument sales, licensing and grant revenue.

Americas revenues increased by $1.9 million, or 14%, driven by license revenue of $3.1 million, and grant revenue of $0.4 million, partially offset by lower instrument and consumables product revenues for the three months ended March 31, 2020 compared to the three months ended March 31, 2019. EMEA revenues grew $0.1 million or 1%. Higher instrument revenues in Europe were mostly offset by lower consumable revenue. Unfavorable foreign exchange rates had a 2% negative impact on EMEA revenue. The $4.3 million, or 48%, decrease in Asia-Pacific revenues was broad-based, with declines in both mass cytometry and microfluidics instrument and consumable revenues and, to a lesser extent, service revenues. On a company-wide basis, weaker foreign exchange rates negatively impacted revenues by less than 1% for the three months ended March 31, 2020 compared to the same period in 2019.

Product Revenue

Product revenue decreased by $5.8 million, or 24%, to $19.0 million for the three months ended March 31, 2020 from $24.8 million for the three months ended March 31, 2019 due to lower sales volumes and lower average selling prices of mass

cytometry instruments and consumables and by lower unit sales of microfluidics consumables. Partially offsetting these declines were higher microfluidics instrument revenue associated with new products.

We expect the average selling prices of our products to fluctuate over time based on market conditions, product mix, and currency fluctuations.

Service Revenue

Service revenue decreased by $0.1 million, or 2%, to $5.2 million for the three months ended March 31, 2020 compared to the three months ended March 31, 2019. Service activities declined due to closed customer facilities.

License Revenue

In March 2020, we reached a settlement agreement for intellectual property infringement claims, in which we received a $3.5 million payment in exchange for a perpetual license under certain of our intellectual property. The settlement is considered a multiple-element arrangement with each element accounted for individually. Accordingly, $3.1 million of the proceeds was recognized as license revenue and $0.4 million was offset against legal costs.

Grant Revenue

We receive grants from various entities to perform research and development activities over contractually defined periods. Grant revenue in the current quarter is attributable to a new grant agreement entered into in the second half of 2019.

Product and Service Cost, Product and Service Gross Profit and Product and Service Margin

Cost of product revenue includes manufacturing costs incurred in the production process, including component materials, labor and overhead, installation, packaging, and delivery costs. In addition, cost of product revenue includes amortization of developed technology and intangibles, royalty costs for licensed technologies included in our products, warranty, provisions for slow-moving and obsolete inventory, and stock-based compensation expense. Our cost of product revenue and related product margin may fluctuate depending on the capacity utilization of our manufacturing facilities in response to market conditions and the demand for our products.

Cost of service revenue includes direct labor hours, overhead, and instrument parts. Our cost of service revenue and related service margin may fluctuate depending on the variability in material and labor costs of servicing instruments.

The following table presents our product and service cost, product and service gross profit and product and service margin for the three months ended March 31, 2020 and 2019 (in thousands):

	Three Months Ended March 31,			
	2020	2019	Change	
Cost of product revenue	$ 9,640	$ 11,389	(15)%	
Cost of service revenue	1,525	1,732	(12)%	
Cost of product and service revenue	$ 11,165	$ 13,121	(15)%	
Product and service gross profit	$ 13,002	$ 16,990	(23)%	
Product and service margin	53.8%	56.4%	(2.6)	ppts

Product and service margin decreased by 2.6 percentage points for the three months ended March 31, 2020 compared to the three months ended March 31, 2019 due to the impact of fixed costs on a lower revenue base, as well as product mix.

Operating Expenses

The following table presents our operating expenses for the three months ended March 31, 2020 and 2019 (in thousands):

	Three Months Ended March 31,		
	2020	2019	Change
Research and development	$ 8,699	$ 8,372	4 %
Selling, general and administrative	22,695	22,824	(1)%
Total operating expenses	$ 31,394	$ 31,196	1 %

Research and Development

Research and development expense consists primarily of compensation-related costs, product development and material expenses, and other allocated facilities and information technology expenses. We have made substantial investments in research and development since our inception. Our research and development efforts have focused primarily on enhancing our technologies and supporting development and commercialization of new and existing products and services.

Research and development expense increased by $0.3 million, or 4%, to $8.7 million for the three months ended March 31, 2020 compared to the three months ended March 31, 2019. Increases were primarily attributable to higher headcount costs and laboratory supplies costs.

We believe that our continued investment in research and development is essential to our long-term competitive position and that these expenses may increase in future periods.

Selling, General and Administrative

Selling, general and administrative expense consists primarily of personnel costs for our sales and marketing, business development, finance, legal, human resources, information technology, and general management, as well as professional services, such as legal and accounting services.

Selling, general and administrative expense decreased by $0.1 million, or 1%, to $22.7 million for three months ended March 31, 2020 compared to the three months ended March 31, 2019. Facilities cost increased approximately $1.0 million for three months ended March 31, 2020 compared to the three months ended March 31, 2019, reflecting moving and lease costs associated with our new corporate headquarters. We also incurred higher costs due to higher headcount compared to the year ago period. These cost increases were largely offset by lower legal and business development costs and lower travel expenses. Foreign exchange rates had a negligible impact on selling, general and administrative expense.

Interest Expense, Loss on Extinguishment of Debt and Other Income (Loss), Net

The following table presents these items for the three months ended March 31, 2020 and 2019 (in thousands):

	Three Months Ended March 31,		
	2020	2019	Change
Interest expense	$ (900)	$ (2,701)	67%
Loss on extinguishment of debt	—	(9,000)	NA
Other income (loss), net	(818)	484	269%
Total	$ (1,718)	$ (11,217)	85%

In February 2014, we closed an underwritten public offering of $201.3 million aggregate principal amount of our Senior Convertible Notes due 2034 (2014 Notes). In March 2018, we entered into separate privately negotiated transactions with certain holders of our 2014 Notes to exchange $150.0 million in aggregate principal amount of the 2014 Notes for our 2.75% Exchange Convertible Senior Notes due 2034 (2018 Notes). In the first quarter of 2019, the 2018 Notes were converted into approximately 19.5 million shares of our common stock and the 2018 Notes were retired. The decrease in interest expense for three months ended March 31, 2020 compared to the three months ended March 31, 2019 was primarily due to the retirement of the 2018 Notes. We recognized a loss of $9.0 million on the conversion of 2018 Notes, which was included in loss on

extinguishment of debt. This amount represents the difference between the fair value of the bonds converted and the carrying value of the bonds at the time of conversion.

Other income (loss) net, of $0.8 million for the three months ended March 31, 2020 is primarily attributable to $0.2 million of interest income, and $1.0 million of foreign exchange losses, reflecting the impact of a stronger U.S. dollar.

Income Tax Benefit (Expense)

Our tax provision is generally driven by three components: (i) tax provision from our foreign operations, (ii) tax benefits from the amortization of acquisition-related intangible assets, and (iii) discrete items, such as changes in valuation allowances or adjustments upon finalization of tax returns. Depending on the relative value of these components, we can have either a tax benefit or expense for any given period.

We recorded a tax benefit of $0.7 million, or an effective tax rate of 4.1%, for the three months ended March 31, 2020. For the three months ended March 31, 2019, we recorded a tax expense of $42 thousand. The benefit in the current period was primarily attributable to the tax benefit from the amortization of our acquisition-related deferred tax liability, partially offset by a provision from our foreign operations. In the prior year, the provision for our foreign operation was larger than the tax benefit from the amortization of our acquisition-related deferred tax liability, resulting in a net expense.

Liquidity and Capital Resources

Sources of Liquidity

As of March 31, 2020, our principal sources of liquidity consisted of $35.0 million of cash and cash equivalents, and $13.5 million of short-term investments, as well as $1.1 million of restricted cash and $8.6 million of availability under our Revolving Credit Facility.

The following table presents our cash flow summary for the three months ended March 31, 2020 and 2019 (in thousands):

	Three Months Ended March 31,	
	2020	2019
Cash flow summary:		
Net cash used in operating activities	$ (4,295)	$ (20,130)
Net cash provided by (used in) investing activities	17,460	(9,757)
Net cash provided by (used in) financing activities	(503)	147
Net increase (decrease) in cash, cash equivalents and restricted cash	12,331	(29,767)

Net Cash Used in Operating Activities

We derive cash flows from operations primarily from cash collected from the sale of our products and services, and license agreements and grants. Our cash flows from operating activities are also significantly influenced by our use of cash for operating expenses and working capital to support our business. We have historically experienced negative cash flows from operating activities as we have expanded our business and built our infrastructure domestically and internationally.

Net cash used in operating activities in the three months ended March 31, 2020 was $4.3 million and consisted of net loss of $16.0 million, adjusted for non-cash adjustments of $7.0 million, partially offset by a net decrease in assets and liabilities of $4.7 million. Non-cash items primarily included an amortization of developed technology of $3.0 million, stock-based compensation expense of $2.4 million, amortization of debt discounts, premiums and issuance costs of $0.1 million, depreciation and amortization of $1.1 million, and other non-cash items of $0.3 million. The net decrease in assets and liabilities was primarily due to a decrease in accounts receivable of $4.7 million, an increase in accounts payable of $3.1 million, and an increase in deferred revenue of $1.0 million, partially offset by an increase of inventories of $2.3 million and a decrease in other liabilities of $2.1 million.

Net cash used in operating activities for the three months ended March 31, 2019 was $20.1 million and consisted of net loss of $25.5 million, adjusted for non-cash adjustments of $17.5 million, and an increase in the assets and liabilities of $12.1 million. Non-cash items primarily included a $9.0 million loss on extinguishment of debt, amortization of developed

technology of $2.8 million, stock-based compensation expense of $2.3 million, amortization of debt discounts, premiums, and issuance costs of $2.0 million, and depreciation and amortization of $1.2 million. The net change in assets and liabilities included a decrease in other liabilities of $10.9 million, an increase in accounts receivable of $2.5 million, an increase in inventories of $0.9 million, and an increase in prepaid and other assets of $1.2 million, partially offset by an increase accounts payable of $2.6 million, and an increase in deferred revenue of $0.7 million.

Net Cash Provided by (Used in) Investing Activities

Our primary investing activities consist of purchases, sales, and maturities of our short-term investments and to a much lesser extent, capital expenditures for manufacturing, laboratory, computer equipment and software to support our infrastructure and work force. We expect to continue to incur costs for capital expenditures to improve manufacturing efficiencies and strengthen information technology and network security, as well as capital expenditures incurred in moving our corporate headquarters in 2020. However, we may choose to decrease or defer certain capital expenditures and development activities, while further optimizing our organization.

Net cash provided by investing activities in the three months ended March 31, 2020 was $17.5 million, which was mainly due to proceeds from maturities of investments of $23.6 million, and partially offset by the acquisition of InstruNor AS, net of cash acquired, of $5.2 million.

Net cash used in investing activities in the three months ended March 31, 2019 was $9.8 million, which consisted of purchases of investments of $9.5 million and capital expenditures of $0.3 million to support our commercial and manufacturing operations.

Net Cash Provided by (Used in) Financing Activities

We used cash in financing activities of $0.5 million during the three months ended March 31, 2020 was primarily due to payments of debt issuance costs of $0.4 million.

We generated cash from financing activities of $0.1 million during the three months ended March 31, 2019, consisting primarily of $0.3 million from exercise of stock options, partially offset by $0.1 million for income taxes related to net share settlement of equity awards.

Capital Resources

At March 31, 2020 and December 31, 2019, our working capital, excluding deferred revenues and restricted cash, was $59.7 million and $74.0 million, respectively, including cash and cash equivalents of $35.0 million and $21.7 million, respectively, and short-term investments of $13.5 million and $37.0 million, respectively.

In February 2014, we closed an underwritten public offering of $201.3 million in aggregate principal amount of our 2014 Notes. In March 2018, we entered into privately negotiated transactions with certain holders of our 2014 Notes to exchange $150.0 million in aggregate principal amount of the 2014 Notes for $150.0 million in aggregate principal amount of 2018 Notes.

In the first quarter of 2019, we received notices from holders of the 2018 Notes electing to voluntarily convert approximately $138.1 million in aggregate principal amount of the 2018 Notes. In February 2019, we notified trustee U.S. Bank National Association of our intention to exercise our issuer’s conversion option with respect to the remaining approximately $11.9 million in aggregate principal amount of 2018 Notes. In total, $150.0 million of the 2018 Notes were converted into approximately 19.5 million shares of our common stock and the 2018 Notes were retired.

In November 2019, we closed a private placement to qualified institutional buyers pursuant to Rule 144A under the Securities Act of $55.0 million aggregate principal amount of our 5.25% convertible senior notes due 2024 (2019 Notes). Net proceeds of the 2019 Notes issuance were $52.7 million, after deductions for commissions and other debt issuance costs. $51.8 million of the proceeds was used to retire $50.2 million aggregate principal amount of our 2014 Notes, leaving approximately $1.1 million of aggregate principal amount of our 2014 Notes outstanding. Pursuant to the Indenture governing the 2014 Notes, holders of the 2014 Notes have the right, subject to certain conditions specified in such indenture, to require the Company to purchase their 2014 Notes beginning in February 2021. The private placement of the 2019 Notes, and concurrent repurchase of a portion of the 2014 Notes, had the effect of refinancing a portion of the Company’s outstanding debt under the 2014 Notes to December 2024.

The 2019 Notes bear interest at 5.25% per annum, payable semiannually on June 1 and December 1 of each year, beginning on June 1, 2020. The Notes will mature on December 1, 2024, unless earlier repurchased or converted pursuant to their terms. The 2019 Notes will be convertible at the option of the holder at any point prior to close of business on the second scheduled trading day preceding the maturity date. The initial conversion rate of the Notes is 344.8276 shares of the Company's common stock per $1,000 principal amount of 2019 Notes (which is equivalent to an initial conversion price of approximately $2.90 per share). The conversion rate will be subject to adjustment upon the occurrence of certain specified events but will not be adjusted for any accrued and unpaid interest.

The 2019 Notes will also be convertible at our option upon certain conditions in accordance with the terms of the indenture governing the 2019 Notes. On or after December 1, 2021 to December 1, 2022, if the price of the Company's common stock has equaled or exceeded 150% of the Conversion Price (as defined in the indenture, currently $2.90, subject to adjustment) for a specified number of days (Issuer's Conversion Option), we may, at our option, elect to convert the 2019 Notes in whole but not in part into shares of the Company, determined in accordance with the terms of the indenture. On or after December 1, 2022, if the price of the Company's common stock has equaled or exceeded 130% of the Conversion Price then in effect for a specified number of days, we may, at our option, elect to convert the 2019 Notes in whole but not in part into shares of the Company, determined in accordance with the terms of the indenture.

The foregoing summaries of the 2014 Notes, the 2018 Notes, the 2019 Notes and the exchange transactions completed in March 2018 and November 2019 are not complete and are qualified in their entirety by the applicable indentures, forms of global notes, and other agreements and documents filed with the SEC.

On August 2, 2018, we entered into a $15.0 million revolving senior credit facility (Revolving Credit Facility) with Silicon Valley Bank (SVB), with a maturity date of August 2, 2020. The Revolving Credit Facility is collateralized by substantially all our property, other than intellectual property. Outstanding loans under the Revolving Credit Facility bear interest, at the greater of (i) prime rate plus 0.50% or (ii) 5.50%. Amounts drawn under the Revolving Credit Facility will be used for working capital and general corporate purposes. As of March 31, 2020 total availability under the Revolving Credit Facility was $8.6 million. We currently have no outstanding debt under the Revolving Credit Facility, and we are in compliance with all the terms and conditions of the loan agreement governing the Revolving Credit Facility. See Note 7 to our consolidated financial statements for more information about the Revolving Credit Facility.

On April 21, 2020, we entered into the Third Amendment to Loan and Security Agreement with SVB (the Amendment), which amends the Loan and Security Agreement dated as of August 2, 2018, between the Company and SVB (as amended by the Default Waiver and First Amendment to Loan and Security Agreement dated September 7, 2018, and the Second Amendment to Loan and Security Agreement dated November 20, 2019, the Revolving Credit Agreement). The Amendment extends the maturity date by two years, to August 2, 2022. We also amended the interest rate to be the greater of (i) prime rate (as customarily defined), plus 0.50%, floating, and (ii) 5.25%. Interest on any outstanding loans continues to be due and payable monthly and the principal balance is due at maturity though loans can be prepaid at any time without penalty. Annual administration fees are unchanged and the quarterly unused revolving line facility fee remains at 0.75% per annum on the average unused facility. The Amendment also includes various administrative changes.

We believe our existing cash, cash equivalents, and investments will be sufficient to meet our working capital and capital expenditure needs for at least the next 18 months. However, we may experience lower than expected cash generated from operating activities or greater than expected capital expenditures, cost of revenue, or operating expenses, and we may need to raise additional capital to fund our operations, further our research and development activities, or acquire or invest in a business. Our future funding requirements will depend on many factors, including market acceptance of our products, the cost of our research and development activities, the cost of filing and prosecuting patent applications, the cost associated with litigation or disputes relating to intellectual property rights or otherwise, the cost and timing of regulatory clearances or approvals, if any, the cost and timing of establishing additional sales, marketing, and distribution capabilities, the cost and timing of establishing additional technical support capabilities, and the effect of competing technological and market developments. In the future, we may acquire businesses or technologies from third parties, and we may decide to raise additional capital through debt or equity financing to the extent we believe this is necessary to successfully complete these acquisitions.

If we require additional funds in the future, we may not be able to obtain such funds on acceptable terms, or at all, and our ability to raise additional capital may be adversely impacted by potential worsening global economic conditions and the recent disruptions to and volatility in the credit and financial markets in the United States and worldwide resulting from COVID-19. If we raise additional funds by issuing equity securities, our stockholders could experience dilution. Debt financing, if available, may involve covenants restricting our operations or our ability to incur additional debt. Any additional debt or equity financing that we raise may contain terms that are not favorable to us or our stockholders. If we do not have, or

are not able to obtain, sufficient funds, we may have to delay development or commercialization of our products or license to third parties the rights to commercialize products or technologies that we would otherwise seek to commercialize. We also may have to reduce marketing, customer support, research and development, or other resources devoted to our products.

Off-Balance Sheet Arrangements

Since our inception, we have not had any off-balance sheet arrangements as defined in Item 303(a)(4) of the SEC's Regulation S-K.

Contractual Obligations and Commitments

Our operating lease obligations relate to leases for our current corporate headquarters and leases for manufacturing and office space for our foreign subsidiaries. Please see Note 8 to our condensed consolidated financial statements for a discussion of our lease obligations.

Other than as disclosed above, there have been no material changes during the three months ended March 31, 2020 to our contractual obligations disclosed in our "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in our annual report on Form 10-K for the year ended December 31, 2019.

Item 3. Quantitative and Qualitative Disclosures about Market Risk

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure is primarily a result of fluctuations in foreign currency exchange rates and interest rates. We do not hold or issue financial instruments for trading purposes.

Foreign Currency Exchange Risk

As we expand internationally our results of operations and cash flows will become increasingly subject to fluctuations due to changes in foreign currency exchange rates. Our revenue is generally denominated in the local currency of the contracting party. Historically, the majority of our revenue has been denominated in U.S. dollars. Our expenses are generally denominated in the currencies in which our operations are located, which is primarily in the United States, with a portion of expenses incurred in Singapore and Canada where our manufacturing facilities are located. Our results of operations and cash flows are, therefore, subject to fluctuations due to changes in foreign currency exchange rates. The volatility of exchange rates depends on many factors that we cannot forecast with reliable accuracy. We have experienced and will continue to experience fluctuations in our net income or loss as a result of transaction gains or losses related to revaluing certain current asset and current liability balances that are denominated in currencies other than the functional currency of the entities in which they are recorded. For the three months ended March 31, 2020, we had a foreign currency loss of $1.0 million compared to a foreign currency gain of $45 thousand in the prior year for the same period. To date, we have not entered into any foreign currency hedging contracts although we may do so in the future. As our international operations grow, we will continue to reassess our approach to manage our risk relating to fluctuations in currency rates. If foreign currency exchange rates had changed by 10% during the periods presented, it would not have had a material impact on our financial position or results of operations.

Interest Rate Sensitivity

We had cash and cash equivalents of $35.0 million as of March 31, 2020. These amounts were held primarily in cash on deposit with banks and money market funds which are short-term. We also held $13.5 million of investments in treasury securities at March 31, 2020. Cash, cash equivalents and investments are held for working capital purposes. We believe that we do not have any material exposure to changes in the fair value of our money market portfolio as a result of changes in interest rates. Declines in interest rates, however, will reduce future investment income. If overall interest rates had decreased by 10% during the periods presented, our interest income would not have been materially affected.

Fair Value of Financial Instruments

We do not have material exposure to market risk with respect to investments. We do not use derivative financial instruments for speculative or trading purposes. We may adopt specific hedging strategies in the future.

Item 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of March 31, 2020. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of March 31, 2020, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting that occurred during the three months ended March 31, 2020 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Limitations on the Effectiveness of Controls

Control systems, no matter how well conceived and operated, are designed to provide a reasonable, but not an absolute, level of assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Because of the inherent limitations in any control system, misstatements due to error or fraud may occur and not be detected.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

In the normal course of business, we are from time to time involved in legal proceedings or potential legal proceedings, including matters involving employment, intellectual property, or others. Although the results of litigation and claims cannot be predicted with certainty, we currently believe that the final outcome of any currently pending matters would not have a material adverse effect on our business, operating results, financial condition, or cash flows. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources, and other factors.

Item 1A. Risk Factors

We operate in a rapidly changing environment that involves numerous uncertainties and risks. The following risks and uncertainties may have a material and adverse effect on our business, financial condition, or results of operations. You should consider these risks and uncertainties carefully, together with all of the other information included or incorporated by reference in this Form 10-Q. The risks described below are not the only ones we face. Our business is also subject to the risks that affect many other companies, such as employment relations, general economic conditions, global sociopolitical events, and international operations. Further, additional risks not currently known to us or that we currently believe are immaterial may in the future materially and adversely affect our business, operations, liquidity and stock price. If any of these risks occur, our business, results of operations, or financial condition could suffer, the trading price of our securities could decline, and you may lose all or part of your investment.

Risks Related to Fluidigm's Business and Strategy

The global COVID-19 pandemic and related impacts are having a material adverse effect on our operations, financial performance and cash flows. We are unable to predict the extent to which the pandemic and related impacts will continue to adversely impact our business operations, financial performance, results of operations, financial position and the achievement of our strategic objectives.

Since December 2019, an outbreak of SARS-CoV-2, a novel strain of coronavirus that causes a disease commonly known as COVID-19, has since spread globally throughout all the countries in which we and our customers, suppliers, and other business partners operate. The World Health Organization has declared COVID-19 to be a pandemic and a public health emergency of international concern. The COVID-19 pandemic has caused significant volatility in financial markets and has raised the prospect of an extended global recession. Public health problems resulting from COVID-19 and precautionary measures instituted by governments and businesses to mitigate its spread, including travel restrictions and quarantines, could continue to contribute to a general slowdown in the global economy, cause increasingly adverse impacts on our customers, suppliers, and other business partners, and further disrupt our operations. Changes in our operations as a result of the COVID-19 pandemic may result in inefficiencies or delays, including in sales and product development efforts and additional costs related to business continuity initiatives that cannot be fully mitigated through succession planning, employees working remotely, or teleconferencing technologies.

The COVID-19 pandemic and related governmental reactions have had, and may continue to have a negative impact on our business, liquidity, results of operations, and stock price due to the occurrence of some or all of the following events or circumstances among others:

- reduced demand for our products and services due to the impact of COVID-19 on our customers, particularly in the global academic research community;
- diminished business productivity due to inefficiencies in employees working from home or increasing physical distancing and other pandemic response protocols in our production facilities;
- increased susceptibility to the risk of information technology security breaches and other disruptions due to increased volumes of remote access to our information systems from our employees working at home;
- the negative impact of travel restrictions and social distancing policies on our sales operations, marketing efforts, and customer field support;
- impaired ability to retain personnel over concerns about workplace exposure to COVID-19, or to hire and effectively train new personnel, due to physical distancing protocols;

- increased operating costs if one of our facilities were to experience a COVID-19 outbreak;
- disruption of the operations of our contract manufacturers, suppliers, and other business partners; and
- increased volatility in our stock price due to financial market instability.

The extent to which the COVID-19 outbreak impacts our business, including our financial results, will depend on future developments, which are highly uncertain and cannot be predicted at this time with confidence, such as the continued geographic spread of the disease, the duration of the outbreak, and actions taken in the United States and elsewhere to contain the outbreak and treat the disease, such as social distancing and quarantines, business closures or business disruptions.

Because the severity, magnitude, and duration of the COVID-19 pandemic and its economic consequences are uncertain and rapidly changing, we are unable to predict the impact of COVID-19 on our operations, our financial performance, and our ability to successfully execute our business strategies and initiatives. The ultimate impact of the COVID-19 pandemic on our operations and financial performance depends on many factors that are not within our control, including, but not limited, to: governmental, business, and individual actions that have been and continue to be taken in response to the pandemic (including restrictions on travel, transport and workforce pressures); the impact of the pandemic and actions taken in response on global and regional economies, travel, and economic activity; the availability of federal, state, local or non-U.S. funding programs; general economic uncertainty in key global markets and financial market volatility; global economic conditions and levels of economic growth; and the pace of recovery when the COVID-19 pandemic subsides.

As the COVID-19 crisis continues to adversely affect our operating and financial results, it may also have the effect of heightening many of the other risks described in our other risk factors below. COVID-19 may also affect our operating and financial results in a manner that is not presently known to us or that we currently do not expect to present significant risks to our operations or financial results, particularly if the pandemic and its associated impacts reoccur in the coming months.

Our financial results and revenue growth rates have varied significantly from quarter-to-quarter and year-to-year due to a number of factors, and a significant variance in our operating results or rates of growth, if any, could lead to substantial volatility in our stock price.

Our revenue, results of operations, and revenue growth rates have varied in the past and may continue to vary significantly from quarter-to-quarter or year-to-year. We may experience substantial variability in our product mix from period-to-period as revenue from sales of our instruments relative to sales of our consumables may fluctuate or deviate significantly from expectations. For example, our revenue declined year-over-year in 2017 compared to 2016, but increased year-over-year in 2018 compared to 2017. Our revenue continued to increase year-over-year in 2019 compared to 2018, but we may not be able to achieve similar revenue growth in future periods. We are also increasingly dependent on our mass cytometry business, which is very capital intensive. Variability in our quarterly or annual results of operations, mix of product revenue, including any decline in our mass cytometry revenue, or variability in rates of revenue growth, if any, may lead to volatility in our stock price as research analysts and investors respond to these fluctuations. These fluctuations are due to numerous factors that are difficult to forecast, including: fluctuations in demand for our products; changes in customer budget cycles and capital spending; seasonal variations in customer operations; tendencies among some customers to defer purchase decisions to the end of the quarter; the large unit value of our systems, particularly our proteomics systems; changes in our pricing and sales policies or the pricing and sales policies of our competitors; our ability to design, manufacture, market, sell, and deliver products to our customers in a timely and cost-effective manner; fluctuations or reductions in revenue from sales of legacy instruments that may have contributed significant revenue in prior periods; quality control or yield problems in our manufacturing operations; our ability to timely obtain adequate quantities of the materials or components used in our products, which in certain cases are purchased through sole and single source suppliers; new product introductions and enhancements by us and our competitors; unanticipated increases in costs or expenses; our complex, variable and, at times, lengthy sales cycle; global economic conditions; and fluctuations in foreign currency exchange rates. Additionally, we have certain customers who have historically placed large orders in multiple quarters during a calendar year. A significant reduction in orders from one or more of these customers could adversely affect our revenue and operating results, and if these customers defer or cancel purchases or otherwise alter their purchasing patterns, our financial results and actual results of operations could be significantly impacted. Other unknown or unpredictable factors also could harm our results.

The foregoing factors, as well as other factors, could materially and adversely affect our quarterly and annual results of operations and rates of revenue growth, if any. We have experienced significant revenue growth in the past but we may not achieve similar growth rates in future periods. You should not rely on our operating results for any prior quarterly or annual period as an indication of our future operating performance. If we are unable to achieve adequate revenue growth, our operating results could suffer and our stock price could decline. In addition, a significant amount of our operating expenses are relatively fixed due to our manufacturing, research and development, and sales and general administrative efforts. Any failure to adjust

spending quickly enough to compensate for a shortfall relative to our anticipated revenue could magnify the adverse impact of such shortfalls on our results of operations. We expect that our sales will continue to fluctuate on an annual and quarterly basis and that our financial results for some periods may be below those projected by securities analysts, which could significantly decrease the price of our common stock.

We have incurred losses since inception, and we may continue to incur substantial losses for the foreseeable future.

We have incurred significant losses in each fiscal year since our inception, including net losses of $64.8 million, $59.0 million, and $60.5 million during the years 2019, 2018, and 2017, respectively. As of March 31, 2020, we had an accumulated deficit of $639.7 million. These losses have resulted principally from costs incurred in our research and development programs, and from our manufacturing costs and selling, general, and administrative expenses. To date, we have funded our operations primarily through equity offerings, the issuance of debt instruments, and from sales of our products.

Until we are able to generate additional revenue to support our level of operating expenses, we will continue to incur operating and net losses and negative cash flow from operations. We believe that our continued investment in research and development, sales, and marketing is essential to our long-term competitive position and future revenue growth and, as a result, we may incur operating losses for the foreseeable future and may never achieve profitability.

The life science markets are highly competitive and subject to rapid technological change, and we may not be able to successfully compete.

The markets for our products are characterized by rapidly changing technology, evolving industry standards, changes in customer needs, emerging competition, new product introductions, and strong price competition. We compete with both established and development stage life science research companies that design, manufacture, and market instruments and consumables for gene expression analysis, single-cell targeted gene expression and protein expression analysis, SNP genotyping, quantitative polymerase chain reaction (qPCR), digital PCR, flow cytometry, cell imaging, and additional applications using well established laboratory techniques, as well as newer technologies such as bead encoded arrays, microfluidics, next generation DNA sequencing, microdroplets, spatial protein expression, and photolithographic arrays. Most of our current competitors have significantly greater name recognition, greater financial and human resources, broader product lines and product packages, larger sales forces, larger existing installed bases, larger intellectual property portfolios, and greater experience and scale in research and development, manufacturing, and marketing than we do.

We consider Illumina, Inc., Agilent Technologies, Inc., Thermo Fisher Scientific Inc. (Thermo), Bio-Rad Laboratories, Inc., NanoString Technologies, Inc. (NanoString), and Agena Bioscience, Inc. to be our principal competitors in the microfluidics space. We believe that Cytek Biosciences, Inc. and Becton, Dickinson and Company are currently our principal competitors for our mass cytometry market share, and that IonPath Inc., Akoya Biosciences, Inc., and NanoString are our principal competitors for our Imaging Mass Cytometry™ market share. While the aforementioned principal competitors are the largest and most prevalent in their representative technology areas, the combined markets in which we compete have an additional 10 to 20 smaller competitors with competing approaches and technologies that we routinely face in selling situations.

Competitors may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards, or customer requirements. In light of these advantages, even if our technology is more effective than the product or service offerings of our competitors, current or potential customers might accept competitive products and services in lieu of purchasing our technology. We anticipate that we will continue to face increased competition in the future as existing companies and competitors develop new or improved products and as new companies enter the market with new technologies. Increased competition is likely to result in pricing pressures, which could reduce our profit margins and increase our sales and marketing expenses. In addition, mergers, consolidations, or other strategic transactions between two or more of our competitors, or between our competitor and one of our key customers, could change the competitive landscape and weaken our competitive position, adversely affecting our business.

Market opportunities may not develop as quickly as we expect, limiting our ability to successfully sell our products, or our product development and strategic plans may change and our entry into certain markets may be delayed, if it occurs at all.

The application of our technologies to high-throughput genomics, single-cell genomics and, particularly, mass cytometry applications are in many cases emerging market opportunities. We believe these opportunities will take several years to develop or mature and we cannot be certain that these market opportunities will develop as we expect. The future growth of our markets and the success of our products depend on many factors beyond our control, including recognition and acceptance by the scientific community, and the growth, prevalence, and costs of competing methods of genetic and protein analysis.

Additionally, our success depends on the ability of our sales organization to successfully sell our products into these new markets. If we are not able to successfully market and sell our products, or to achieve the revenue or margins we expect, our operating results may be harmed and we may not recover our product development and marketing expenditures. In addition, our product development and strategic plans may change, which could delay or impede our entry into these markets.

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

Our success depends on our ability to develop and market products that are recognized and accepted as reliable, enabling and cost-effective. Most of our potential customers already use expensive research systems in their laboratories and may be reluctant to replace those systems. Market acceptance of our systems will depend on many factors, including our ability to convince potential customers that our systems are an attractive alternative to existing technologies. Compared to some competing technologies, our technology is relatively new, and most potential customers have limited knowledge of, or experience with, our products. Prior to adopting our systems, some potential customers may need to devote time and effort to testing and validating our systems. Any failure of our systems to meet these customer benchmarks could result in customers choosing to retain their existing systems or to purchase systems other than ours, and revenue from the sale of legacy instruments that may have contributed significant revenue in prior periods may decrease.

In addition, it is important that our systems be perceived as accurate and reliable by the scientific and medical research community as a whole. Historically, a significant part of our sales and marketing efforts has been directed at convincing industry leaders of the advantages of our systems and encouraging such leaders to publish or present the results of their evaluation of our system. If we are unable to continue to induce leading researchers to use our systems, or if such researchers are unable to achieve and publish or present significant experimental results using our systems, acceptance and adoption of our systems will be slowed and our ability to increase our revenue would be adversely affected.

We may experience development or manufacturing problems or delays that could limit the potential growth of our revenue or increase our losses.

We may encounter unforeseen situations in the manufacturing and assembly of our products that would result in delays or shortfalls in our production. For example, our production processes and assembly methods may have to change to accommodate any significant future expansion of our manufacturing capacity, which may increase our manufacturing costs, delay production of our products, reduce our product margin, and adversely impact our business. Conversely, if demand for our products shifts such that a manufacturing facility is operated below its capacity for an extended period, we may adjust our manufacturing operations to reduce fixed costs, which could lead to uncertainty and delays in manufacturing times and quality during any transition period.

Additionally, all of our integrated fluidic circuits (IFCs) for commercial sale are manufactured at our facility in Singapore. Production of the elastomeric block that is at the core of our IFCs is a complex process requiring advanced clean rooms, sophisticated equipment, and strict adherence to procedures. Any contamination of the clean room, equipment malfunction, or failure to strictly follow procedures can significantly reduce our yield in one or more batches. We have in the past experienced variations in yields due to such factors. A drop in yield can increase our cost to manufacture our IFCs or, in more severe cases, require us to halt the manufacture of our IFCs until the problem is resolved. Identifying and resolving the cause of a drop in yield can require substantial time and resources.

Furthermore, developing an IFC for a new application may require developing a specific production process for that type of IFC. While all of our IFCs are produced using the same basic processes, significant variations may be required to ensure adequate yield of any particular type of IFC. Developing such a process can be very time consuming, and any unexpected difficulty in doing so can delay the introduction of a product.

If our manufacturing activities are adversely impacted, or if we are otherwise unable to keep up with demand for our products by successfully manufacturing, assembling, testing, and shipping our products in a timely manner, our revenue could be impaired, market acceptance for our products could be adversely affected and our customers might instead purchase our competitors' products.

If our research and product development efforts do not result in commercially viable products within anticipated timelines, if at all, our business and results of operations will be adversely affected.

Our business is dependent on the improvement of our existing products, our development of new products to serve existing markets, and our development of new products to create new markets and applications that were previously not practical with existing systems. We intend to devote significant personnel and financial resources to research and development activities designed to advance the capabilities of our technology. We have developed design rules for the implementation of our

technology that are frequently revised to reflect new insights we have gained about the technology. In addition, we have discovered that biological or chemical reactions sometimes behave differently when implemented on our systems rather than in a standard laboratory environment. Furthermore, many such reactions take place within the confines of single cells, which have also demonstrated unexpected behavior when grown and manipulated within microfluidic environments. As a result, research and development efforts may be required to transfer certain reactions and cell handling techniques to our systems. In the past, product development projects have been significantly delayed when we encountered unanticipated difficulties in implementing a process on our systems. We may have similar delays in the future, and we may not obtain any benefits from our research and development activities. Any delay or failure by us to develop and release new products or product enhancements would have a substantial adverse effect on our business and results of operations.

Our products could have defects or errors, which may give rise to claims against us, adversely affect market adoption of our systems, and adversely affect our business, financial condition, and results of operations.

Our systems utilize novel and complex technology and such systems may develop or contain undetected defects or errors. We cannot assure you that material performance problems, defects, or errors will not arise, and as we increase the density and integration of our systems, these risks may increase. We generally provide warranties that our systems will meet performance expectations and will be free from defects. The costs incurred in correcting any defects or errors may be substantial and could adversely affect our operating margins. For example, we have experienced a performance issue with respect to certain IFCs used in our C1 systems due to the presence of more than one cell in an IFC chamber. Although we have redesigned such C1 IFCs, we may experience additional unexpected product defects or errors that could affect our ability to adequately address these performance issues.

In manufacturing our products, including our systems, IFCs, and assays, we depend upon third parties for the supply of various components, many of which require a significant degree of technical expertise to produce. In addition, we purchase certain products from third party suppliers for resale. If our suppliers fail to produce components to specification or provide defective products to us for resale and our quality control tests and procedures fail to detect such errors or defects, or if we or our suppliers use defective materials or workmanship in the manufacturing process, the reliability and performance of our products will be compromised.

If our products contain defects, we may experience:

- a failure to achieve market acceptance or expansion of our product sales;
- loss of customer orders and delay in order fulfillment;
- damage to our brand reputation;
- increased cost of our warranty program due to product repair or replacement;
- product recalls or replacements;
- inability to attract new customers;
- diversion of resources from our manufacturing and research and development departments into our service department; and
- legal claims against us, including product liability claims, which could be costly and time consuming to defend and result in substantial damages.

In addition, certain of our products are marketed for use with products sold by third parties. For example, certain of our systems are marketed as compatible with major next-generation DNA sequencing instruments. If such third-party products are not produced to specification, are produced in accordance with modified specifications, or are defective, they may not be compatible with our products. In such case, the reliability and performance of our products may be compromised.

The occurrence of any one or more of the foregoing could negatively affect our business, financial condition, and results of operations.

Our business depends on research and development spending levels of our customers, a reduction in which could limit our ability to sell our products and adversely affect our business.

We expect that our revenue in the foreseeable future will continue to be derived primarily from sales of our systems, IFCs, assays, and reagents to academic research institutions, translational research and medicine centers, cancer centers,

clinical research laboratories biopharmaceutical, biotechnology, and plant and animal research companies, and contract research organizations worldwide. Our success will depend upon their demand for and use of our products. Accordingly, the spending policies and practices of these customers—which may additionally be impacted by factors such as the COVID-19 pandemic—could have a significant effect on the demand for our technology. These policies may be based on a wide variety of factors, including concerns regarding any future federal government budget sequestrations, the availability of resources to make purchases, the spending priorities among various types of equipment, policies regarding spending during recessionary periods, and changes in the political climate. In addition, academic, governmental, and other research institutions that fund research and development activities may be subject to stringent budgetary constraints that could result in spending reductions, reduced allocations, or budget cutbacks, which could jeopardize the ability of these customers to purchase our products. Our operating results may fluctuate substantially due to reductions and delays in research and development expenditures by our customers. For example, reductions in operating expenditures by global academic research facilities, approximately 60% to 70% of which are either closed or working at reduced capacity because of the COVID-19 pandemic, have resulted in lower than expected sales of our systems, IFCs, assays, and reagents. Similar reductions and delays in customer spending may result from other factors that are not within our control, such as:

- changes in economic conditions;
- natural disasters or public health crises;
- changes in government programs that provide funding to research institutions and companies;
- changes in the regulatory environment affecting life science and plant and animal research companies engaged in research and commercial activities;
- differences in budget cycles across various geographies and industries;
- market-driven pressures on companies to consolidate operations and reduce costs;
- mergers and acquisitions in the life science and plant and animal research industries; and
- other factors affecting research and development spending.

Any decrease in our customers' budgets or expenditures, or in the size, scope, or frequency of capital or operating expenditures, could materially and adversely affect our operations or financial condition.

If one or more of our manufacturing facilities become unavailable or inoperable, we will be unable to continue manufacturing our instruments, IFCs, assays and/or reagents and, as a result, our business will be harmed until we are able to secure a new facility.

We manufacture our genomics analytical and preparatory instruments and IFCs for commercial sale at our facility in Singapore and our mass cytometry instruments, assays, and reagents for commercial sale at our facility in Canada. No other manufacturing facilities are currently available to us, particularly facilities of the size and scope of our Singapore and Canada operations. Our facilities and the equipment we use to manufacture our instruments, IFCs, assays, and reagents would be costly to replace and could require substantial lead times to repair or replace. Our facilities may be harmed or rendered inoperable by natural or man-made disasters, which may render it difficult or impossible for us to manufacture our products for some period of time. If any of our facilities become unavailable to us, we cannot provide assurances that we will be able to secure a new manufacturing facility on acceptable terms, if at all. The inability to manufacture our products, combined with our limited inventory of manufactured supplies, may result in the loss of customers or harm our reputation, and we may be unable to reestablish relationships with those customers in the future. Although we possess insurance for damage to our property and the disruption of our business, this insurance may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, or at all. If our manufacturing capabilities are impaired, we may not be able to manufacture and ship our products in a timely manner, which would adversely impact our business.

Disruption of our manufacturing facilities or other operations, or in the operations of our customers or business partners, due to earthquake, flood, other natural catastrophic events, public health crises, or terrorism could result in cancellation of orders, delays in deliveries or other business activities, or loss of customers and could seriously harm our business.

We have significant manufacturing operations in Singapore and Canada and operations in the United States. In addition, our business is international in nature, with our sales, service and administrative personnel and our customers located in numerous countries throughout the world. Operations at our manufacturing facilities and our subcontractors, as well as our

other operations and those of our customers, are subject to disruption for a variety of reasons, including work stoppages, acts of war, terrorism, public health crises (including the ongoing COVID-19 pandemic), fire, earthquake, volcanic eruptions, energy shortages, flooding, or other natural disasters. Such disruption could cause delays in, among other things, shipments of products to our customers, our ability to perform services requested by our customers, or the installation of our products at customer sites.

We cannot provide any assurance that alternate means of conducting our operations (whether through alternate production capacity or service providers or otherwise) would be available if a major disruption were to occur or that, if such alternate means were available, they could be obtained on favorable terms.

We generate a substantial portion of our revenue internationally and our international business exposes us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

During the years 2019, 2018, and 2017, approximately 63%, 57%, and 55% respectively, of our product and service revenue was generated from sales to customers located outside of the United States. We believe that a significant percentage of our future revenue will continue to come from international sources as we expand our international operations and develop opportunities in other countries. Engaging in international business inherently involves a number of difficulties and risks, including:

- required compliance with existing and changing foreign regulatory requirements and laws that are or may be applicable to our business in the future, such as the European Union's General Data Protection Regulation and other data privacy requirements, labor and employment regulations, anticompetition regulations, the U.K. Bribery Act of 2010 and other anticorruption laws, and the RoHS and WEEE directives, which regulate the use of certain hazardous substances in, and require the collection, reuse, and recycling of waste from, products we manufacture;
- required compliance with U.S. laws such as the Foreign Corrupt Practices Act, and other U.S. federal laws and regulations established by the office of Foreign Asset Control;
- export requirements and import or trade restrictions;
- laws and business practices favoring local companies;
- longer payment cycles and difficulties in enforcing agreements and collecting receivables through certain foreign legal systems;
- changes in social, economic, and political conditions or in laws, regulations and policies governing foreign trade, manufacturing, development, and investment both domestically as well as in the other countries and jurisdictions in which we operate and into which we sell our products, including as a result of the separation of the United Kingdom from the European Union (Brexit);
- business interruptions resulting from global sociopolitical events, including war and terrorism, public health crises such as COVID-19, and natural disasters including earthquakes, typhoons, floods and fires;
- potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements, and other trade barriers;
- difficulties and costs of staffing and managing foreign operations; and
- difficulties protecting or procuring intellectual property rights.

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

We are subject to fluctuations in the exchange rate of the U.S. Dollar and foreign currencies.

A majority of our product sales are currently denominated in U.S. dollars and fluctuations in the value of the U.S. dollar relative to foreign currencies could decrease demand for our products and adversely impact our financial performance. For example, if the value of the U.S. dollar increases relative to foreign currencies, our products could become more costly to the international consumer and therefore less competitive in international markets, or if the value of the U.S. dollar decreases relative to the Singapore dollar or the Canadian dollar, it would become more costly in U.S. dollars for us to manufacture our products in Singapore and/or in Canada. Additionally, our expenses are generally denominated in the currencies of the countries in which our operations are located, which is primarily in the United States, with a portion of expenses incurred in Singapore

and Canada where a significant portion of our manufacturing operations are located. Our results of operations and cash flows are, therefore, subject to fluctuations due to changes in foreign currency exchange rates. The volatility of exchange rates depends on many factors that we cannot forecast with reliable accuracy. We have experienced and will continue to experience fluctuations in our net income or loss as a result of transaction gains or losses related to revaluing certain current asset and current liability balances that are denominated in currencies other than the functional currency of the entities in which they are recorded. Fluctuations in currency exchange rates could have an adverse impact on our financial results in the future.

Any disruption or delay in the shipping or off-loading of our products, whether domestically or internationally, may have an adverse effect on our financial condition and results of operations.

We rely on shipping providers to deliver products to our customers globally. Labor, tariff, or World Trade Organization-related disputes, piracy, physical damage to shipping facilities or equipment caused by severe weather or terrorist incidents, congestion at shipping facilities, complications related to public health crises, inadequate equipment to load, dock, and offload our products, energy-related tie-ups, or other factors could disrupt or delay shipping or off-loading of our products domestically and internationally. Such disruptions or delays may have an adverse effect on our financial condition and results of operations.

We are dependent on single and sole source suppliers for some of the components and materials used in our products, and the loss of any of these suppliers could harm our business.

We rely on single and sole source suppliers for certain components and materials used in our products. Additionally, several of our instruments are assembled at the facilities of contract manufacturers in Singapore. We do not have long term contracts with our suppliers of these components and materials or our assembly service providers. The loss of a single or sole source supplier of any of the following components and/or materials would require significant time and effort to locate and qualify an alternative source of supply, if at all:

- The IFCs used in our microfluidic systems are fabricated using a specialized polymer, and other specialized materials, that are available from a limited number of sources. In the past, we have encountered quality issues that have reduced our manufacturing yield or required the use of additional manufacturing processes.
- The electron multiplier detector included in the Hyperion/Helios systems and certain metal isotopes used with the Hyperion/Helios systems are purchased from sole source suppliers.
- The raw materials for our Delta Gene and SNP Type assays and Access Array target-specific primers are available from a limited number of sources.

Our reliance on single and sole source suppliers and assembly service providers also subjects us to other risks that could harm our business, including the following:

- we may be subject to increased component or assembly costs and
- we may not be able to obtain adequate supply or services in a timely manner or on commercially reasonable terms.

We have in the past experienced quality control and supply problems with some of our suppliers, such as manufacturing errors, and may again experience problems in the future. We may not be able to quickly establish additional or replacement suppliers, particularly for our single source components, or assembly service providers. Any interruption or delay in the supply of components or materials or assembly of our instruments, or our inability to obtain components, materials, or assembly services from alternate sources at acceptable prices in a timely manner, could impair our ability to meet the demand of our customers and cause them to cancel orders or switch to competitive products.

Our future success is dependent upon our ability to expand our customer base and introduce new applications.

Our customer base is primarily composed of academic research institutions, translational research and medicine centers, cancer centers, clinical research laboratories, biopharmaceutical, biotechnology, and plant and animal research companies, and contract research organizations that perform analyses for research and commercial purposes. Our success will depend, in part, upon our ability to increase our market share among these customers, attract additional customers outside of these markets, and market new applications to existing and new customers as we develop such applications. Attracting new customers and introducing new applications require substantial time and expense. For example, it may be difficult to identify, engage, and market to customers who are unfamiliar with the current applications of our systems. Any failure to expand our existing customer base or launch new applications would adversely affect our ability to increase our revenue.

We may not be able to develop new products or enhance the capabilities of our existing systems to keep pace with rapidly changing technology and customer requirements, which could have a material adverse effect on our business, revenue, financial condition, and operating results.

Our success depends on our ability to develop new products and applications for our technology in existing and new markets, while improving the performance and cost-effectiveness of our systems. New technologies, techniques, or products could emerge that might offer better combinations of price and performance than our current or future product lines and systems. Existing markets for our products, including high-throughput genomics, single-cell genomics and mass cytometry, as well as potential markets for our products such as high-throughput DNA sequencing and molecular applications, are characterized by rapid technological change and innovation. It is critical to our success for us to anticipate changes in technology and customer requirements and to successfully introduce new, enhanced, and competitive technology to meet our customers' and prospective customers' needs on a timely and cost-effective basis. Developing and implementing new technologies will require us to incur substantial development costs and we may not have adequate resources available to be able to successfully introduce new applications of, or enhancements to, our systems. We cannot guarantee that we will be able to maintain technological advantages over emerging technologies in the future. While we typically plan improvements to our systems, we may not be able to successfully implement these improvements. If we fail to keep pace with emerging technologies, demand for our systems will not grow and may decline, and our business, revenue, financial condition, and operating results could suffer materially. In addition, if we introduce enhanced systems but fail to manage product transitions effectively, customers may delay or forgo purchases of our systems and our operating results may be adversely affected by product obsolescence and excess inventory. Even if we successfully implement some or all of these planned improvements, we cannot guarantee that our current and potential customers will find our enhanced systems to be an attractive alternative to existing technologies, including our current products.

Our business operations depend upon the continuing efforts of our management team and other skilled and experienced personnel, and if we are unable to retain them or to recruit and train new key executives, scientists, and technical support personnel, we may be unable to achieve our goals.

Our success depends largely on the skills, experience, and performance of our management team and scientific and technical support personnel. The loss of the services of any key member of our management team or our scientific or technical support staff might significantly delay or prevent the development of our products or achievement of other business objectives by diverting management's attention to transition matters and identification of suitable replacements, if any, and could have a material adverse effect on our business. Our research and product development efforts could also be delayed or curtailed if we are unable to attract, train, and retain highly skilled employees, particularly, senior scientists and engineers. In April 2020, in response to the COVID-19 pandemic, we implemented a temporary reduction in employee salaries and company-wide hiring constraints. The duration of both the temporary salary reduction and the hiring constraints is indefinite, and we cannot predict our employees' willingness to remain with us during such salary reduction until our regular operations are restored. We do not maintain fixed term employment contracts or significant key person life insurance with any of our employees.

Additionally, to expand our research and product development efforts, we need to retain and recruit scientists skilled in areas such as molecular and cellular biology, assay development, and manufacturing. We also need highly trained technical support personnel with the necessary scientific background and ability to understand our systems at a technical level to effectively support potential new customers and the expanding needs of current customers. Competition for these people is intense and we may face challenges in retaining and recruiting such individuals if, for example, our stock price declines, reducing the retention value of equity awards, or our business or technology is no longer perceived as leading in our field. Because of the complex and technical nature of our systems and the dynamic market in which we compete, any failure to attract and retain a sufficient number of qualified employees could materially harm our ability to develop and commercialize our technology.

Our business growth strategy involves the potential for significant acquisitions, and our operating results and prospects could be harmed if we are unable to integrate future acquisitions successfully.

We may acquire other businesses to improve our product offerings or expand into new markets. Our future acquisition strategy will depend on our ability to identify, negotiate, complete, and integrate acquisitions and, if necessary, to obtain satisfactory debt or equity financing to fund those acquisitions. Mergers and acquisitions are inherently risky, and any transaction we complete may not be successful. Any merger or acquisition we may pursue would involve numerous risks, including but not limited to the following:

- difficulties in integrating and managing the operations, technologies, and products of the companies we acquire;
- diversion of our management's attention from normal daily operation of our business;

- our inability to maintain the key business relationships and the reputations of the businesses we acquire;
- our inability to retain key personnel of the acquired company;
- uncertainty of entry into markets in which we have limited or no prior experience and in which competitors have stronger market positions;
- our dependence on unfamiliar affiliates and customers of the companies we acquire;
- insufficient revenue to offset our increased expenses associated with acquisitions;
- our responsibility for the liabilities of the businesses we acquire, including those which we may not anticipate; and
- our inability to maintain internal standards, controls, procedures, and policies.

We may be unable to secure the equity or debt funding necessary to finance future acquisitions on terms that are acceptable to us. If we finance acquisitions by issuing equity or convertible debt securities, our existing stockholders will likely experience dilution, and if we finance future acquisitions with debt funding, we will incur interest expense and may have to comply with financial covenants and secure that debt obligation with our assets.

Security breaches, loss of data, cyberattacks, and other information technology failures could disrupt our operations, damage our reputation, and adversely affect our business, operations, and financial results.

We are dependent upon our data and information technology systems for the effective operation of our business and for the secure maintenance and storage of confidential data relating to our business and third-party businesses. Our information technology systems may be damaged, disrupted or shut down due to attacks by experienced programmers or hackers who may be able to penetrate our security controls and deploy computer viruses, cyberattacks, phishing schemes, or other malicious software programs, or due to employee error or malfeasance, power outages, hardware failures, telecommunication or utility failures, catastrophes or other unforeseen events, and our system redundancy and other disaster recovery planning may be ineffective or inadequate in preventing or responding to any of these circumstances. Any such compromise of our information technology systems could result in the unauthorized publication of our confidential business or proprietary information and unauthorized release of customer, supplier or employee data, any of which could expose us to a risk of legal claims or proceedings, liability under privacy or other laws, disruption of our operations and damage to our reputation, which could divert our management's attention from the operation of our business and materially and adversely affect our business, revenues and competitive position. In addition, our liability insurance may not be sufficient in type or amount to cover us against claims related to security breaches, cyberattacks and other related breaches. The cost and operational consequences of implementing further data protection measures, either as a response to specific breaches or as a result of evolving risks, could be significant. In addition, our inability to use or access our information systems at critical points in time could adversely affect the timely and efficient operation of our business. Any delayed sales, significant costs or lost customers resulting from these technology failures could adversely affect our business, operations, and financial results.

We have implemented security controls to protect our information technology infrastructure but, despite our efforts, we are not fully insulated from technology disruptions that could adversely impact us. For example, in March 2019, we experienced a ransomware attack that infiltrated and encrypted certain of our information technology systems, including systems containing critical business data. Immediately following the attack, actions were taken to recover the compromised systems and we believe we were able to restore their operation without significant loss of business data. Based on the nature of the attack and its impact on our systems, we do not believe confidential data was lost or disclosed. If, however, confidential data is later determined to have been released in the course of this or any future event, it is possible that we could be the subject of actions by governmental authorities or claims from persons alleging they suffered damages from such a release. Although we believe we have contained the disruption from the March 2019 attack, we anticipate additional work and expense in the future as we continue to enhance our security processes and initiatives in response to ever-evolving information security threats.

In addition to risks affecting our own systems, we could also be negatively impacted by a data breach or cyber incident happening to a third party's network and affecting us. Third parties with which we conduct business have access to certain portions of our sensitive data, including information pertaining to our customers and employees. In the event that these third parties do not adequately safeguard our data, security breaches could result and negatively impact our business, operations, and financial results.

Our efficiency and cost-savings initiatives could be disruptive to our operations and adversely affect our results of operations and financial condition, and we may not realize some or all of the anticipated benefits of these initiatives in the time frame anticipated or at all.

Since 2017, we have implemented efficiency and cost-savings initiatives intended to stabilize our business operations and return to growth. These efficiency initiatives have included targeted workforce reductions, optimizing our facilities, and reducing excess space. In connection with the COVID-19 pandemic, we have begun implementing reductions in our operating expense structure, including implementing enterprise-wide salary reductions and constrained hiring until our business returns to more normal volumes. Further actions such as these may be required on an ongoing basis to preserve liquidity and optimize our organization. For example, we may need to decrease or defer capital expenditures and development activities or implement further operating expense reduction measures. The implementation of these further efficiency and cost-savings initiatives could impair our ability to invest in developing, marketing and selling new and existing products, be disruptive to our operations, make it difficult to attract or retain employees, result in higher than anticipated charges, divert the attention of management, result in a loss of accumulated knowledge, impact our customer and supplier relationships, and otherwise adversely affect our results of operations and financial condition. In addition, our ability to complete our efficiency and cost-savings initiatives and achieve the anticipated benefits within the expected time frame is subject to estimates and assumptions and may vary materially from our expectations, including as a result of factors that are beyond our control. Furthermore, our efforts to grow our business and become profitable may not be successful.

To use our products, our Biomark, EP1, Helios/CyTOF 2, and Hyperion systems in particular, customers typically need to purchase specialized reagents. Any interruption in the availability of these reagents for use in our products could limit our ability to market our products.

Our products, our Biomark, EP1, Helios, and Hyperion systems in particular, must be used in conjunction with one or more reagents designed to produce or facilitate the particular biological or chemical reaction desired by the user. Many of these reagents are highly specialized and available to the user only from a single supplier or a limited number of suppliers. Although we sell reagents for use with certain of our products, our customers may purchase these reagents directly from third-party suppliers, and we have no control over the supply of those materials. In addition, our products are designed to work with these reagents as they are currently formulated. We have no control over the formulation of reagents sold by third-party suppliers, and the performance of our products might be adversely affected if the formulation of these reagents is changed. If one or more of these reagents were to become unavailable or were reformulated, our ability to market and sell our products could be materially and adversely affected.

In addition, the use of a reagent for a particular process may be covered by one or more patents relating to the reagent itself, the use of the reagent for the particular process, the performance of that process, or the equipment required to perform the process. Typically, reagent suppliers, who are either the patent holders or their authorized licensees, sell the reagents along with a license or covenant not to sue with respect to such patents. The license accompanying the sale of a reagent often purports to restrict the purposes for which the reagent may be used. If a patent holder or authorized licensee were to assert against us or our customers that the license or covenant relating to a reagent precluded its use with our systems, our ability to sell and market our products could be materially and adversely affected. For example, our Biomark system involves real-time quantitative polymerase chain reaction (qPCR) technology. Leading suppliers of reagents for real-time qPCR reactions include Life Technologies Corporation (now part of Thermo) and Roche Diagnostics Corporation, who are our direct competitors, and their licensees. These real-time qPCR reagents are typically sold pursuant to limited licenses or covenants not to sue with respect to patents held by these companies. We do not have any contractual supply agreements for these real-time qPCR reagents, and we cannot assure you that these reagents will continue to be available to our customers for use with our systems, or that these patent holders will not seek to enforce their patents against us, our customers, or suppliers.

If we elect to label and promote any of our products as medical devices, we would be required to obtain prior approval or clearance by the FDA, which would take significant time and expense and could fail to result in FDA clearance or approval for the intended uses we believe are commercially attractive.

Our products are currently labeled, promoted and sold to academic research institutions, translational research and medicine centers, cancer centers, clinical research laboratories, contract research organizations, and biopharmaceutical, biotechnology, and plant and animal research companies as RUO, and are not designed, or intended to be used, for clinical diagnostic tests or as medical devices as currently marketed. If we elect to label and market our products for use as, or in the performance of, clinical diagnostics in the United States, thereby subjecting them to FDA regulation as medical devices, we would be required to obtain premarket 510(k) clearance or premarket approval from the FDA, unless an exception applies.

We may in the future register with the FDA as a medical device manufacturer and list some of our products with the FDA pursuant to an FDA Class I listing for general purpose laboratory equipment. While this regulatory classification is exempt from certain FDA requirements, such as the need to submit a premarket notification commonly known as a 510(k), and some of the requirements of the FDA's Quality System Regulations (QSRs), we would be subject to ongoing FDA "general controls," which include compliance with FDA regulations for labeling, inspections by the FDA, complaint evaluation, corrections and removals reporting, promotional restrictions, reporting adverse events or malfunctions for our products, and general prohibitions against misbranding and adulteration.

In addition, we may in the future submit 510(k) premarket notifications to the FDA to obtain FDA clearance of certain of our products on a selected basis. It is possible, in the event we elect to submit 510(k) applications for certain of our products, that the FDA would take the position that a more burdensome premarket application, such as a premarket approval application or a de novo application is required for some of our products. If such applications were required, greater time and investment would be required to obtain FDA approval. Even if the FDA agreed that a 510(k) was appropriate, FDA clearance can be expensive and time consuming. It generally takes a significant amount of time to prepare a 510(k), including conducting appropriate testing on our products, and several months to years for the FDA to review a submission. Notwithstanding the effort and expense, FDA clearance or approval could be denied for some or all of our products. Even if we were to seek and obtain regulatory approval or clearance, it may not be for the intended uses we believe are important or commercially attractive.

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

In addition, we could decide to seek regulatory clearance or approval for certain of our products in countries outside of the United States. Sales of such products outside the United States will likely be subject to foreign regulatory requirements, which can vary greatly from country to country. As a result, the time required to obtain clearances or approvals outside the United States may differ from that required to obtain FDA clearance or approval and we may not be able to obtain foreign regulatory approvals on a timely basis or at all. In Europe, we would need to comply with the new Medical Device Regulation 2017/745 and In Vitro Diagnostic Regulation 2017/746, which became effective May 26, 2017, with application dates of May 26, 2021 (postponed from 2020) and May 26, 2022 respectively. This will increase the difficulty of regulatory approvals in Europe in the future. In addition, the FDA regulates exports of medical devices. Failure to comply with these regulatory requirements or obtain and maintain required approvals, clearances and certifications could impair our ability to commercialize our products for diagnostic use outside of the United States.

Our products could become subject to regulation as medical devices by the FDA or other regulatory agencies even if we do not elect to seek regulatory clearance or approval to market our products for diagnostic purposes, which would adversely impact our ability to market and sell our products and harm our business.

As products that are currently labeled, promoted and intended as RUO, our products are not currently subject to regulation as medical devices by the FDA or comparable agencies of other countries. However, the FDA or comparable agencies of other countries could disagree with our conclusion that our products are currently intended for research use only or deem our current sales, marketing and promotional efforts as being inconsistent with research use only products. For example, our customers may independently elect to use our research use only labeled products in their own laboratory developed tests (LDTs) for clinical diagnostic use. The FDA has historically exercised enforcement discretion in not enforcing the medical device regulations against laboratories offering LDTs. However, on October 3, 2014, the FDA issued two draft guidance documents that set forth the FDA's proposed risk-based framework for regulating LDTs, which are designed, manufactured, and used within a single laboratory. The draft guidance documents provide the anticipated details through which the FDA would propose to establish an LDT oversight framework, including premarket review for higher-risk LDTs, such as those that have the same intended use as FDA-approved or cleared companion diagnostic tests currently on the market. In January 2017, the FDA announced that it would not issue final guidance on the oversight of LDTs and manufacturers of products used for LDTs, but would seek further public discussion on an appropriate oversight approach, and give Congress an opportunity to develop a legislative solution. More recently, the FDA has issued warning letters to certain genomics labs for illegally marketing genetic tests that claim to predict patients' responses to specific medications, noting that the FDA has not created a

legal “carve-out” for LDTs and retains discretion to take action when appropriate, such as when certain genomic tests raise significant public health concerns. As manufacturers develop more complex genetic tests and diagnostic software, the FDA may increase its regulation of LDTs. Any future legislative or administrative rule making or oversight of LDTs, if and when finalized, may impact the sales of our products and how customers use our products, and may require us to change our business model in order to maintain compliance with these laws. We cannot predict how these various efforts will be resolved, how Congress or the FDA will regulate LDTs in the future, or how that regulatory system will impact our business.

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

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

Compliance or the failure to comply with current and future regulations affecting our products and business operations worldwide, such as environmental regulations enacted in the European Union, could cause us significant expense and adversely impact our business.

We are subject to many federal, state, local, and foreign regulations relating to various aspects of our business operations. Governmental entities at all levels are continuously enacting new regulations, and it is difficult to identify all applicable regulations and anticipate how such regulations will be implemented and enforced. We continue to evaluate the necessary steps for compliance with applicable regulations. To comply with applicable regulations, we have and will continue to incur significant expense and allocate valuable internal resources to manage compliance-related issues. In addition, such regulations could restrict our ability to expand or equip our facilities, or could require us to acquire costly equipment or to incur other significant expenses to comply with the regulations. For example, the Restriction on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive (RoHS) and the Waste Electrical and Electronic Equipment Directive (WEEE), both enacted in the European Union, regulate the use of certain hazardous substances in, and require the collection, reuse, and recycling of waste from, products we manufacture. Certain of our products sold in these countries are subject to WEEE and RoHS. These and similar regulations that have been or are in the process of being enacted in other countries may require us to redesign our products, use different types of materials in certain components, or source alternative components to ensure compliance with applicable standards, and may reduce the availability of parts and components used in our products by negatively impacting our suppliers’ ability to source parts and components in a timely and cost-effective manner.

The Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) regulation (EC) No. 1907/206 is the European Union’s regulation on chemicals and their safe use. The list of chemicals has been updated and some of the updates affect chemicals used in our products. We will request a research exception, but if not granted, we will need to reduce the concentration of some of the chemicals in our products, which will require significant research and development and operations efforts.

Any such redesigns, required use of alternative materials, or limited availability of parts and components used in our products may detrimentally impact the performance of our products, add greater testing lead times for product introductions, reduce our product margins, or limit the markets for our products, and if we fail to comply with any present and future regulations, we could be subject to future fines, penalties, and restrictions, such as the suspension of manufacturing of our products or a prohibition on the sale of products we manufacture. Any of the foregoing could adversely affect our business, financial condition, or results of operations.

If we fail to maintain effective internal control over financial reporting in the future, the accuracy and timing of our financial reporting may be impaired, which could adversely affect our business and our stock price.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective internal control over financial reporting and disclosure controls and procedures. In particular, we must perform system and process evaluation and testing of our

internal control over financial reporting to allow management to report on the effectiveness of our internal control over financial reporting, as required by Section 404 of the Sarbanes-Oxley Act. Our testing may reveal deficiencies in our internal control over financial reporting that are deemed to be material weaknesses.

Our compliance with Section 404 requires that we incur substantial accounting expense and expend significant management time on compliance-related issues. We currently do not have an internal audit group, and we continue to evaluate our need for additional accounting and financial staff with appropriate public company experience and technical accounting knowledge. Moreover, if we do not comply with the requirements of Section 404, or if we or our independent registered public accounting firm identify deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the Nasdaq Global Select Market (Nasdaq), the SEC, or other regulatory authorities, which would require additional financial and management resources.

Impairment of our goodwill or other intangible assets could materially and adversely affect our business, operating results, and financial condition.

As of December 31, 2019, we had approximately $153.2 million of goodwill and net intangible assets, including approximately $104.1 million of goodwill and $49.1 million of net intangible assets. These assets represent a significant portion of the assets recorded on our consolidated balance sheet and relate primarily to our acquisition of DVS Sciences, Inc. (DVS) in February 2014. In addition, if in the future we acquire additional businesses, technologies, or other intangible assets, a substantial portion of the value of such assets may be recorded as goodwill or intangible assets. In the fourth quarter of 2019, we concluded that certain of our patents and licenses were impaired and reduced the applicable carrying value to zero, recognizing a charge of $0.4 million, which is reflected in accumulated amortization.

The carrying amounts of goodwill and intangible assets are affected whenever events or changes in circumstances indicate that their carrying amounts may not be recoverable. We review goodwill and indefinite lived intangible assets for impairment at least annually and more frequently under certain circumstances. Other intangible assets that are deemed to have finite useful lives will continue to be amortized over their useful lives but must be reviewed for impairment when events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. Events or changes in circumstances that could affect the likelihood that we will be required to recognize an impairment charge include declines in our stock price or market capitalization, declines in our market share or revenues, an increase in our losses, rapid changes in technology, failure to achieve the benefits of capacity increases and utilization, significant litigation arising out of an acquisition, or other matters. In particular, these or other adverse events or changes in circumstances may affect the estimated undiscounted future operating cash flows expected to be derived from our goodwill and intangible assets. Any impairment charges could have a material adverse effect on our operating results and net asset value in the quarter in which we recognize the impairment charge. We cannot provide assurances that we will not in the future be required to recognize impairment charges.

Our future capital needs are uncertain and we may need to raise additional funds in the future, which may cause dilution to stockholders or may be upon terms that are not favorable to us.

We have continued to experience losses and, if that trend continues, we may need to seek additional sources of financing. In addition, we may need to raise substantial additional capital for various purposes, including:

- expanding the commercialization of our products;
- funding our operations;
- furthering our research and development; and
- acquiring other businesses or assets and licensing technologies.

Our future funding requirements will depend on many factors, including:

- market acceptance of our products;
- the cost of our research and development activities;
- the cost of filing and prosecuting patent applications;
- the cost of defending any litigation including intellectual property, employment, contractual or other litigation;
- the cost and timing of regulatory clearances or approvals, if any;
- the cost and timing of establishing additional sales, marketing, and distribution capabilities;
- the cost and timing of establishing additional technical support capabilities;

- fluctuations in cash demands (e.g., due to interest or principal payments or payouts under existing cash compensation plans);
- variability in sales and timing of related cash collections;
- the effectiveness of our efficiency and cost-savings initiatives;
- the impact of any natural disasters or public health crises, such as COVID-19;
- the effect of competing technological and market developments; and
- the extent to which we acquire or invest in businesses, products, and technologies, although we currently have no commitments or agreements relating to any of these types of transactions.

To the extent we draw on our Revolving Credit Facility or otherwise incur additional indebtedness, the risks described above could increase. Further, if we increase our indebtedness, our actual cash requirements in the future may be greater than expected. Our cash flow from operations may not be sufficient to repay all of the outstanding debt as it becomes due, and we cannot assure you that we will be able to obtain additional funds on acceptable terms, or at all. The ongoing COVID-19 pandemic has led to extreme disruption and volatility in the global capital markets, increasing the cost of—and adversely impacting access to—capital. If we raise additional funds by issuing equity securities, our stockholders may experience dilution. Debt financing in addition to the Revolving Credit Facility, if available, may involve covenants restricting our operations or our ability to incur additional debt. Any additional debt or equity financing that we raise may contain terms that are not favorable to us or our stockholders, and our ability to raise additional capital may be adversely impacted by potential worsening global economic conditions resulting from COVID-19. If we raise additional funds through collaboration and licensing arrangements with third parties, it may be necessary to relinquish some rights to our technologies or our products, or grant licenses on terms that are not favorable to us. If we do not have or are unable to raise adequate funds, we may have to liquidate some or all of our assets, delay development or commercialization of our products, or license to third parties the rights to commercialize products or technologies that we would otherwise seek to commercialize. We also may have to reduce marketing, customer support, research and development, or other resources devoted to our products, or cease operations. Any of these factors could harm our operating results.

If we fail to comply with the covenants and other obligations under our Revolving Credit Facility, the lenders may be able to accelerate amounts owed under the facilities and may foreclose upon the assets securing our obligations.

In August 2018, we entered into the Revolving Credit Facility, which provides for secured revolving loans in an aggregate amount of up to $15.0 million. The Revolving Credit Facility is secured by substantially all of our assets, other than intellectual property. The Revolving Credit Facility contains customary affirmative and negative covenants which, unless waived by the bank, limit our ability to, among other things, incur additional indebtedness, grant liens, make investments, repurchase stock, pay dividends, transfer assets, enter into affiliate transactions, undergo a change of control, or engage in merger and acquisition activity, including merging or consolidating with a third party. If we fail to comply with the covenants and our other obligations under the Revolving Credit Facility, the lenders would be able to accelerate the required repayment of amounts due under the Revolving Credit Agreement and, if they are not repaid, could foreclose upon the assets securing our obligations under the Revolving Credit Facility.

We are subject to risks related to taxation in multiple jurisdictions and if taxing authorities disagree with our interpretations of existing tax laws or regulations, our effective income tax rate could be adversely affected and we could have additional tax liability.

We are subject to income taxes in both the United States and certain foreign jurisdictions. Significant judgments based on interpretations of existing tax laws or regulations are required in determining the provision for income taxes. For example, we have made certain interpretations of existing tax laws or regulations based upon the operations of our business internationally and we have implemented intercompany agreements based upon these interpretations and related transfer pricing analyses. If the U.S. Internal Revenue Service or other taxing authorities disagree with the positions, our effective income tax rate could be adversely affected and we could have additional tax liability, including interest and penalties. From time to time, we may review our corporate structure and tax positions in the various international jurisdictions in which we operate and such review may result in changes to how we structure our international business operations, which may adversely impact our effective income tax rate. Our effective income tax rate could also be adversely affected by changes in the mix of earnings in tax jurisdictions with different statutory tax rates, changes in the valuation of deferred tax assets and liabilities, changes in existing tax laws or tax rates, changes in the level of non-deductible expenses (including share-based compensation), changes in our future levels of research and development spending, mergers and acquisitions, or the result of examinations by various tax authorities. Payment of additional amounts as a result of changes in applicable tax law or upon final adjudication of any disputes could have a material impact on our results of operations and financial position.

Our ability to use net operating loss carryforwards to offset future taxable income for U.S. federal income tax purposes and other tax benefits may be limited.

Section 382 of the Internal Revenue Code of 1986, as amended (the Code), imposes an annual limitation on the amount of taxable income that may be offset by net operating loss carryforwards (NOLs) if a corporation experiences an "ownership change." As provided in Section 382 of the Code, an "ownership change" occurs when a company's "five-percent shareholders" collectively increase their ownership in the company by more than 50 percentage points (by value) over a rolling three-year period. Various states also have limitations on the use of state NOLs following an ownership change.

Future changes in our stock ownership, some of which are outside our control, could result in an ownership change under Section 382 of the Code. If we experience an ownership change, our ability to use our NOLs or other tax benefits could be substantially limited, which could significantly impair their value. There is no assurance that we will be able to fully utilize our NOLs or other tax benefits, which could adversely impact our results of operations.

We believe that these tax benefits are a valuable asset for us and we monitor our stock ownership to determine whether our NOLs are at material risk of limitation based on an ownership change pursuant to Section 382. If our board of directors determines a potential risk exists that our NOLs could be limited, it could elect to adopt a tax benefit preservation plan in an effort to protect our tax benefits. Adoption of a tax benefit preservation plan could make it more difficult for a third party to acquire, or could discourage a third party from acquiring, us or a large block of our common stock.

Adverse conditions in the global economy and disruption of financial markets may significantly harm our revenue, profitability, and results of operations.

Adverse economic conditions in the U.S. and international markets, including the economic contraction resulting in part from the COVID-19 pandemic, have negatively affected our revenues and operating results and may continue to do so. The global credit and financial markets have in recent years experienced volatility and disruptions, including diminished liquidity and credit availability, increased concerns about inflation and deflation, and the downgrade of U.S. debt and exposure risks on other sovereign debts, decreased consumer confidence, lower economic growth, volatile energy costs, increased unemployment rates, and uncertainty about economic stability. In addition, certain geopolitical events, including the United States government's adoption and expansion of trade restrictions and the United Kingdom's withdrawal from the European Union, have caused significant economic, market, political and regulatory uncertainty in some of our markets. Volatility and disruption of financial markets could limit our customers' ability to obtain adequate financing or credit to purchase and pay for our products in a timely manner or to maintain operations, which could result in a decrease in sales volume that could harm our results of operations. General concerns about the fundamental soundness of domestic and international economies may also cause our customers to reduce their purchases. Changes in governmental banking, monetary, and fiscal policies to address liquidity and increase credit availability may not be effective. Significant government investment and allocation of resources to assist the economic recovery of sectors that do not include our customers may reduce the resources available for government grants and related funding for life science, plant and animal research, and clinical research and development. Continuation or further deterioration of these financial and macroeconomic conditions could significantly harm our sales, profitability, and results of operations.

If we are unable to expand our direct sales and marketing force or distribution capabilities to adequately address our customers' needs, our business may be adversely affected.

We may not be able to market, sell, and, distribute our products effectively enough to support our planned growth. We sell our products primarily through our own sales force and through distributors in certain territories. Our future sales will depend in large part on our ability to continue to develop and substantially expand our direct sales force and to increase the scope of our marketing efforts. Our products are technically complex and used for highly specialized applications. As a result, we believe it is necessary to continue to develop a direct sales force that includes people with specific scientific backgrounds and expertise, and a marketing group with technical sophistication. We have experienced significant changes in our sales organization in the past year due to reorganizations and changes in leadership. In addition, as part of our cost reduction program to manage the impact of the COVID-19 pandemic, we have implemented enterprise-wide salary reductions, including with respect to our sales and marketing employees. Failure to return our employees to prior salary levels may negatively impact our ability to maintain the skilled sales and marketing force necessary to support business activities in the future, if and when market activities return to pre-COVID-19 levels. As a result, our future success will depend largely on our ability to retain and motivate such personnel. Because competition for such employees is intense, we can provide no assurance that we will be able to retain them on favorable or commercially reasonable terms, if at all. Failure to attract and retain our current personnel or to build an efficient and effective sales and marketing force would negatively impact sales of our products and reduce our revenue and profitability.

In addition, we may continue to enlist one or more sales representatives and distributors to assist with sales, distribution, and customer support globally or in certain regions of the world. If we do seek to enter into such arrangements, we may not be successful in attracting desirable sales representatives and distributors, or we may not be able to enter into such arrangements on favorable terms. If our sales and marketing efforts, or those of any third-party sales representatives and distributors, are not successful, our technologies and products may not gain market acceptance, which would materially and adversely impact our business operations.

If we seek to implement a company-wide enterprise resource planning (ERP) system, such implementation could adversely affect our business and results of operations or the effectiveness of internal control over financial reporting.

We have considered implementing a company-wide ERP system to handle the business and financial processes within our operations and corporate functions. ERP implementations are complex and time-consuming projects that involve substantial expenditures on system software and implementation activities that can continue for several years. ERP implementations also require transformation of business and financial processes in order to reap the benefits of the ERP system. If we decide to implement a company-wide ERP system, our business and results of operations could be adversely affected if we experience operating problems and/or cost overruns during the ERP implementation process, or if the ERP system and the associated process changes do not give rise to the benefits that we expect. If we do not effectively implement the ERP system as planned or if the system does not operate as intended, our business, results of operations, and internal controls over financial reporting could be adversely affected.

Changes in accounting principles, or interpretations thereof, could have a significant impact on our financial position and results of operations.

We prepare our consolidated financial statements in accordance with U.S. GAAP. These principles are subject to interpretation by the SEC and various bodies formed to interpret and create appropriate accounting principles. A change in these principles can have a significant effect on our reported results and may even retroactively affect previously reported transactions. Additionally, the adoption of new or revised accounting principles may require that we make significant changes to our systems, processes and controls.

For example, the U.S.-based Financial Accounting Standards Board (FASB) is currently working together with the International Accounting Standards Board (IASB), on several projects to further align accounting principles and facilitate more comparable financial reporting between companies who are required to follow U.S. GAAP under SEC regulations and those who are required to follow International Financial Reporting Standards outside of the United States. These efforts by the FASB and IASB may result in different accounting principles under U.S. GAAP that may result in materially different financial results for us in areas including, but not limited to, principles for recognizing revenue and lease accounting. Additionally, significant changes to U.S. GAAP resulting from the FASB's and IASB's efforts may require that we change how we process, analyze and report financial information and that we change financial reporting controls. Additionally, the FASB issued new guidance (ASU 2014-09) *Revenue from Contracts with Customers (Topic 606)* which supersedes nearly all existing U.S. GAAP revenue recognition guidance. The new guidance was effective for our fiscal year 2018. We adopted ASU 2014-09 in the first quarter of 2018 using the modified retrospective method. Under the modified retrospective method, periods prior to the adoption of ASU 2014-09 are not restated and the cumulative effect of initially applying the new standard is reflected in the opening balance of accumulated deficit as of January 1, 2018. To date, the adoption has not had a material impact on our consolidated financial statements. Additional disclosures are required for significant differences between the reported results under the new standard and those that would have been reported under the legacy standard, which required us to make certain changes to our business processes and controls to support revenue recognition and disclosure under the new standard.

The FASB also issued Accounting Standards Update (ASU) 2016-02, *Leases (Topic 842)* (ASU 2016-02). The core principle is that lessees should recognize the assets and liabilities arising from leases on the balance sheet. Under the new standard, lessees will be required to recognize lease assets and liabilities for all leases, with certain exceptions, on their balance sheets. We adopted ASU 2016-02 as of January 1, 2019. The adoption of this standard had a material impact on our consolidated financial statements. We continue to identify the appropriate changes to our business processes, systems, and controls to support the new lease standard and the required disclosures under the new standard.

It is not clear if or when potential changes in accounting principles may become effective, whether we have the proper systems and controls in place to accommodate such changes and the impact that any such changes may have on our financial position and results of operations.

We have a significant amount of outstanding indebtedness, and our financial condition and results of operations could be adversely affected if we do not efficiently manage our liabilities.

We have significant outstanding convertible debt. As of March 31, 2020, we had outstanding $1.1 million aggregate principal amount of our 2.75% Senior Convertible Notes due 2034 (2014 Notes) and $55.0 million aggregate principal amount of our 5.25% convertible senior notes due 2024 (2019 Notes). The 2014 Notes will mature on February 1, 2034, unless earlier converted, redeemed, or repurchased in accordance with the terms of the 2014 Notes. Holders of the 2014 Notes may require us to repurchase all or a portion of their 2014 Notes on each of February 6, 2021, February 6, 2024, and February 6, 2029 at a repurchase price in cash equal to 100% of the principal amount of the Notes plus accrued and unpaid interest. The 2019 Notes will mature on December 1, 2024, unless earlier converted, or repurchased in accordance with the terms of the 2019 Notes. If we undergo a fundamental change (as defined in the terms of the indenture governing either the 2014 Notes or the 2019 Notes (collectively, the Convertible Notes)), holders of the applicable series of Convertible Notes may require us to repurchase such Convertible Notes in whole or in part for cash at a repurchase price equal to 100% of the principal amount of the applicable series of Convertible Notes plus accrued and unpaid interest. If we refinance the debt owed under the 2014 Notes or 2019 Notes, we may issue additional convertible notes or other debt, which could include additional company obligations and represent more dilution to existing stockholders and noteholders.

This significant amount of debt has important risks to us and our investors, including:

- requiring a portion of our cash flow from operations to make interest payments on this debt;
- increasing our vulnerability to general adverse economic and industry conditions;
- reducing the cash flow available to fund capital expenditures and other corporate purposes and to grow our business;
- limiting our flexibility in planning for, or reacting to, changes in our business and the industry; and
- limiting our ability to borrow additional funds as needed or take advantage of business opportunities as they arise.

In addition, to the extent we draw on our Revolving Credit Facility or otherwise incur additional indebtedness, the risks described above could increase. Further, if we increase our indebtedness, our actual cash requirements in the future may be greater than expected. Our cash flow from operations may not be sufficient to repay all of the outstanding debt as it becomes due, and we may not be able to borrow money, sell assets or otherwise raise funds on acceptable terms, or at all, to refinance our debt.

Risks Related to Intellectual Property

Our ability to protect our intellectual property and proprietary technology through patents and other means is uncertain.

Our commercial success depends in part on our ability to protect our intellectual property and proprietary technologies. We rely on patent protection, where appropriate and available, as well as a combination of copyright, trade secret, and trademark laws, and nondisclosure, confidentiality, and other contractual restrictions to protect our proprietary technology. However, these legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage. We apply for patents covering our products and technologies and uses thereof, as we deem appropriate. However, we may fail to apply for patents on important products and technologies in a timely fashion or at all. Our pending U.S. and foreign patent applications may not issue as patents or may not issue in a form that will be sufficient to protect our proprietary technology and gain or keep our competitive advantage. Any patents we have obtained or do obtain may be subject to re-examination, reissue, opposition, or other administrative proceeding, or may be challenged in litigation, and such challenges could result in a determination that the patent is invalid or unenforceable. In addition, competitors may be able to design alternative methods or devices that avoid infringement of our patents. Both the patent application process and the process of managing patent disputes can be time consuming and expensive.

Furthermore, the laws of some foreign countries may not protect our intellectual property rights to the same extent as do the laws of the United States, and many companies have encountered significant problems in protecting and defending such rights in foreign jurisdictions. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business. Changes in either the patent laws or in interpretations of patent laws in the United States or other countries may diminish the value of our intellectual property. We cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. For example:

- we might not have been the first to make the inventions covered by each of our pending patent applications;
- we might not have been the first to file patent applications for these inventions;
- the patents of others may have an adverse effect on our business; and
- others may independently develop similar or alternative products and technologies or duplicate any of our products and technologies.

To the extent our intellectual property, including licensed intellectual property, offers inadequate protection, or is found to be invalid or unenforceable, our competitive position and our business could be adversely affected.

We may be involved in lawsuits to protect or enforce our patents and proprietary rights, to determine the scope, coverage and validity of others' proprietary rights, or to defend against third party claims of intellectual property infringement, any of which could be time-intensive and costly and may adversely impact our business or stock price.

Litigation may be necessary for us to enforce our patent and proprietary rights, determine the scope, coverage, and validity of others' proprietary rights, and/or defend against third party claims of intellectual property infringement against us as well as against our suppliers, distributors, customers, and other entities with whom we do business. Litigation could result in substantial legal fees and could adversely affect the scope of our patent protection. The outcome of any litigation or other proceeding is inherently uncertain and might not be favorable to us, and we might not be able to obtain licenses to technology that we require. Even if such licenses are obtainable, they may not be available at a reasonable cost. We could therefore incur substantial costs related to royalty payments for licenses obtained from third parties, which could negatively affect our product margins or financial position. Further, we could encounter delays in product introductions, or interruptions in product sales, as we develop alternative methods or products.

As we move into new markets and applications for our products, incumbent participants in such markets may assert their patents and other proprietary rights against us as a means of impeding our entry into such markets or as a means to extract substantial license and royalty payments from us. Our commercial success may depend in part on our non-infringement of the patents or proprietary rights of third parties. Numerous significant intellectual property issues have been litigated, and will likely continue to be litigated, between existing and new participants in our existing and targeted markets. For example, some of our products provide for the testing and analysis of genetic material, and patent rights relating to genetic materials remain a developing area of patent law. A recent U.S. Supreme Court decision held, among other things, that claims to isolated genomic DNA occurring in nature are not patent eligible, while claims relating to synthetic DNA may be patent eligible. We expect the ruling will result in additional litigation in our industry. In addition, third parties may assert that we are employing their proprietary technology without authorization, and if they are successful in making such claims, we may be forced to enter into license agreements, pay additional royalties or license fees, or enter into settlements that include monetary obligations or restrictions on our business.

Our customers have been sued for various claims of intellectual property infringement in the past, and we expect that our customers will be involved in additional litigation in the future. In particular, our customers may become subject to lawsuits claiming that their use of our products infringes third-party patent rights, and we could become subject to claims that we contributed to or induced our customer's infringement. In addition, our agreements with some of our suppliers, distributors, customers, and other entities with whom we do business may require us to defend or indemnify these parties to the extent they become involved in infringement claims against us, including the claims described above. We could also voluntarily agree to defend or indemnify third parties in instances where we are not obligated to do so if we determine it would be important to our business relationships. If we are required or agree to defend or indemnify any of these third parties in connection with any infringement claims, we could incur significant costs and expenses that could adversely affect our business, operating results, or financial condition.

We may be subject to damages resulting from claims that we or our employees have wrongfully used or disclosed alleged trade secrets of our employees' former employers or other institutions or third parties with whom such employees may have been previously affiliated.

Many of our employees were previously employed at universities or other life science or plant and animal research companies, including our competitors or potential competitors. In the future, we may become subject to claims that our employees, or we, have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers or other third parties or institutions with whom our employees may have been previously affiliated. Litigation may be necessary to defend against these claims. For example, we were a defendant in litigation brought against us and one of our non-executive employees by Thermo alleging, among other claims, misappropriation of proprietary information

and breach of contractual and fiduciary obligations. While we resolved our dispute with Thermo in July 2017, if we fail in defending against similar claims brought in the future we could be subject to injunctive relief against us. A loss of key research personnel work product could hamper or prevent our ability to commercialize certain potential products or a loss of or inability to hire key marketing, sales or research and development personnel could adversely affect our future product development, sales and revenues, any of which could severely harm our business. Even if we are successful in defending against any similar claims brought in the future, litigation could result in substantial costs and be a distraction to management.

We depend on certain technologies that are licensed to us. We do not control these technologies and any loss of our rights to them could prevent us from selling our products, which would have an adverse effect on our business.

We rely on licenses in order to be able to use various proprietary technologies that are material to our business, including our core IFC, multi-layer soft lithography, and mass cytometry technologies. In some cases, we do not control the prosecution, maintenance, or filing of the patents to which we hold licenses, or the enforcement of these patents against third parties. Additionally, our business and product development plans anticipate and may substantially depend on future in-license agreements with additional third parties, some of which are currently in the early discussion phase. For example, Fluidigm Canada Inc., or Fluidigm Canada, an Ontario corporation and wholly-owned subsidiary of Fluidigm Sciences, was party to an interim license agreement, now expired, with Nodality, Inc., or Nodality, under which Nodality granted Fluidigm Canada a worldwide, non-exclusive, research use only, royalty bearing license to certain cytometric reagents, instruments, and other products. While we were able to secure a license under a new license agreement with Nodality, we cannot provide assurances that we will always be able to obtain suitable license rights to technologies or intellectual property of other third parties on acceptable terms, if at all.

In-licensed intellectual property rights that are fundamental to our business being operated present numerous risks and limitations. For example, all or a portion of the license rights granted may be limited for research use only, and in the event we attempt to expand into diagnostic applications, we would be required to negotiate additional rights, which may not be available to us on commercially reasonable terms, if at all.

Our rights to use the technology we license are also subject to the negotiation and continuation of those licenses. Certain of our licenses contain provisions that allow the licensor to terminate the license upon specific conditions. Our rights under the licenses are subject to our continued compliance with the terms of the license, including the payment of royalties due under the license. Because of the complexity of our products and the patents we have licensed, determining the scope of the license and related royalty obligation can be difficult and can lead to disputes between us and the licensor. An unfavorable resolution of such a dispute could lead to an increase in the royalties payable pursuant to the license. If a licensor believed we were not paying the royalties due under the license or were otherwise not in compliance with the terms of the license, the licensor might attempt to revoke the license. If such an attempt were successful and the license is terminated, we might be barred from marketing, producing, and selling some or all of our products, which would have an adverse effect on our business. Potential disputes between us and one of our existing licensors concerning the terms or conditions of the applicable license agreement could result, among other risks, in substantial management distraction; increased expenses associated with litigation or efforts to resolve disputes; substantial customer uncertainty concerning the direction of our product lines; potential infringement claims against us and/or our customers, which could include efforts by a licensor to enjoin sales of our products; customer requests for indemnification by us; and, in the event of an adverse determination, our inability to operate our business as currently operated. Termination of material license agreements could prevent us from manufacturing and selling our products unless we can negotiate new license terms or develop or acquire alternative intellectual property rights that cover or enable similar functionality. Any of these factors would be expected to have a material adverse effect on our business, operating results, and financial condition and could result in a substantial decline in our stock price.

We are subject to certain manufacturing restrictions related to licensed technologies that were developed with the financial assistance of U.S. governmental grants.

We are subject to certain U.S. government regulations because we have licensed technologies that were developed with U.S. government grants. In accordance with these regulations, these licenses provide that products embodying the technologies are subject to domestic manufacturing requirements. If this domestic manufacturing requirement is not met, the government agency that funded the relevant grant is entitled to exercise specified rights, referred to as “march-in rights,” which if exercised would allow the government agency to require the licensors or us to grant a non-exclusive, partially exclusive, or exclusive license in any field of use to a third party designated by such agency. All of our microfluidic systems revenue is dependent upon the availability of our IFCs, which incorporate technology developed with U.S. government grants. Our genomics instruments, including microfluidic systems, and IFCs are manufactured at our facility in Singapore. The federal regulations allow the funding government agency to grant, at the request of the licensors of such technology, a waiver of the domestic manufacturing requirement. Waivers may be requested prior to any government notification. We have assisted the licensors of

these technologies with the analysis of the domestic manufacturing requirement, and, in December 2008, the sole licensor subject to the requirement applied for a waiver of the domestic manufacturing requirement with respect to the relevant patents licensed to us by this licensor. In July 2009, the funding government agency granted the requested waiver of the domestic manufacturing requirement for a three-year period commencing in July 2009. In June 2012, the licensor requested a continued waiver of the domestic manufacturing requirement with respect to the relevant patents, but the government agency has not yet taken any action in response to this request. If the government agency does not grant the requested waiver or the government fails to grant additional waivers of such requirement that may be sought in the future, then the U.S. government could exercise its march-in rights with respect to the relevant patents licensed to us. In addition, the license agreement under which the relevant patents are licensed to us contains provisions that obligate us to comply with this domestic manufacturing requirement. We are not currently manufacturing instruments and IFCs in the United States that incorporate the relevant licensed technology. If our lack of compliance with this provision constituted a material breach of the license agreement, the license of the relevant patents could be terminated or we could be compelled to relocate our manufacturing of microfluidic systems and IFCs to the United States to avoid or cure a material breach of the license agreement. Any of the exercise of march-in rights, the termination of our license of the relevant patents or the relocation of our manufacturing of microfluidic systems and IFCs to the United States could materially adversely affect our business, operations and financial condition.

We are subject to certain obligations and restrictions relating to technologies developed in cooperation with Canadian government agencies.

Some of our Canadian research and development is funded in part through government grants and by government agencies. The intellectual property developed through these projects is subject to rights and restrictions in favor of government agencies and Canadians generally. In most cases the government agency retains the right to use intellectual property developed through the project for non-commercial purposes and to publish the results of research conducted in connection with the project. This may increase the risk of public disclosure of information relating to our intellectual property, including confidential information, and may reduce its competitive advantage in commercializing intellectual property developed through these projects. In certain projects, we have also agreed to use commercially reasonable efforts to commercialize intellectual property in Canada, or more specifically in the province of Ontario, for the economic benefit of Canada and the province of Ontario. These restrictions will limit our choice of business and manufacturing locations, business partners and corporate structure and may, in certain circumstances, restrict our ability to achieve maximum profitability and cost efficiency from the intellectual property generated by these projects. In one instance, a dispute with the applicable government funded entity may require mediation, which could lead to unanticipated delays in our commercialization efforts to that project. One of our Canadian government funded projects is also subject to certain limited “march-in” rights in favor of the government of the Province of Ontario, under which we may be required to grant a license to our intellectual property, including background intellectual property developed outside the scope of the project, to a responsible applicant on reasonable terms in circumstances where the government determines that such a license is necessary in order to alleviate emergency or extraordinary health or safety needs or for public use. In addition, we must provide reasonable assistance to the government in obtaining similar licenses from third parties required in connection with the use of its intellectual property. Instances in which the government of the Province of Ontario has exercised similar “march-in” rights are rare; however, the exercise of such rights could materially adversely affect our business, operations and financial condition.

Risks Related to Our Common Stock

Our stock price may fluctuate significantly, particularly if holders of substantial amounts of our stock attempt to sell, and holders may have difficulty selling their shares based on current trading volumes of our stock. In addition, numerous other factors could result in substantial volatility in the trading price of our stock.

Our stock is currently traded on Nasdaq, but we can provide no assurance that we will be able to maintain an active trading market on Nasdaq or any other exchange in the future. The trading volume of our stock tends to be low relative to our total outstanding shares, and we have several stockholders who hold substantial blocks of our stock. As of December 31, 2019, we had 69,956,397 shares of common stock outstanding, and stockholders holding at least 5% of our stock, individually or with affiliated persons or entities, collectively beneficially owned or controlled approximately 46.3% of such shares and one stockholder beneficially owned approximately 9.8% of our outstanding common stock. Sales of large numbers of shares by any of our large stockholders could adversely affect our trading price, particularly given our relatively small historic trading volumes. If stockholders holding shares of our common stock sell, indicate an intention to sell, or if it is perceived that they will sell, substantial amounts of their common stock in the public market, the trading price of our common stock could decline. Moreover, if there is no active trading market or if the volume of trading is limited, holders of our common stock may have difficulty selling their shares. In addition, the concentration of ownership of our outstanding common stock (approximately

46.3% held by our top six stockholders) means that a relatively small number of stockholders have significant control over the outcomes of stockholder voting.

In addition, the trading price of our common stock may be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control. These factors include:

- the impact of public health crises, including the COVID-19 pandemic, on global financial markets;
- actual or anticipated quarterly variation in our results of operations or the results of our competitors;
- announcements or communications by us or our competitors relating to, among other things, new commercial products, technological advances, significant contracts, commercial relationships, capital commitments, acquisitions or sales of businesses, and/or misperceptions in or speculation by the market regarding such announcements or communications;
- issuance of new or changed securities analysts' reports or recommendations for our stock;
- developments or disputes concerning our intellectual property or other proprietary rights;
- commencement of, or our involvement in, litigation;
- market conditions in the life science, plant and animal research, and CRO sectors;
- failure to complete significant sales;
- manufacturing disruptions that could occur if we are unable to successfully expand our production in our current or an alternative facility;
- any future sales of our common stock or other securities in connection with raising additional capital or otherwise;
- any major change to the composition of our board of directors or management; and
- general economic conditions and slow or negative growth of our markets.

The stock market in general, and market prices for the securities of technology-based companies like ours in particular, have from time to time experienced volatility that often has been unrelated to the operating performance of the underlying companies. These broad market and industry fluctuations may adversely affect the market price of our common stock regardless of our operating performance. In several recent situations where the market price of a stock has been volatile, holders of that stock have instituted securities class action litigation against the company that issued the stock. If any of our stockholders were to bring a lawsuit against us, the defense and disposition of the lawsuit could be costly and divert the time and attention of our management and harm our operating results.

If securities or industry analysts publish unfavorable research about our business or cease to cover our business, our stock price and/or trading volume could decline.

The trading market for our common stock may rely, in part, on the research and reports that equity research analysts publish about us and our business. We do not have any control of the analysts or the content and opinions included in their reports. The price of our stock could decline if one or more equity research analysts downgrade our stock or issue other unfavorable commentary or research. If one or more equity research analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which in turn could cause our stock price or trading volume to decline.

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

Provisions in our certificate of incorporation and bylaws may have the effect of delaying or preventing a change of control or changes in our management, including provisions that:

- authorize our board of directors to issue, without further action by the stockholders, up to 10,000,000 shares of undesignated preferred stock;

- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by our board of directors, the chairman of the board, the chief executive officer or the president;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- establish that our board of directors is divided into three classes, Class I, Class II, and Class III, with each class serving staggered three-year terms;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- specify that no stockholder is permitted to cumulate votes at any election of directors; and
- require a super-majority of votes to amend certain of the above-mentioned provisions.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

We have never paid cash dividends on our capital stock, and we do not anticipate paying any cash dividends in the foreseeable future.

We have paid no cash dividends on any of our classes of capital stock to date and currently intend to retain our future earnings to fund the development and growth of our business. In addition, we cannot pay any cash dividends on any of our classes of common stock without approval from the lender under our Revolving Credit Facility, and may become subject to covenants under future debt arrangements that place restrictions on our ability to pay dividends. As a result, capital appreciation, if any, of our common stock will be stockholders' sole source of gain for the foreseeable future.

Any conversions of the 2014 Notes or 2019 Notes will dilute the ownership interest of our existing stockholders and may otherwise depress the price of our common stock.

Any conversion of some or all of the 2014 Notes or 2019 Notes will dilute the ownership interests of our existing stockholders. Any sales in the public market of our common stock issuable upon such conversion could also adversely affect prevailing market prices of our common stock. In addition, holders of the 2014 Notes or 2019 Notes may hedge their position in such Convertible Notes by entering into short positions with respect to the underlying common stock. As a result, any anticipated conversion of the 2014 Notes or 2019 Notes could depress the market price of our common stock and impair our ability to raise capital through the sale of additional equity securities.

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

In connection with our acquisition of InstruNor AS, a privately held Norwegian company, we issued 485,451 shares of our common stock pursuant to an exemption from registration provided under Regulation S of the Securities Act of 1933, as amended. The consideration for the InstruNor AS acquisition also included approximately $5.2 million in cash, for a total purchase price of $7.2 million.

Item 5. Other Information

None.

Item 6. Exhibits

The documents listed in the Exhibit List, which follows below, are incorporated by reference or are filed with this quarterly report on Form 10-Q, in each case as indicated therein (numbered in accordance with Item 601 of Regulation S-K).

EXHIBIT LIST

Exhibit Number	Description	Incorporated by Reference From Form	Incorporated by Reference From Exhibit Number	Date Filed
31.1	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 of Chief Executive Officer.	Filed herewith		
31.2	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 of Chief Financial Officer.	Filed herewith		
32.1(1)	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 of Chief Executive Officer.	Filed herewith		
32.2(1)	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 of Chief Executive Officer.	Filed herewith		
101.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.	Filed herewith		
101.SCH	XBRL Taxonomy Extension Schema Document	Filed herewith		
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	Filed herewith		
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	Filed herewith		
101.LAB	XBRL Taxonomy Extension Label Document	Filed herewith		
101.PRE	XBRL Taxonomy Extension Presentation Document	Filed herewith		

(1) In accordance with Item 601(b)(32)(ii) of Regulation S-K and SEC Release No. 33-8238 and 34-47986, Final Rule: Management's Reports on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, the certifications furnished in Exhibits 32.1 and 32.2 hereto are deemed to accompany this Form 10-K and will not be deemed "filed" for purposes of Section 18 of the Exchange Act. Such certifications will not be deemed to be incorporated by reference into any filings under the Securities Act or the Exchange Act, except to the extent that the registrant specifically incorporates it by reference.

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.

FLUIDIGM CORPORATION

Dated: May 11, 2020

By: /s/ Stephen Christopher Linthwaite

Stephen Christopher Linthwaite

President and Chief Executive Officer

Dated: May 11, 2020

By: /s/ Vikram Jog

Vikram Jog

Chief Financial Officer

Exhibit 31.1

**CERTIFICATION OF THE PRESIDENT AND CHIEF EXECUTIVE OFFICER
PURSUANT TO SECURITIES EXCHANGE ACT RULES 13a-14(a) AND 15d-14(a),
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Stephen Christopher Linthwaite, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Fluidigm Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 11, 2020

By: /s/ Stephen Christopher Linthwaite
Stephen Christopher Linthwaite
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION OF THE CHIEF FINANCIAL OFFICER
PURSUANT TO SECURITIES EXCHANGE ACT RULES 13a-14(a) AND 15d-14(a),
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Vikram Jog, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Fluidigm Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 11, 2020

By: /s/ Vikram Jog
Vikram Jog
Chief Financial Officer

Exhibit 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002

I, Stephen Christopher Linthwaite, the chief executive officer of Fluidigm Corporation (the "Company"), certify for the purposes of 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge,

1. the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2020 (the "Report"), fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

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

Date: May 11, 2020

By: /s/ Stephen Christopher Linthwaite
Stephen Christopher Linthwaite
President and Chief Executive Officer

Exhibit 32.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002

I, Vikram Jog, the chief financial officer of Fluidigm Corporation (the "Company"), certify for the purposes of 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge,

1. the Company's Quarterly Report on Form 10-Q for the quarter year ended March 31, 2020 (the "Report"), fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

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

Date: May 11, 2020

By: /s/ Vikram Jog
Vikram Jog
Chief Financial Officer