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, 2021
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 Exchange Act). Yes ☐ No ☒

As of April 30, 2021, there were 74,962,847 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, 2021	December 31, 2020
ASSETS		
Current assets:		
Cash and cash equivalents	$ 49,744	$ 68,520
Accounts receivable (net of allowance of $356 at each of March 31, 2021 and December 31, 2020)	15,412	25,423
Inventories, net	21,892	19,689
Prepaid expenses and other current assets	9,279	4,031
Total current assets	96,327	117,663
Property and equipment, net	23,784	17,531
Operating lease right-of-use asset, net	37,245	38,114
Other non-current assets	4,386	4,680
Developed technology, net	37,000	40,206
Goodwill	106,456	106,563
Total assets	$ 305,198	$ 324,757
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 12,552	$ 9,220
Accrued compensation and related benefits	8,693	13,787
Operating lease liabilities, current	3,025	2,973
Other accrued liabilities	15,037	14,794
Deferred revenue, current	14,222	13,475
Total current liabilities	53,529	54,249
Convertible notes, net	53,837	54,224
Deferred tax liability	6,732	8,697
Operating lease liabilities, non-current	37,419	38,178
Deferred revenue, non-current	7,202	7,990
Deferred grant income, non-current	22,167	21,036
Other non-current liabilities	1,374	1,333
Total liabilities	182,260	185,707
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.001 par value, 10,000 shares authorized, no shares issued and outstanding at either March 31, 2021 or December 31, 2020	—	—
Common stock: $0.001 par value, 200,000 shares authorized at March 31, 2021 and December 31, 2020; 74,963 and 74,543 shares issued and outstanding at March 31, 2021 and December 31, 2020, respectively	75	75
Additional paid-in capital	818,776	815,624
Accumulated other comprehensive loss	(331)	112
Accumulated deficit	(695,582)	(676,761)
Total stockholders' equity	122,938	139,050
Total liabilities and stockholders' equity	$ 305,198	$ 324,757

See accompanying notes

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

	Three Months Ended March 31,	
	2021	**2020**
Revenue:		
Product revenue	$ 24,728	$ 18,981
Service revenue	6,286	5,186
Development revenue	1,480	—
Other revenue	300	3,450
Total revenue	32,794	27,617
Costs and expenses:		
Cost of product revenue	11,663	9,640
Cost of service revenue	2,090	1,525
Research and development	10,753	8,699
Selling, general and administrative	27,608	22,695
Total costs and expenses	52,114	42,559
Loss from operations	(19,320)	(14,942)
Interest expense	(887)	(900)
Other expense, net	(285)	(818)
Loss before income taxes	(20,492)	(16,660)
Income tax benefit	1,671	680
Net loss	$ (18,821)	$ (15,980)
Net loss per share, basic and diluted	$ (0.25)	$ (0.23)
Shares used in computing net loss per share, basic and diluted	74,707	70,458

See accompanying notes

FLUIDIGM CORPORATION
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(In thousands)
(Unaudited)

	Three Months Ended March 31,	
	2021	**2020**
Net loss	$ (18,821)	$ (15,980)
Other comprehensive income (loss), net of tax:		
Foreign currency translation adjustment	(443)	(303)
Net change in unrealized gain (loss) on investments	—	—
Other comprehensive income (loss), net of tax	(443)	(303)
Comprehensive loss	$ (19,264)	$ (16,283)

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, 2020	74,543	$ 75	$ 815,624	$ 112	$ (676,761)	$ 139,050
Issuance of restricted stock, net of shares withheld for taxes, and other	420	—	(525)	—	—	(525)
Stock-based compensation expense	—	—	3,677	—	—	3,677
Net loss	—	—	—	—	(18,821)	(18,821)
Other comprehensive loss, net of tax	—	—	—	(443)	—	(443)
Balance as of March 31, 2021	74,963	$ 75	$ 818,776	$ (331)	$ (695,582)	$ 122,938

	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

See accompanying notes

FLUIDIGM CORPORATION
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)
(Unaudited)

	Three Months Ended March 31,	
	2021	**2020**
Operating activities		
Net loss	$ (18,821)	$ (15,980)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation expense	3,677	2,366
Amortization of developed technology	2,983	2,968
Depreciation and amortization	934	1,092
Amortization of debt discounts, premiums and issuance costs	132	140
Lease amortization	151	380
Provision for excess and obsolete inventory	315	195
Other non-cash items	12	(116)
Changes in assets and liabilities:		
Accounts receivable, net	9,843	4,730
Inventories, net	(2,896)	(2,280)
Prepaid expenses and other assets	(2,763)	112
Accounts payable	3,363	3,124
Deferred revenue	156	1,040
Other liabilities	(9,987)	(2,066)
Net cash used in operating activities	(12,901)	(4,295)
Investing activities		
Acquisition, net of cash acquired	—	(5,154)
Proceeds from NIH Contract	2,000	—
Proceeds from maturities of investments	—	23,644
Purchases of property and equipment	(6,923)	(1,030)
Net cash provided by (used in) investing activities	(4,923)	17,460
Financing activities		
Repayment of long-term debt	(501)	—
Payments for taxes related to net share settlement of equity awards and other	(525)	(146)
Payment of debt issuance costs	—	(357)
Net cash used in financing activities	(1,026)	(503)
Effect of foreign exchange rate fluctuations on cash and cash equivalents	74	(331)
Net increase (decrease) in cash, cash equivalents and restricted cash	(18,776)	12,331
Cash, cash equivalents and restricted cash at beginning of period	69,536	23,736
Cash, cash equivalents and restricted cash at end of period	$ 50,760	$ 36,067
Supplemental disclosures of cash flow information		
Cash paid for interest	$ 44	$ 44
Cash paid for income taxes, net of refunds	$ 1,200	$ 87
Non-cash right-of-use assets and lease liabilities	$ —	$ 35,465
Asset retirement obligations	$ 324	$ 303

See accompanying notes

FLUIDIGM CORPORATION
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
March 31, 2021

1. Description of Business

Fluidigm Corporation (the Company, Fluidigm, we, our or us) improves life by driving meaningful insights in health and disease. Our innovative technologies explore the biological complexities of disease to advance human health through research, diagnostics and clinical applications. We create, manufacture, and market a range of products and services, including instruments, consumables, reagents and software that are used by researchers and clinical labs worldwide. Our customers are leading academic and government laboratories, as well as pharmaceutical, biotechnology, plant and animal research organizations, and clinical laboratories worldwide. 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 condensed 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, 2021, we had wholly owned subsidiaries in Singapore, Canada, the Netherlands, Japan, France, Italy, 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 financial statements 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.

Unaudited Interim Financial Information

The accompanying interim condensed consolidated financial statements and related disclosures are unaudited, have been prepared on the same basis as the annual financial statements and, in the opinion of management, reflect all adjustments, which include only normal recurring adjustments, necessary for a fair statement of the results of operations for the periods presented.

The year-end condensed consolidated balance sheet was derived from audited financial statements, but does not include all disclosures required by U.S. GAAP. The condensed consolidated results of operations for the three months ended March 31, 2021 are not necessarily indicative of the results to be expected for the full year or for any other year or interim period. The accompanying condensed consolidated financial statements should be read in conjunction with the audited financial statements and the related notes for the year ended December 31, 2020 included in our annual report on Form 10-K, filed with the SEC on February 25, 2021.

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 condensed 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 the pandemic, 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, including the unknown impact of COVID-19 as of March 31, 2021. 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 condensed 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 integrated fluidic circuits (IFCs), assays and reagents. Service revenue is primarily derived from the sale of instrument service contracts, repairs, installation, training and other specialized product support services. We also generate revenue from product development agreements, license and royalty agreements and grants. Revenue is reported net of any sales, use and value-added taxes we collect from customers as required by government authorities. Research and development cost includes costs associated with development and grant revenue.

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.

Development Revenue

We have entered and may continue to enter into development agreements with third parties that provide for up-front and periodic milestone payments. Our development agreements may include more than one performance obligation. At the inception of the contract, we assess whether each obligation represents a separate performance obligation or whether such obligations should be combined as a single performance obligation. The transaction price for each development agreement is determined based on the amount of consideration we expect to be entitled to for satisfying all performance obligations within the agreement.

We assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. In arrangements where we satisfy performance obligation(s) over time, we recognize development revenue typically using an input method based on our costs incurred relative to the total expected cost which determines the extent of our progress toward completion. As part of the accounting for these arrangements, we must develop estimates and assumptions that require judgment to determine the transaction price and progress towards completion. We review our estimate of the transaction price and progress toward completion based on the best information available to recognize the cumulative progress toward completion as of the end of each reporting period, and make revisions to such estimates as necessary.

We also generate revenue from development or collaboration agreements that do not include upfront or milestone-based payments and generally recognize revenue on these types of agreements based on the timing of development activities.

Other Revenue

Other revenue consists of license and royalty revenue and grant revenue. We recognize revenue from license agreements when the license is transferred to the customer and the customer is able to use and benefit from the license. For contracts that include sales-based royalties, we recognize revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied.

In March 2020, we entered into an agreement to settle 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.

We receive grants from various entities to perform research and development activities over contractually defined periods. Grant revenue is not accounted for under ASC 606 Revenue from Contracts with Customers, as the grant agreement is not with a customer. As there is no authoritative U.S. GAAP guidance for grants awarded to for-profit entities, we have applied the guidance in ASC 958 Not-for-Profit Entities by analogy. Revenue is generally recognized provided that the conditions under which the grants were provided have been met and any remaining performance obligations are perfunctory.

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. One customer from whom we derived product revenue exceeded 10% of revenue for the three months ended March 31, 2021. License revenue, recognized as part of a settlement agreement with a party who is not a regular customer, exceeded 10% of total revenue for the three months ended March 31, 2020. No other customer represented more than 10% of revenue during the three months ended March 31, 2021 or during the same period the previous year. There were no customers who represented more than 10% of total billed receivables as of March 31, 2021 or December 31, 2020.

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 the 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. 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 not to 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.

Business Combinations, Goodwill, Intangible Assets and Other Long-Lived Assets

We have completed acquisitions of businesses in the past and may acquire additional businesses or technologies in the future. The results of businesses acquired in a business combination are included in our condensed consolidated financial statements from the date of acquisition. We allocate the purchase price, which is the sum of the consideration provided in a business combination, to the identifiable assets and liabilities of the acquired business at their acquisition date fair values. The excess of the purchase price over the amount allocated to the identifiable assets and liabilities, if any, is recorded as goodwill. Determining the fair value of assets acquired and liabilities assumed requires management to use significant judgment and estimates, including the selection of valuation methodologies and estimates of future revenue.

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. There were no indicators of impairment in 2020 or for the three months ended March 31, 2021. 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.

Deferred Grant Income

In September 2020, we executed a definitive contract with the National Institutes of Health (NIH) for a project under the NIH Rapid Acceleration of Diagnostics (RADx) program. The definitive contract, which amended the letter contract we entered into with the NIH in July 2020 (collectively, the NIH Contract), has a total value of up to $34.0 million upon the achievement

of certain conditional milestones. Proceeds from the NIH Contract will be used primarily to expand production capacity and product throughput capabilities.

Accounting for the NIH Contract does not fall under ASC 606, Revenue from Contracts with Customers, as the NIH will not benefit directly from our expansion or product development. As there is no authoritative guidance under U.S. GAAP on accounting for government assistance to for-profit business entities, we applied International Accounting Standards (IAS) 20, Accounting for Government Grants and Disclosure of Government Assistance, by analogy when accounting for the NIH Contract payments to Fluidigm.

The NIH Contract proceeds used for production capacity expansion meet the definition of grants related to assets as the primary purpose for the payments is to fund the purchase and construction of capital assets to scale up production capacity. Under IAS 20, government grants related to assets are presented in the statement of financial position either by setting up the grant as deferred income or by deducting the grant in arriving at the carrying amount of the asset. Either of these two methods of presentation of grants related to assets in financial statements are regarded as acceptable alternatives under IAS 20. We have elected to record the grants received as deferred income using the first method.

Under IAS 20, grant proceeds are recognized when there is reasonable assurance the conditions of the grant will be met and the grant will be received. With the NIH Contract, this occurs when either each milestone has been accepted by NIH or management concludes the conditions of the grant have been substantially met. Deferred income related to production capacity expansion will be amortized over the period of depreciation for the related assets as a reduction of depreciation expense. Deferred income related to reimbursement of operating expenses is recorded as a reduction of those expenses incurred to date.

Convertible Notes

In February 2014, we closed an underwritten public offering of 2.75% Senior Convertible Notes due 2034 (2014 Notes). 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). As the 2014 Notes and 2019 Notes do not provide for a cash conversion feature, the 2014 Notes and the 2019 Notes are recorded as debt in their entirety in accordance with ASC 470. 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.

As provided by the indenture governing the 2014 Notes, in February 2021, holders of $0.5 million of the 2014 Notes required us to repurchase their notes at 100% of the principal amount plus accrued and unpaid interest. We recorded a loss of $9 thousand on the extinguishment of these notes, representing the difference between the price paid to extinguish the 2014 Notes and their carrying value, including unamortized debt issuance costs. The loss is included in other expense, net on the condensed consolidated statement of operations.

See Note 8 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, 2021 are as follows (in thousands):

	Foreign Currency Translation Adjustment	Unrealized Gain (Loss) on Investments	Accumulated Other Comprehensive Income (Loss)
Ending balance at December 31, 2020	$ 112	$ —	$ 112
Other comprehensive income (loss)	(443)	—	(443)
Ending balance at March 31, 2021	$ (331)	$ —	$ (331)

Immaterial amounts of unrealized gains and losses have been reclassified into the condensed consolidated statement of operations for the three months ended March 31, 2021 and 2020.

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,	
	2021	2020
Stock options, restricted stock units and performance awards	6,974	6,652
2019 Convertible Notes	18,966	18,966
2019 Convertible Notes potential make-whole shares	1,538	4,707
2014 Convertible Notes	10	19
Total	27,488	30,344

Recent Accounting Changes and Accounting Pronouncements

Adoption of New Accounting Guidance

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 simplify U.S. GAAP for Topic 740 by clarifying and amending existing guidance for, among other items, 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. The adoption of the new guidance did not have a significant impact on our financial results.

Recent Accounting Pronouncements

In August 2020, the FASB issued ASU 2020-06 Debt-Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging-Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity. The amendment to this ASU reduces the number of accounting models for convertible instruments and allows more contracts to qualify for equity classification, which is expected to result in more convertible instruments being accounted for as a single unit, rather than being bifurcated between debt and equity. The new guidance is effective for fiscal years beginning after December 15, 2021. We are currently evaluating the impact of adoption on our condensed consolidated financial statements.

3. NIH Contract

In 2020, we were awarded the NIH Contract under the RADx program to support the expansion of our production capacity and throughput capabilities for COVID-19 testing with our microfluidics technology. The NIH Contract has a total value of up to $34.0 million upon the achievement of certain conditional milestones. The NIH Contract was modified in February 2021, dividing the remaining milestones into multiple discrete milestones expected to be completed in 2021, with no change to the total grant amount. Proceeds from the NIH Contract are being used primarily to expand production capacity and, to a lesser extent, to offset related operating expenses.

The NIH has the right to terminate the NIH Contract for convenience. In the event of termination for convenience, we will be paid a percentage of the NIH Contract price reflecting the percentage of the work performed prior to the notice of termination, plus reasonable charges. In the event of termination for cause due to our default, NIH is not liable for supplies or services not accepted.

If we fail to deliver within the time specified in the NIH Contract and the delay is due to Fluidigm's fault or negligence, we are required to pay liquidated damages in the amount of 33% of the amount(s) already disbursed to date under the NIH Contract within six months from the date of termination. We are in compliance with the terms of the NIH Contract and do not currently expect to pay any liquidated damages. We are working with the NIH to ensure we remain in compliance with the requirements and milestones of the NIH Contract.

The following table summarizes the activity under the NIH Contract through March 31, 2021 (in thousands):

	March 31, 2021	December 31, 2020
Total value of milestones reasonably assured	$ 29,936	$ 25,436
Cumulative amounts applied against operating expenses	(1,951)	(1,488)
Total deferred grant income	$ 27,985	$ 23,948

	March 31, 2021	December 31, 2020
Short-term deferred grant income	$ 5,818	$ 2,912
Long-term deferred grant income	22,167	21,036
Deferred grant income	$ 27,985	$ 23,948

	March 31, 2021	December 31, 2020
Total value of milestones reasonably assured	$ 29,936	$ 25,436
Cumulative funding received	(27,436)	(25,436)
Grant receivable from NIH Contract	$ 2,500	$ —

The grant receivable from the NIH Contract is included in prepaid and other current assets on the condensed consolidated balance sheet at March 31, 2021. Short-term deferred grant income represents future research and development costs expected to be funded by the NIH as well as estimated depreciation expense to be incurred over the next twelve months. Short-term deferred grant income is included in other accrued liabilities on the condensed consolidated balance sheet at March 31, 2021. The long-term deferred grant income includes capital expenditure amounts which will be amortized in later periods.

We have incurred $16.1 million of capital expenditures through March 31, 2021. The majority of this amount is included in construction-in-progress, which is included in property and equipment, net in the condensed consolidated balance sheet as of March 31, 2021 (see Note 7).

4. Development Agreement

Effective March 31, 2020, we signed an OEM Supply and Development Agreement (Development Agreement) with a customer. Under the Development Agreement, Fluidigm will develop products based on our microfluidics technology. The Development Agreement provides up-front and periodic milestone payments of up to $11.7 million during the development stage, which is expected to be completed in 2021. We recognized $1.5 million of development revenue from this agreement during the three months ended March 31, 2021. Cumulatively, we have recognized $10.3 million of development revenue from this agreement. Unbilled receivables of $2.8 million, which represent revenues recognized in excess of milestones billed through March 31, 2021, are included in prepaid and other current assets on the condensed consolidated balance sheet at March 31, 2021. No development revenue was recognized during the three months ended March 31, 2020.

5. Revenue

Disaggregation of Revenue

The following table presents our revenue for the three months ended March 31, 2021 and 2020, respectively, based on geographic area and by source (in thousands):

	Three Months Ended March 31,	
	2021	2020
Geographic Markets:		
Americas	$ 18,523	$ 14,844
EMEA	9,142	8,096
Asia-Pacific	5,129	4,677
Total revenue	$ 32,794	$ 27,617

	Three Months Ended March 31,	
	2021	2020
Sources:		
Instruments	$ 7,708	$ 9,471
Consumables	17,020	9,510
Product revenue	24,728	18,981
Service revenue	6,286	5,186
Development revenue	1,480	—
Other revenue:		
License revenue	—	3,100
Grant revenue	300	350
Total other revenue	300	3,450
Total revenue	$ 32,794	$ 27,617

Performance Obligations

We reported $21.5 million of deferred revenue in our December 31, 2020 consolidated balance sheet. During the three months ended March 31, 2021, $3.9 million of the opening balance was recognized as revenue and $3.8 million of net additional advance payments were received from customers, primarily associated with instrument service contracts. At March 31, 2021, we reported $21.4 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, 2021 (in thousands):

Fiscal Year	Expected Revenue (1)
2021 remainder of the year	$ 11,033
2022	8,123
2023	4,584
Thereafter	2,648
Total	$ 26,388

(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 not to disclose information about unsatisfied performance obligations for service contracts with an expected term of one year or less.

6. 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 January 2020, we recognized $2.2 million (Euro 2.0 million) of goodwill from the InstruNor acquisition and $5.4 million (Euro 4.9 million) of developed technology. As the goodwill and developed technology from the InstruNor acquisition are recorded in the functional currency of our European operations, which is the Euro, these balances are revalued each period and the U.S. dollar value of these assets will fluctuate as foreign exchange rates change.

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 ongoing global 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.

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, 2021			
	Gross Amount	Accumulated Amortization	Net	Weighted-Average Amortization Period
Developed technology	$ 117,689	$ (80,689)	$ 37,000	9.9 years
Patents and licenses	$ 11,274	$ (9,485)	$ 1,789	7.0 years

	December 31, 2020			
	Gross Amount	Accumulated Amortization	Net	Weighted-Average Amortization Period
Developed technology	$ 117,658	$ (77,452)	$ 40,206	9.9 years
Patents and licenses	$ 11,274	$ (9,256)	$ 2,018	7.5 years

Total amortization expense for both the three months ended March 31, 2021 and 2020 was $3.2 million.

Based on the carrying value of intangible assets, net, as of March 31, 2021, the amortization expense is expected to be as follows (in thousands):

Fiscal Year	Developed Technology Amortization Expense	Patents and Licenses Amortization Expense	Total
2021 remainder of the year	$ 8,933	$ 532	$ 9,465
2022	11,911	678	12,589
2023	11,911	572	12,483
2024	2,111	7	2,118
2025	711	—	711
Thereafter	1,423	—	1,423
Total	$ 37,000	$ 1,789	$ 38,789

7. Balance Sheet Details

Cash, Cash Equivalents and Restricted Cash

Cash, cash equivalents and restricted cash consisted of the following as of March 31, 2021 and December 31, 2020 (in thousands):

	March 31, 2021	December 31, 2020
Cash and cash equivalents	$ 49,744	$ 68,520
Restricted cash	1,016	1,016
Total cash, cash equivalents and restricted cash	$ 50,760	$ 69,536

Short-term restricted cash of approximately $16 thousand is 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, 2021.

Inventories, net

Inventories consisted of the following as of March 31, 2021 and December 31, 2020 (in thousands):

	March 31, 2021	December 31, 2020
Raw materials	$ 9,846	$ 8,292
Work-in-process	1,083	1,214
Finished goods	10,963	10,183
Total inventories, net	$ 21,892	$ 19,689

Property and Equipment, net

Property and equipment consisted of the following as of March 31, 2021 and December 31, 2020 (in thousands):

	March 31, 2021	December 31, 2020
Computer equipment and software	$ 4,276	$ 4,240
Laboratory and manufacturing equipment	18,331	18,107
Leasehold improvements	7,226	7,203
Office furniture and fixtures	2,021	1,994
Property and equipment, gross	31,854	31,544
Less accumulated depreciation and amortization	(24,707)	(23,989)
Construction-in-progress	16,637	9,976
Property and equipment, net	$ 23,784	$ 17,531

Accrued Compensation and Related Benefits

Accrued compensation and related benefits consisted of the following as of March 31, 2021 and December 31, 2020 (in thousands):

	March 31, 2021	December 31, 2020
Accrued incentive compensation	$ 2,350	$ 7,842
Accrued vacation	3,634	3,367
Accrued payroll taxes and other	2,709	2,578
Accrued compensation and related benefits	$ 8,693	$ 13,787

Warranties

Activity for our warranty accrual for the three months ended March 31, 2021 and 2020, which is included in other accrued liabilities, is summarized below (in thousands):

	Three Months Ended March 31,	
	2021	2020
Beginning balance	$ 1,663	$ 1,390
Accrual (release) for current period warranties	(150)	227
Warranty costs incurred	(236)	(162)
Ending balance	$ 1,277	$ 1,455

8. 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 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. Repurchase provisions for the 2014 Notes permit the holders of the 2014 Notes to 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 2014 Notes plus accrued and unpaid interest. On February 6, 2021, holders of $0.5 million of the 2014 Notes required us to repurchase their notes in accordance with this provision. We recorded a loss of $9 thousand on the extinguishment of these notes, which is included in other expense, net in our condensed consolidated statement of operations.

We have retired the majority of the 2014 Notes through the issuance of the 2018 Notes and 2019 Notes, as discussed below, as well as the February 2021 redemption. As of March 31, 2021, there is $0.6 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 the aggregate principal amount of the 2014 Notes outstanding. The 2018 Notes accrued interest at a rate of 2.75% payable semi-annually. 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. In the first quarter of 2019, $150.0 million of the 2018 Notes were converted into 19.5 million shares of our common stock and the bonds were 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 offering 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.

The 2019 Notes bear interest at 5.25% per annum, payable semiannually in arrears 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, 2021	December 31, 2020
2.75% 2014 Notes due 2034		
Principal amount	$ 578	$ 1,079
Unamortized debt discount	(9)	(16)
Unamortized debt issuance cost	(2)	(4)
	$ 567	$ 1,059
5.25% 2019 Notes due 2024		
Principal amount	$ 55,000	$ 55,000
Unamortized debt issuance cost	(1,730)	(1,835)
	$ 53,270	$ 53,165
Net carrying value of all Notes	$ 53,837	$ 54,224

2018 Revolving Credit Facility

In August 2018, we entered into a revolving credit facility with Silicon Valley Bank (as amended, the 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. Total availability under the Revolving Credit Facility as of March 31, 2021 was $13.2 million. There were no borrowings outstanding under the Revolving Credit Facility at March 31, 2021.

The Revolving Credit Facility is collateralized by substantially all our property, other than intellectual property. The interest rate on outstanding loans under the Revolving Credit Facility is the greater of (i) prime rate plus 0.50% or (ii) 5.25% . 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. Fees for the Revolving Credit Facility include an annual commitment fee of $112,500 and

a quarterly unused line fee based on the Borrowing Base. Effective April 21, 2020, the Revolving Credit Facility was amended to extend the maturity date to August 2, 2022.

9. 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, 2021 and December 31, 2020 (in thousands, except for discount rate and lease term):

	March 31, 2021	December 31, 2020
Operating lease right-of-use buildings	$ 41,097	$ 41,132
Operating lease right-of-use equipment	86	89
Operating lease right-of-use vehicles	653	679
Total operating lease right-of-use assets, gross	41,836	41,900
Accumulated amortization	(4,591)	(3,786)
Total operating lease right-of-use assets, net	$ 37,245	$ 38,114
Operating lease liabilities, current	$ 3,025	$ 2,973
Operating lease liabilities, non-current	37,419	38,178
Total operating lease liabilities	$ 40,444	$ 41,151
Weighted average remaining lease term (in years)	8.5	8.6
Weighted average discount rate per annum	12.0 %	11.9 %

10. 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, 2021						
	Amortized Cost	Gross Unrealized Gain	Gross Unrealized Loss	Fair Value	Cash and Cash Equivalents	Short-Term Marketable Securities	Cash- Restricted
Assets:							
Cash-unrestricted	$ 44,442	$ —	$ —	$ 44,442	$ 44,442	$ —	$ —
Cash-restricted	1,016	—	—	1,016	—	—	1,016
Total cash	$ 45,458	$ —	$ —	$ 45,458	$ 44,442	$ —	$ 1,016
Available-for-sale:							
Level I:							
Money market funds	$ 5,302	$ —	$ —	$ 5,302	$ 5,302	$ —	$ —
Subtotal	$ 5,302	$ —	$ —	$ 5,302	$ 5,302	$ —	$ —
Total	$ 50,760	$ —	$ —	$ 50,760	$ 49,744	$ —	$ 1,016

	December 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	$ 47,818	$ —	$ —	$ 47,818	$ 47,818	$ —	$ —
Cash-restricted	1,016	—	—	1,016	—	—	1,016
Total cash	$ 48,834	$ —	$ —	$ 48,834	$ 47,818	$ —	$ 1,016
Available-for-sale:							
Level I:							
Money market funds	$ 20,702	$ —	$ —	$ 20,702	$ 20,702	$ —	$ —
Subtotal	$ 20,702	$ —	$ —	$ 20,702	$ 20,702	$ —	$ —
Total	$ 69,536	$ —	$ —	$ 69,536	$ 68,520	$ —	$ 1,016

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, 2021.

Convertible Notes

Our convertible notes are not regularly traded and it is difficult to estimate a reliable and accurate market price for these securities. The estimated fair values for these securities represent Level III valuations since a fair value for these securities cannot be determined by using readily observable inputs or measures, such as market prices. 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, 2021 and December 31, 2020, respectively (in thousands):

	March 31, 2021			December 31, 2020		
	Par Value	Carrying Value	Fair Value	Par Value	Carrying Value	Fair Value
2014 Notes	$ 578	$ 567	$ 601	$ 1,079	$ 1,059	$ 1,122
2019 Notes	55,000	53,270	94,053	55,000	53,165	117,899
Total	$ 55,578	$ 53,837	$ 94,654	$ 56,079	$ 54,224	$ 119,021

11. Shareholders' Equity

2020 At-the-Market Offering

In March 2020, we entered into an Open Market Sale Agreement (Sale Agreement) with Jefferies LLC (Jefferies) to sell shares of our common stock having aggregate sales proceeds of up to $50,000,000, from time to time, through an "at-the-market" equity offering program under which Jefferies acts as sales agent. During the third quarter of 2020, we sold 2.5 million shares of our common stock pursuant to the Sale Agreement. Our net proceeds from the sale of such shares of common stock were approximately $20.1 million, after deducting related expenses, including commissions of approximately $0.6 million and issuance costs of approximately $0.2 million.

InstruNor Acquisition

In January 2020, we completed the acquisition of all of the outstanding shares of InstruNor. The purchase price was approximately $7.2 million, consisting of $5.2 million in cash and 485,451 shares of our common stock. No measurement period adjustments were made after January 2020 and the purchase price allocation has been finalized.

Common Shares Reserved

At March 31, 2021, 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
2011 Equity Incentive Plan	1,393	5,199	2,517
DVS Sciences Inc. 2010 Equity Incentive Plan	12	—	—
2017 Inducement Award Plan	207	163	—
2017 Employee Stock Purchase Plan	—	—	2,925
	1,612	5,362	5,442

The number of shares available for future issuance reflects performance share units at the maximum number of shares that could be issued under these awards.

12. 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 equity incentive 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. In May 2020, we granted 1.8 million retention RSUs that vest over three years, with 50% of the RSUs vesting after one year and 25% of the RSUs vesting each year thereafter.

Incentive stock options and non-statutory stock options granted under our 2011 Equity Incentive Plan (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 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 an 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. In May 2020, our board of directors authorized, and in June 2020, our stockholders approved an increase in the number of shares reserved for issuance under the 2011 Plan of 1.4 million shares. In April 2021, our board of directors authorized an increase of 4.1 million shares reserved for issuance under the 2011 Plan, subject to stockholder approval at our annual meeting of stockholders in May 2021.

Activity under the various plans was as follows:

Restricted Stock Units:

	Number of Units (in 000s)	Weighted-Average Grant Date Fair Value per Unit
Balance at December 31, 2020	4,862	$ 4.98
RSUs granted	72	$ 4.89
RSUs released	(368)	$ 4.84
RSUs forfeited	(83)	$ 4.53
Balance as of March 31, 2021	4,483	$ 5.00

As of March 31, 2021, the unrecognized compensation costs related to outstanding unvested RSUs under our equity incentive plans were $17.5 million. We expect to recognize those costs over a weighted average period of 2.4 years.

***Stock Options*:**

	Number of Options (000s)	Weighted-Average Exercise Price per Option	Weighted-Average Remaining Contractual Life (in Years)	Aggregate Intrinsic Value [1] in (000s)
Balance at December 31, 2020	1,635	$ 7.33	6.2	$ —
Options granted	—	$ —		
Options exercised	—	$ —		$ —
Options forfeited	(23)	$ 7.87		
Balance as of March 31, 2021	1,612	$ 7.32	6.0	$ 192
Vested at March 31, 2021	1,417	$ 7.51	5.8	$ 162
Unvested awards at March 31, 2021	195	$ 5.98	7.6	$ 30

(1) Aggregate intrinsic value as of March 31, 2021 was calculated as the difference between the closing price per share of our common stock on the last trading day of March 31, 2021, which was $4.52, and the exercise price of the options, multiplied by the number of in-the-money options.

As of March 31, 2021, the unrecognized compensation costs related to outstanding unvested options under our equity incentive plans were $0.6 million. We expect to recognize those costs over a weighted average period of 1.3 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.

Based on the performance of our stock relative to our defined group of peer companies for the period 2018-2020, PSUs awarded in 2018 vested in 2021 at a rate of 118.6% of target. The performance adjustment in the table below reflects the impact of the above target performance.

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, 2020	962	$ 9.74
PSU granted	—	
Performance adjustment for 2018 awards	21	
PSU released	(133)	$ 10.09
PSU forfeited	—	
Balance at March 31, 2021	850	$ 9.69

As of March 31, 2021, the unrecognized compensation costs related to these awards were $3.1 million. We expect to recognize those costs over a weighted average period of 1.3 years.

Performance Stock Units with Performance Conditions. During 2019, we also granted performance stock units to a certain employee. The number of performance stock units that ultimately vest under these awards is dependent on achieving certain discrete operational milestones, the latest of which is December 31, 2021. As of March 31, 2021, there were approximately 29 thousand units of these awards outstanding with a weighted-average grant date fair value of $6.46 per unit.

2017 Employee Stock Purchase Plan (ESPP)

Our ESPP offers U.S. and some non-U.S. employees the right to purchase shares of our common stock. Our ESPP program has 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 are eligible to participate through payroll deductions of up to 10% of their compensation. Employees may not purchase more than $25 thousand of stock for any calendar year. The purchase price at which shares are sold under the ESPP 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 offering period.

Stock-based Compensation Expense

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

	Three months ended March 31,	
	2021	2020
Restricted stock units, stock options and performance share units	$ 3,473	$ 2,112
Employee stock purchase plan	204	$ 254
Total stock-based compensation	$ 3,677	$ 2,366

13. Income Taxes

Our quarterly provision for income taxes is based on an estimated effective annual income tax rate. Our 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.

We recorded a tax benefit of $1.7 million and $0.7 million for the three months ended March 31, 2021, and 2020 respectively. For the first quarter of each of 2021 and 2020, our foreign operations recorded a loss. The benefits for all periods were primarily attributable to the tax benefits from the amortization of our acquisition-related deferred tax liabilities and tax benefits from our foreign operations. These benefits were partially offset by state minimum income taxes.

Our tax benefit for income taxes for the periods presented differ from the 21% U.S. Federal statutory rate for the three months ended March 31, 2021 and 2020, respectively, primarily due to maintaining a valuation allowance for most of our deferred tax assets, which primarily consist of net operating loss carryforwards.

Our tax positions are subject to audits by multiple tax jurisdictions. We believe that we have provided adequate reserves for uncertain tax positions for all tax years still open for assessment. For the three months ended March 31, 2021, and 2020, respectively, we 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 and future expected financial results. Domestic deferred tax assets have been offset by valuation allowances. 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.

14. 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, 2021 and 2020 is included in Note 5 to the condensed consolidated financial statements.

Sales to customers in the United States represented $18.1 million, or 55% of total revenues, and $14.1 million or 51% of total revenues, for the three months ended March 31, 2021 and 2020, respectively. No foreign country or jurisdiction had sales in excess of 10% of total revenues for the three months ended March 31, 2021, or 2020.

15. 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

In September 2020, a putative class action complaint alleging violations of the federal securities laws was filed against the Company (also naming our Chief Executive Officer and Chief Financial Officer as defendants) in the U.S. District Court for the Northern District of California (Reena Saintjermain, et al. v. Fluidigm Corporation, et al). The Court appointed a lead plaintiff and lead counsel in December 2020, and an amended complaint was filed on February 19, 2021. The complaint, as amended, seeks unspecified damages on behalf of a purported class of persons and entities who acquired our common stock between February 7, 2019 and November 5, 2019 and alleges securities laws violations based on statements and alleged omissions made by the Company during such period. The Company filed a motion to dismiss the complaint on April 5, 2021. We believe the claims alleged in the complaint lack merit and we intend to defend this action vigorously.

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.

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 the COVID-19 pandemic) 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 improves life by driving meaningful insights in health and disease. Our innovative technologies explore the biological complexities of disease to advance human health through research, diagnostics and clinical applications. We create, manufacture, and market a range of products and services, including instruments, consumables, reagents and software that are used by researchers and clinical labs worldwide. Our customers are leading academic and government laboratories, as well as pharmaceutical, biotechnology, plant and animal research organizations, and clinical laboratories worldwide. Together with our customers, we strive to increase the quality of life for all.

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 microfluidics instruments, which are assembled by our contract manufacturer located within our Singapore facility. All of our microfluidic products are fabricated at our Singapore facility. Our mass cytometry instruments, assays and reagents are manufactured at our facility in Canada. We also use U.S.-based third-party contract manufacturers for reagent manufacturing.

Our total revenue for the three months ended March 31, 2021 was $32.8 million compared to $27.6 million for the three months ended March 31, 2020. Our total revenue was $138.1 million in 2020 and $117.2 million in 2019. We have incurred significant net losses since our inception in 1999 and, as of March 31, 2021, our accumulated deficit was $695.6 million.

Recent Developments

The COVID-19 pandemic has given us an opportunity to demonstrate our product capabilities for diagnostics markets and build new accounts, while at the same time accessing a variety of external funding sources to support product development and innovation. Our response to the pandemic has driven more innovation, exposure of our products to new customers around the world, and increased consumables sales.

As vaccines for the coronavirus have become available and the perceived threat of the pandemic recedes, the demand for our COVID-19 testing products has slowed, resulting in a corresponding decline in COVID-19 testing revenue in the first quarter of 2021, compared to the fourth quarter of 2020. As a result of these recent trends and ensuing uncertainties around COVID-19 testing, we now expect our revenue related to COVID-19 testing to further decline in each of the subsequent quarters in 2021 and have lowered our revenue expectations for this year. We expect the improving outlook on our base business (excluding COVID-19 revenues) to partially offset the effect of this decline but at the same time, we are also focused on cost containment and margin improvement and continue to look for alternative, cost-effective funding sources for new product development while mitigating cash usage.

Despite the uncertainties around the demand for COVID-19 testing products, Fluidigm continues to remain focused on growing its business across multiple applications. To date, our solutions span the spectrum from discovery to diagnostics, and we see an avenue for our products to move deeper into clinical applications. We remain focused on bringing leading solutions, with a best-in-class value, throughput and accuracy, to our customers and the market.

For additional information on the various risks posed by the COVID-19 pandemic, refer to Part II, Item 1A. Risk Factors of this Form 10-Q.

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 the pandemic, 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.

Recent Accounting Changes and Accounting Pronouncements

Adoption of New Accounting Guidance

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 simplify GAAP for Topic 740 by clarifying and amending existing guidance for, among other items, 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. The adoption of the new guidance did not have a significant impact on our financial results.

Recent Accounting Pronouncements

In August 2020, the FASB issued ASU 2020-06 Debt-Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging-Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity. The amendment to this ASU reduces the number of accounting models for convertible instruments and allows more contracts to qualify for equity classification, which is expected to result in more convertible instruments being accounted for as a single unit, rather than being bifurcated between debt and equity. The new guidance is effective for fiscal years beginning after December 15, 2021. We are currently evaluating the impact of adoption on our condensed consolidated financial statements.

Results of Operations

The following table presents our historical condensed consolidated statements of operations data for the three months ended March 31, 2021 and 2020, and as a percentage of total revenue for the respective periods (in thousands):

	Three Months Ended March 31,			
	2021		2020	
Revenue:				
Total revenue	$ 32,794	100 %	$ 27,617	100 %
Costs and expenses:				
Cost of product revenue	11,663	35	9,640	35
Cost of service revenue	2,090	6	1,525	6
Research and development	10,753	34	8,699	31
Selling, general and administrative	27,608	84	22,695	82
Total costs and expenses	52,114	159	42,559	154
Loss from operations	(19,320)	(59)	(14,942)	(54)
Interest expense	(887)	(2)	(900)	(3)
Other expense, net	(285)	(1)	(818)	(3)
Loss before income taxes	(20,492)	(62)	(16,660)	(60)
Income tax benefit	1,671	5	680	2
Net loss	$ (18,821)	(57)%	$ (15,980)	(58)%

Revenue

We generate revenue primarily from sales of our products and services, development agreements, license and royalty agreements, and grants. Our product revenue consists of sales of instruments and consumables. Consumables revenue 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 the sales and active installed base of our instruments as our service revenue primarily consists of post-warranty service contracts, preventive maintenance plans, instrument parts, installation and training. We sell our products to leading academic and government laboratories, as well as pharmaceutical, biotechnology, clinical, plant and animal research organizations and clinical laboratories worldwide.

Development Revenue. Effective March 31, 2020, we signed an OEM Supply and Development Agreement (Development Agreement) with a customer. Under the Development Agreement, Fluidigm will develop products based on our microfluidics technology. The Development Agreement provides up-front and periodic milestone payments of up to $11.7 million during the development stage. The development stage is expected to be completed in the second half of 2021. We recognized $1.5 million of development revenue from this agreement in the three months ended March 31, 2021 and cumulatively $10.3 million.

We recognize revenue under the Development Agreement using an input method based on our costs incurred relative to the total expected cost which determines the extent of our progress toward satisfaction of our obligations under the agreement. Costs associated with the Development Agreement are recorded in research and development expense in the condensed consolidated statement of operations.

Grant Revenue. We receive grants to perform research and development activities over contractually defined periods. Grant revenue in the current year is attributable to a grant agreement entered into in the second half of 2019, which is expected to end in the first half of 2021. Costs associated with grant agreements are recorded in research and development expense in the condensed consolidated statement of operations.

License and Royalty Revenue. In March 2020, we entered into an agreement to settle 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.

One customer exceeded 10% of total revenue for the three months ended March 31, 2021. License revenue, recognized as part of a settlement agreement with a party who is not a regular customer, exceeded 10% of revenue for the three months ended March 31, 2020. No other customer represented more than 10% of total revenue for the three months ended March 31, 2021 or

2020. Revenues from our five largest customers were 27% of total revenue for the three months ended March 31, 2021 and, excluding the license agreement mentioned above, 15% of revenue for the three months ended March 31, 2020. There was no customer who represented more than 10% of total billed receivables as of March 31, 2021 and December 31, 2020.

The following table presents our revenue by source for the three months ended March 31, 2021 and 2020, and as a percentage of total revenue for the respective periods (in thousands):

	Three Months Ended March 31,				Year-over-Year Change
	2021		2020		
Revenue:					
Instruments	$ 7,708	24 %	$ 9,471	34 %	(19)%
Consumables	17,020	52	9,510	34	79 %
Product revenue	24,728	76	18,981	68	30 %
Service revenue	6,286	19	5,186	20	21 %
Product and service revenue	31,014	95	24,167	88	28 %
Development revenue	1,480	4	—	—	NA
Grant revenue	300	1	350	1	(14)%
License revenue	—	—	3,100	11 %	(100)%
Total revenue	$ 32,794	100 %	$ 27,617	100 %	19 %

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, 2021 and 2020 (in thousands):

	Three Months Ended March 31,				Year-over-Year Change
	2021		2020		
Americas	$ 18,523	56 %	$ 14,844	54 %	25 %
EMEA	9,142	28	8,096	29	13 %
Asia-Pacific	5,129	16	4,677	17	10 %
Total revenue	$ 32,794	100 %	$ 27,617	100 %	19 %

The Americas revenue includes revenue generated in the United States of $18.1 million and $14.1 million for the three months ended March 31, 2021, and 2020 respectively. No foreign country or jurisdiction had sales in excess of 10% of total revenues for the three months ended March 31, 2021 and 2020.

Total revenue. Total revenue increased by $5.2 million or 19%, for the three months ended March 31, 2021 compared to the three months ended March 31, 2020, driven primarily by higher product, service and development revenue, partially offset by lower license revenue. Product revenue increased primarily due to COVID-19-related applications which resulted in higher sales of microfluidics consumables.

Americas revenues increased by $3.7 million, or 25%, for the three months ended March 31, 2021 compared to the three months ended March 31, 2020. This increase includes $5.4 million of higher product and service revenue driven primarily by COVID-19-related opportunities. Americas revenues for the three months ended March 31, 2021 also includes $1.5 million of development revenue and $0.3 million of grant revenue. For the three months ended March 31, 2020, Americas revenues included $3.1 million of license revenue as part of a litigation settlement. In Asia Pacific, higher sales of microfluidics products and mass cytometry consumables were partially offset by lower sales of mass cytometry instruments. Increases in EMEA revenues reflect higher mass cytometry product and service revenues due to stronger instrument placements. A stronger Euro contributed 7 of the 13 percentage point increase in EMEA's revenue during the three months ended March 31, 2021 and 2 of

the 19 percentage point increase in total revenues for the three months ended March 31, 2021 compared to the same period in 2020.

Product and Service Revenue. The following tables present the split of product and service revenue between mass cytometry and microfluidic product categories and as a percentage of the respective category's total product and service revenue for the respective periods presented (in thousands):

	Three Months Ended March 31,				Year-over-Year Change
	2021		2020		
Mass cytometry:					
Instruments	$ 4,965	35 %	$ 7,548	50 %	(34)%
Consumables	4,575	33 %	3,903	27 %	17 %
Total product revenue	9,540	68 %	11,451	77 %	(17)%
Service revenue	4,482	32 %	3,511	23 %	28 %
Total product and service revenue	$ 14,022	100 %	$ 14,962	100 %	(6)%

	Three Months Ended March 31,				Year-over Year Change
	2021		2020		
Microfluidics:					
Instruments	$ 2,743	16 %	$ 1,923	21 %	43 %
Consumables	12,445	73 %	5,607	61 %	122 %
Total product revenue	15,188	89 %	7,530	82 %	102 %
Service revenue	1,804	11 %	1,675	18 %	8 %
Total product and service revenue	$ 16,992	100 %	$ 9,205	100 %	85 %

Higher microfluidics instrument revenue was attributable to higher unit sales of Biomark and Juno instruments. Higher microfluidics consumables revenue was driven by increases in COVID-19 tests. Mass cytometry revenue was lower due to lower instrument volumes, and to a lesser extent, lower average unit selling prices, partially offset by higher consumables sales. We expect the average selling prices of our products to fluctuate over time based on market conditions, product mix, and currency fluctuations.

Service plan revenues, which are recognized over the life of the service agreement and are not activity-dependent, drove nearly half of the increase in service revenues. As more customers were open during the three months ended March 31, 2021 compared to the three months ended March 31, 2020, we are also seeing increases in parts and repair-related service revenues.

Product and Service Cost, Gross Profit, and 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, 2021 and 2020 (in thousands):

	Three Months Ended March 31,		Year-over-Year Change
	2021	2020	
Cost of product revenue	$ 11,663	$ 9,640	21 %
Cost of service revenue	2,090	1,525	37 %
Cost of product and service revenue	$ 13,753	$ 11,165	23 %
Product and service gross profit	$ 17,261	$ 13,002	33 %
Product and service margin	55.7 %	53.8 %	1.9 ppt

Product and service margin increased by 1.9 percentage points for the three months ended March 31, 2021 compared to the three months ended March 31, 2020. Fixed depreciation and amortization costs on a higher revenue base positively impacted margins by 2.8 percentage points. This favorability was partially offset by lower average selling prices of mass cytometry instruments, and product mix, which included lower margin microfluidics instruments.

Operating Expenses

The following table presents our operating expenses for the three months ended March 31, 2021 and 2020 (in thousands):

	Three Months Ended March 31,		Year-over-Year Change
	2021	2020	
Research and development	$ 10,753	$ 8,699	24 %
Selling, general and administrative	27,608	22,695	22 %
Total	$ 38,361	$ 31,394	22 %

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. 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 also includes costs incurred in conjunction with research grants and development arrangements. We have made substantial investments in research and development since our inception and expect to continue to do so.

Research and development expense increased by $2.1 million, or 24%, for the three months ended March 31, 2021 compared to the three months ended March 31, 2020. Compensation and benefit costs increased by $1.0 million, primarily due to cost attributable to higher headcount and annual merit increases. Consulting costs and laboratory supplies increased by $0.6 million and $0.3 million, respectively, due to development and grant projects. Stock based compensation costs also increased by $0.2 million for the three months ended March 31, 2021 compared to the three months ended March 31, 2020 primarily due to retention awards granted in the second quarter of 2020.

We believe our continued investment in research and development is essential to our long-term competitive position and 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 increased by $4.9 million, or 22%, for the three months ended March 31, 2021 compared to the three months ended March 31, 2020. Salaries and benefits costs increased by $1.4 million in the three months ended March 31, 2021 compared to the three months ended March 31, 2020 primarily due to increased headcount and annual merit increases. Commission and incentive compensation costs increased by $1.3 million for the three months ended March 31, 2021 compared to the three months ended March 31, 2020. Facilities costs increased by approximately $0.6 million for the

three months ended March 31, 2021 compared to the three months ended March 31, 2020, reflecting higher lease costs associated with a lease on our new corporate headquarters which commenced in March 2020. Stock-based compensation costs increased by $1.1 million for the three months ended March 31, 2021 compared to the three months ended March 31, 2020, primarily due to retention awards granted in the second quarter of 2020. Higher litigation-related expenses were offset by lower travel costs.

Interest Expense and Other Expense, Net

The following table presents these items for the three months ended March 31, 2021 and 2020 (in thousands):

	Three Months Ended March 31,		Year-over-Year Change
	2020	2019	
Interest expense	$ (887)	$ (900)	(1)%
Other expense, net	(285)	(818)	(65)%
Total	$ (1,172)	$ (1,718)	(32)%

Interest expense consists primarily of interest on our convertible debt. Other expense, net of $0.3 million for the three months ended March 31, 2021 is primarily attributable to $0.4 million of foreign exchange losses, partially offset by interest income. Other expense, net for the three months ended March 31, 2021 also includes a $9 thousand loss on the repurchase of the 2014 Notes. Other expense, net of $0.8 million for the three months ended March 31, 2020 includes $1.0 million of foreign exchange losses partially offset by $0.2 million of interest income.

Income Tax Benefit

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 $1.7 million, for an effective tax rate of 8.2%, for the three months ended March 31, 2021. For the three months ended March 31, 2020, we recorded a tax benefit of $0.7 million for an effective tax rate of 4.1%. The benefit increased for the three months ended March 31, 2021 compared to the three months ended March 31, 2020 due to higher pre-tax losses from our foreign operations compared to the same period last year.

Liquidity and Capital Resources

Sources of Liquidity

As of March 31, 2021, our principal sources of liquidity consisted of $49.7 million of cash and cash equivalents, as well as $1.0 million of restricted cash and $13.2 million of availability under our Revolving Credit Facility.

The following table presents our cash flow summary for the three months ended March 31, 2021 and 2020 (in thousands):

	Three Months Ended March 31,	
	2021	2020
Cash flow summary:		
Net cash used in operating activities	$ (12,901)	$ (4,295)
Net cash provided by (used in) investing activities	(4,923)	17,460
Net cash used in financing activities	(1,026)	(503)
Effect of foreign exchange rate fluctuations on cash and cash equivalents	74	(331)
Net increase (decrease) in cash, cash equivalents and restricted cash	$ (18,776)	$ 12,331

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, 2021 was $12.9 million and consisted of net loss of $18.8 million, adjusted for non-cash items of $8.2 million and cash used in assets and liabilities, net, of $2.3 million. Non-cash items included stock-based compensation expense of $3.7 million, amortization of developed technology of $3.0 million, depreciation and amortization of $0.9 million, a provision for excess and obsolete inventory of $0.3 million, lease amortization of $0.2 million, and a variety of smaller items. The cash used in assets and liabilities, net was primarily due to a decrease of other liabilities of $10.0 million, an increase in prepaid expenses and other assets of $2.8 million, and an increase of inventories, net of $2.9 million. These uses of funds were partially offset by a decrease in accounts receivable, net, of $9.8 million, an increase in accounts payable of $3.4 million, and an increase in deferred revenue of $0.2 million.

Net cash used in operating activities for the three months ended March 31, 2020 was $4.3 million and consisted of net loss of $16.0 million, adjusted for non-cash items of $7.0 million, and cash provided by assets and liabilities, net, 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, depreciation and amortization of $1.1 million, lease amortization of $0.4 million, and a variety of smaller items. The cash provided by assets and liabilities, net was primarily due to a decrease in accounts receivable, net 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 inventory, net of $2.3 million and a decrease in other liabilities of $2.1 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 expand capacity under the NIH Contract, 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 used in investing activities in the three months ended March 31, 2021 was $4.9 million. Capital expenditures of $6.9 million were incurred primarily to expand our production in Singapore. We also received proceeds from the NIH Contract of $2.0 million.

Net cash provided by investing activities in the three months ended March 31, 2020 was $17.5 million, which was mainly due to proceeds of 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 Financing Activities

We used cash in financing activities of $1.0 million during the three months ended March 31, 2021, which was primarily due to the repurchase of $0.5 million of 2014 Notes and payments for income tax withholding related to net share settlement of equity awards of $0.5 million.

We used cash in financing activities of $0.5 million during the three months ended March 31, 2020, which was primarily due to payments of debt issuance costs of $0.4 million for the November 2019 issuance of the 2019 Notes.

Capital Resources

At March 31, 2021 and December 31, 2020, our working capital, excluding deferred revenues and restricted cash, was $57.0 million and $76.9 million, respectively, including cash and cash equivalents of $49.7 million and $68.5 million, respectively. We had no investments as of March 31, 2021 and December 31, 2020.

In February 2014, we closed an underwritten public offering of our 2014 Notes. 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 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 2014 Notes plus accrued and unpaid interest. On February 6, 2021, holders of $0.5 million of the 2014 Notes caused us to repurchase their notes in accordance with this provision leaving $0.6 million of 2014 Notes outstanding.

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 2019 Notes. 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 $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 and the 2019 Notes 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.

In March 2020, we entered into the Sale Agreement with Jefferies to sell shares of our common stock having aggregate sales proceeds of up to $50,000,000, from time to time, through the ATM equity offering program under which Jefferies acts as sales agent. During the third quarter of 2020, we sold 2.5 million shares of our common stock, pursuant to the Sale Agreement. Our net proceeds were approximately $20.1 million, after deducting related expenses, including commissions of approximately $0.6 million and issuance costs of approximately $0.2 million.

On August 2, 2018, we entered into our 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. The Revolving Credit Facility was amended and extended on April 21, 2020. 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. Amounts drawn under the Revolving Credit Facility will be used for working capital and general corporate purposes.

As of March 31, 2021, total availability under the Revolving Credit Facility was $13.2 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 Revolving Credit Agreement governing the Revolving Credit Facility. See Note 8 to our condensed consolidated financial statements for more information about the Revolving Credit Facility.

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 the COVID-19 pandemic. 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.

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 9 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, 2021 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, 2020.

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.

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, 2021, we had a foreign currency loss of $0.4 million compared to a foreign currency loss of $1.0 million 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 $49.7 million as of March 31, 2021. These amounts were held primarily in cash on deposit with banks and money market funds which are short-term. We held no investments in treasury securities at March 31, 2021. 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, 2021. 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, 2021, 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, 2021 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 September 2020, a putative class action complaint alleging violations of the federal securities laws was filed against the Company (also naming our Chief Executive Officer and Chief Financial Officer as defendants) in the U.S. District Court for the Northern District of California (Reena Saintjermain, et al. v. Fluidigm Corporation, et al). The Court appointed a lead plaintiff and lead counsel in December 2020, and an amended complaint was filed on February 19, 2021. The complaint, as amended, seeks unspecified damages on behalf of a purported class of persons and entities who acquired our common stock between February 7, 2019 and November 5, 2019 and alleges securities laws violations based on statements and alleged omissions made by the Company during such period. The Company filed a motion to dismiss the complaint on April 5, 2021. We believe the claims alleged in the complaint lack merit and we intend to defend this action vigorously.

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 quarterly report on 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.

Summary of Risk Factors

Risks Related to our Business, Industry, and Strategy

- The COVID-19 pandemic has significantly affected our business operations.
- Our financial results and revenue growth rates have varied significantly from quarter-to-quarter and year-to-year, and may not be consistent with market expectations.
- We have incurred losses since inception, and we may continue to incur substantial losses for the foreseeable future.
- The life science markets are highly competitive and subject to rapid technological change.
- 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.
- Market opportunities may not develop as quickly as we expect, limiting our ability to successfully sell our products.
- Our future success is dependent upon our ability to expand our customer base and introduce new applications.
- If our products fail to achieve and sustain sufficient market acceptance, our revenue will be adversely affected.
- We may not be able to develop new products or enhance the capabilities of our existing systems.
- Our business growth strategy involves the potential for significant acquisitions.
- Our efficiency and cost-savings initiatives could be disruptive to our operations.
- Implementation of a company-wide enterprise resource planning (ERP) system could adversely affect our business.

Risks Related to Operations and Reliance on Third Parties

- We may experience development or manufacturing problems or delays.
- Our business depends on research and development spending levels of our customers.
- 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.

- Disruption of our manufacturing facilities or other operations, or in the operations of our customers or business partners, could result in cancellation of orders, delays in deliveries or other business activities, or loss of customers.
- Any disruption or delay in the shipping or off-loading of our products may have an adverse effect on our financial condition and results of operations.
- We rely on single and sole source suppliers for some of the components and materials used in our products.
- Our business operations depend upon the continuing efforts of our management team and other key employees.
- Security breaches, loss of data, cyberattacks, and other IT failures could adversely affect our business.
- To use our analytical systems, customers typically need to purchase specialized reagents.
- Our distribution capabilities and direct sales, field support, and marketing forces must be sufficient to meet our customers' needs.

Risks Related to Quality and the Regulatory Environment

- Our products could have defects or errors.
- Although the FDA granted Emergency Use Authorization (EUA) for our Advanta Dx SARS-CoV-2 RT-PCR Assay in August 2020 and for the AZOVA COVID-19 Test Collection Kit in February 2021, these authorizations are only valid during the COVID-19 public health emergency.
- Our contract with the National Institutes of Health (NIH) could expose us to risks and costs.
- To the extent we elect to label and promote any of our non-EUA products as medical devices, we would be required to obtain prior approval or clearance by the FDA or comparable foreign regulatory authority.
- Our products could become subject to regulation as medical devices by the FDA or other regulatory agencies.
- Compliance or the failure to comply with current and future regulations affecting our products and business operations worldwide could cause us significant expense and adversely impact our business.

Risks Related to Economic Conditions and Operating a Global Business

- We generate a substantial portion of our revenue internationally.
- Adverse conditions in the global economy may significantly harm our revenue, profitability, and results of operations.
- We are subject to fluctuations in the exchange rate of the U.S. dollar and foreign currencies.

Financial, Tax, and Accounting Risks

- Our future capital needs are uncertain and we may need to raise additional funds in the future.
- Any failure to maintain effective internal control over financial reporting could adversely affect our business.
- We may not realize the value of our goodwill or other intangible assets.
- 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.
- We are subject to risks related to taxation in multiple jurisdictions.
- Changes in accounting principles, or interpretations thereof, could impact our financial position and results of operations.
- We have a significant amount of outstanding indebtedness.

Risks Related to Intellectual Property

- Our ability to protect our intellectual property and proprietary technology is uncertain.
- We may be involved in lawsuits to protect or enforce our patents and proprietary rights.
- We may be subject to damages resulting from claims that we or our employees have wrongfully used or disclosed alleged trade secrets.
- We depend on certain technologies that are licensed to us.
- 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 obligations and restrictions relating to technologies developed in cooperation with Canadian government agencies.

Risks Related to Our Common Stock

- Our stock price is volatile.
- Future sales of our common stock in the public market could cause our stock price to fall.
- We will have broad discretion over the use of the proceeds to us from our ATM equity offering program.
- If securities or industry analysts publish unfavorable research about us or cease to cover our business, our stock price and/or trading volume could decline.
- Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us more difficult.
- The forum selection provision in our bylaws could limit the ability of our stockholders to bring a claim in a judicial forum viewed by the stockholders as more favorable for disputes with us or our directors, officers or other employees.
- Any conversions of our 2014 Notes or 2019 Notes will dilute the ownership interest of our existing stockholders.

RISKS RELATED TO OUR BUSINESS, INDUSTRY, AND STRATEGY

The global COVID-19 pandemic has significantly affected our business operations and could adversely impact our financial position and cash flows to an extent that is unknown and difficult to predict.

The pandemic and international public health emergency caused by SARS-CoV-2, the novel strain of coronavirus that causes the disease commonly known as COVID-19, has spread throughout all the countries in which we and our customers, suppliers, and other business partners operate, causing significant disruption and volatility in global financial markets and raising 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 have resulted in inefficiencies and 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 some of our products and services due to the impact of COVID-19 on our customers, including 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 hire and effectively train new personnel due to travel restrictions and 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;
- shortages or delays in the supply of components and materials used in our products; and
- increased volatility in our stock price due to financial market instability.

In addition to its negative impact on some aspects of our business, the COVID-19 pandemic has been a source of opportunity for our diagnostics business, opening up external funding sources to support innovation and product development and resulting in increased revenues due to sales of our Advanta Dx SARS-CoV-2 RT-PCR test and related sales of our microfluidics instruments. However, as vaccines for the coronavirus have become available and the perceived threat of the pandemic recedes, the demand for our COVID-19 testing products has slowed, resulting in a corresponding decline in COVID-19 revenue. As a result of these trends, we have lowered our revenue expectations for 2021. If our revenues decline more than expected, we may be required implement cost control initiatives as the year progresses, and may be required to raise additional financing to support our investment priorities. Additional details concerning these risks are provided in the risk

factors below, including under "*Our efficiency and cost-savings initiatives could be disruptive to our operations and adversely affect our results of operations and financial condition*," and "*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.*"

The extent to which the COVID-19 pandemic will continue to impact our business and financial results will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the continued spread of the disease, the duration of the public health emergency, and actions taken in the United States and elsewhere to contain the virus and prevent new outbreaks, 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 pandemic continues to 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 from market expectations, 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. Our revenue increased year-over-year in 2019 compared to 2018, and again in 2020 compared to 2019, but we may not be able to achieve similar revenue growth in future periods. Variability in our quarterly or annual results of operations, mix of product revenue, including any decline in our revenue related to the COVID-19 pandemic, 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 $53.0 million, $64.8 million and $59.0 million during the years 2020, 2019, and 2018, respectively. As of March 31, 2021, we had an accumulated deficit of $695.6 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 (NGS), 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 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., NanoString, and 10x Genomics, Inc. 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.

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.

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.

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.

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 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 NGS 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 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;
- the possibility that we may not realize the value of acquired assets recorded as goodwill or intangible assets, and would be required to incur material charges relating to the impairment of those assets; 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.

Our efficiency and cost-savings initiatives could be disruptive to our operations and adversely affect our results of operations and financial condition.

From time to time, we have implemented efficiency and cost-savings initiatives intended to stabilize our business operations. These efficiency initiatives have included targeted workforce reductions, optimizing our facilities, and reducing excess space. In 2020, in response to the uncertainty arising from the COVID-19 pandemic, we initiated a range of additional actions aimed at temporarily reducing our operating expenses and preserving liquidity. These actions included implementing temporary enterprise-wide salary reductions of 20% for employees at or above the 'director' level and 10% for all others, temporarily reducing our board members' cash retainers by 20%, and constraining hiring. Although we have discontinued our hiring constraints and pandemic-related pay reductions, actions such as these may be required in the future 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 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.

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.

RISKS RELATED TO OPERATIONS AND RELIANCE ON THIRD PARTIES

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 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.

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 have been impacted by the COVID-19 pandemic and may additionally be impacted by other factors—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 because of the COVID-19 pandemic have resulted in lower than expected sales of our mass cytometry instruments. 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 microfluidics 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.

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 (including the ongoing COVID-19 pandemic), 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 rely on a limited number of third-party suppliers for some of the components and materials used in our products, and the loss of any of these suppliers, or delays or problems in the supply of components and materials could harm our business.

We rely on a limited number of third-party suppliers for certain components and materials used in our products, including single and sole source suppliers. 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 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. For example, as part of our cost reduction program to manage the impact of the COVID-19 pandemic, we implemented temporary enterprise-wide salary reductions and delayed implementation of 2020 merit-based salary increases. Although all salaries have been restored as of the date of this filing, any reinstatement of salary reductions or any other failure to maintain competitive levels of compensation may negatively impact our ability to retain the personnel necessary to achieve our goals. 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.

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 early 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 were 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. We believe our mitigation measures have reduced, but cannot eliminate, the risk of a similar attack, and 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.

Due to the COVID-19 pandemic, we have an increased number of employees working remotely. As a result, we may have increased cyber security and data security risks, due to increased use of home wi-fi networks and virtual private networks, as well as increased disbursement of physical machines. While we have implemented security controls to reduce the risk of

cyberattacks and security breaches, there is no guarantee that these measures will be adequate to safeguard all systems with the increased number of employees working remotely.

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 are unable to expand our direct sales, field support, and marketing forces 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 increase the scope of our marketing efforts and develop and substantially expand our direct sales force and field application specialist and service engineer teams. 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 addition, as part of our cost reduction program to manage the impact of the COVID-19 pandemic, we implemented temporary enterprise-wide salary reductions, including with respect to our sales and marketing employees. Although all salaries have been restored to prior levels as of the date of this filing, any reinstatement of salary reductions or any other failure to maintain competitive levels of compensation may negatively impact our ability to maintain the skilled sales and marketing force necessary to support our business activities. 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.

RISKS RELATED TO QUALITY AND THE REGULATORY ENVIRONMENT

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 NGS 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.

Although the FDA granted Emergency Use Authorization (EUA) for our Advanta Dx SARS-CoV-2 RT-PCR Assay in August 2020 and for the AZOVA COVID-19 Test Collection Kit in February 2021, these authorizations are only valid during the COVID-19 public health emergency, and when the federally declared public health emergency ends, we will be required to stop commercial distribution of our assay and the collection kit immediately in the United States unless we comply with FDA requirements, which may include obtaining FDA clearance or approval for our assay under a traditional regulatory pathway for in vitro diagnostics, which is lengthy and expensive.

Under section 564 of the Federal Food, Drug, and Cosmetic Act (FD&C Act), the FDA has authority to allow certain unapproved medical products or unapproved uses of approved medical products to be used during a public health emergency under an EUA. In issuing an EUA, the FDA will consider the totality of scientific evidence available to the FDA regarding safety, efficacy and known and potential risks of such products and availability of alternatives to the emergency use products, among others. EUAs issued by the FDA will specify the scope of authorization and conditions of authorization, including limitations on distribution and conditions related to product advertising and promotion. Once granted, an EUA is effective until the declaration that circumstances exist justifying the authorization of the emergency use is terminated under Section 564(b)(2) of the FD&C Act or the EUA is revoked under Section 564(g) of the FD&C Act, after which the product must be cleared or

approved by the FDA under a traditional pathway as defined by the FDA and we must comply with the FDA quality system regulations in order to remain on the market or to continue commercialization of the product.

In August 2020, the FDA granted EUA for our Advanta Dx SARS-CoV-2 RT-PCR Assay for qualitative detection of nucleic acid from SARS-CoV-2 in saliva specimens from individuals suspected by their healthcare providers of having COVID-19, with the use of the assay limited to CLIA high complexity laboratories. Four supplements have been submitted and authorized as follows: S001 for addition of the FDA Reference Panel Results, S002 for software updates and labeling changes, S003 for addition of alternative source of targets and labeling updates, and S004 for addition of AZOVA home collection kit. In February 2021, the FDA granted EUA for the AZOVA COVID-19 Test Collection Kit, which is authorized for self-collection of saliva specimens at home, for use with the Advanta Dx SARS-CoV-2 RT-PCR Assay. As set forth in each EUA, we are required to comply with the conditions of authorization, including certain requirements pertaining to FDA notification, distribution, printed materials, advertising and promotion. If we, our distributors, or authorized laboratories do not comply with the EUA requirements, our business, financial condition and results of operations may be adversely impacted, and we may be subject to regulatory or enforcement actions, including the issuance of an untitled letter, a warning letter, penalties, or fines, among other adverse actions.

If the FDA's policies and guidance change unexpectedly and/or materially or if we misinterpret them, potential sales of Advanta Dx SARS-CoV-2 RT-PCR and the AZOVA COVID-19 Test Collection Kit could be adversely impacted. In addition, the FDA will revoke an EUA where it is determined that the underlying public health emergency no longer exists or warrants such authorization, or if new evidence becomes available that indicates the test does not meet the conditions of authorization or perform as provided in the EUA application. We cannot predict how long this EUA will remain effective. The termination or revocation of the EUA and changing policies and regulatory requirements could adversely impact our business, financial condition and results of operations. The demand for our product and our profitability may decline or be adversely impacted by the federal government's implementation of a national COVID-19 testing strategy. Given the uncertain nature of the COVID-19 pandemic and future legislation and regulation in this space, we can provide no assurance with respect to our ability to achieve or sustain profitability on a quarterly or annual basis.

Our contract with the National Institutes of Health (NIH) could expose us to unique risks and costs as an entity contracting with the federal government.

The NIH launched the Rapid Acceleration of Diagnostics (RADx) program to expedite development, commercialization, and implementation of technologies for COVID-19 testing to help increase testing in the United States. In July 2020, we entered into a letter contract with the NIH for a project under the RADx program. The letter contract provided access to approximately $12.2 million of the total proposed funding for the project prior to execution of a further definitive contract for the project. In September 2020, we executed a definitive contract with the NIH as an amendment to the letter contract (collectively, the NIH Contract) to expand production capacity and throughput capabilities for COVID-19 testing with our microfluidics technology. Pursuant to the terms of the NIH Contract, the funding for the project was increased by approximately $22.0 million, for a total contract value of up to approximately $34.0 million. Release of funding under the NIH Contract is based on the achievement of milestones, including expansion of our manufacturing facilities, addition of production lines, and achieving full production capacity.

There is significant competition among RADx projects, which are evaluated by experts on a rolling basis. Projects with the most potential for success are advanced to the next stage. There is no certainty that we can meet all the milestones in our NIH Contract on a timely basis, if at all. If we do not meet all the milestones, we will not be able to access all $34.0 million in funding under the NIH Contract. We cannot guarantee that we will be able to access all the available funding under the NIH Contract in a timely manner, or at all. We must prioritize among many different opportunities, and we may expend our limited resources on programs that do not yield a successful or profitable product candidate and may forego other more profitable opportunities. Further, the Bayh-Dole Act applies to all NIH research and development funding granted to for-profit organizations, which requires the government to be provided a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world.

Factors that could materially adversely affect our funding under the NIH Contract include:

- budgetary constraints affecting U.S. government spending generally, or NIH in particular;
- changes in U.S. government or NIH fiscal policies or available funding, including due to changes in Congressional appropriations;
- changes in U.S. government or NIH programs, requirements or priorities;
- adoption of new laws or regulations;
- technological developments;

- U.S. government shutdowns, threatened shutdowns or budget delays;
- competition and consolidation in our industry; and
- general economic conditions.

These or other factors could cause NIH to reduce its funding or future activities under the NIH Contract, or to exercise its right to terminate the NIH Contract for convenience, either of which could have a material adverse effect on the revenue generated by the NIH Contract.

The NIH Contract includes certain provisions from the Federal Acquisition Regulations, some of which are customary or legally required, that give the U.S. government substantial rights and remedies, many of which are not typically found in commercial contracts. For example, the NIH Contract contains provisions permitting unilateral termination or modification, in whole or in part, at the convenience of the U.S. government. Under general principles of government contracting law, if the U.S. government terminates a contract for convenience, the government contractor may recover only its incurred or committed costs, settlement expenses and profit on work completed prior to the termination. If the U.S. government terminates a contract for default, the government contractor is entitled to recover costs incurred and associated profits on accepted items only and may be liable for excess costs incurred by the government in procuring undelivered items from another source. In addition, government contracts normally contain additional requirements that may increase our costs of doing business, reduce our profits, and expose us to liability for failure to comply with these terms and conditions. These requirements include, for example, mandatory internal control systems and policies, mandatory socioeconomic compliance requirements, including labor standards, non-discrimination and affirmative action programs and environmental compliance requirements and public disclosures of certain contract information, which may enable competitors to gain insights into our research program. If we fail to maintain compliance with these requirements, we may be subject to potential contract or False Claims Act liability and to termination of our NIH Contract.

Other examples of rights and remedies under the NIH Contract include provisions that allow NIH to:

- terminate the NIH Contract, in whole or in part, for any reason or no reason;
- unilaterally reduce or modify the U.S. government's obligations under the NIH Contract, without our consent, including by imposing price adjustments;
- claim rights, including intellectual property rights, in or to (i) products, (ii) data, and (iii) facilities, in each case developed under the NIH Contract;
- under certain circumstances involving public health and safety, license inventions made under such agreements to third parties;
- suspend us from receiving new contracts pending resolution of alleged violations of procurement laws or regulations;
- impose U.S. manufacturing requirements for products that embody inventions conceived or first reduced to practice under the NIH Contract;
- suspend or debar us from doing future business with the government;
- change the course of a development program in a manner that differs from the NIH Contract's original terms or from our desired development plan, including decisions regarding our partners in the program;
- pursue civil or criminal remedies under the False Claims Act and False Statements Act; and
- control or prohibit the export of products.

Furthermore, we may be required to enter into agreements and subcontracts with third parties, including suppliers, consultants and other third-party contractors in order to satisfy our contractual obligations pursuant to our agreements with the U.S. government. Negotiating and entering into such arrangements can be time-consuming and we may not be able to reach agreement with such third parties. Any such agreement must also be compliant with the terms of the NIH Contract. Any delay or inability to enter into such arrangements or entering into such arrangements in a manner that is non-compliant with the terms of our contract, may result in violations of our contract.

U.S. government agencies routinely audit and investigate government contractors and recipients of federal grants and contracts. These agencies review a contractor's performance under its contracts, cost structure and compliance with applicable laws, regulations and standards. The audit may also include review of the adequacy of, and a contractor's compliance with, its internal control systems and policies, including the contractor's accounting, purchasing, property, estimating, compensation and management information systems. If an audit uncovers improper or illegal activities, we may be subject to civil and criminal penalties and administrative sanctions. In addition, we could suffer serious reputational harm if allegations of impropriety were made against us, which could cause our stock price to decrease.

To the extent we elect to label and promote any of our non-EUA products as medical devices, we would be required to obtain prior approval or clearance by the FDA or comparable foreign regulatory authority, which could take significant time and expense and could fail to result in a marketing authorization for the intended uses we believe are commercially attractive. Obtaining marketing authorization in one jurisdiction does not mean that we will be successful in obtaining marketing authorization in other jurisdictions where we conduct business.

Except for the Advanta Dx SARS-CoV-2 RT-PCR Assay and the AZOVA COVID-19 Test Collection Kit authorized by the FDA under an EUA granted in August 2020 and February 2021, respectively, our other 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 "research use only" (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 are currently registered with the FDA as a medical device manufacturer, with the reagents for the Advanta Dx SARS-CoV-2 RT-PCR Assay listed as our sole medical device product. As noted in the issued EUA for the Advanta Dx SARS-CoV-2 RT-PCR Assay and the AZOVA COVID-19 Test Collection Kit, the FDA has waived certain quality system requirements under 21 CFR Part 820 for the duration of the EUA. We may in the future list some of our other products with the FDA pursuant to an FDA Class I listing for general purpose laboratory equipment if we pursue clinical applications for such equipment. While this regulatory classification is generally 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. If we do not comply with all the requirements of the EUA or the normal regulatory requirements for any of our medical device products, including additional regulatory requirements that would apply to the Advanta Dx SARS-CoV-2 RT-PCR Assay and the AZOVA COVID-19 Test Collection Kit after the expiration or termination of the EUA, we may be subject to regulatory or enforcement actions, including the issuance of an untitled letter, a warning letter, penalties, or fines, among other adverse actions, any of which may adversely impact our business, financial condition and results of operations. Compliance with additional or changing regulatory requirements can be time-consuming and costly.

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 material modifications or improvements to such products. We could also be subject to additional FDA post-marketing obligations for such products, any or all of which would increase our costs and divert resources away from other projects. If we sought and received regulatory clearance or approval and are not able to maintain regulatory compliance with applicable laws, we could be prohibited from marketing our products for use as, or in the performance of, clinical diagnostics and/or could be subject to enforcement actions, including warning letters and adverse publicity, fines, injunctions, and civil penalties; recall or seizure of products; operating restrictions; and criminal prosecution.

In addition, to the extent we decide to seek regulatory marketing authorization for certain of our products in countries outside of the United States, we or our partners, or collaborators, will need to obtain regulatory marketing authorization for our products for the intended use in the jurisdiction where such products will be marketed. Regulatory clearance or approval in one jurisdiction does not mean that we will be successful in obtaining regulatory marketing authorization in other jurisdictions where we conduct business. 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 need to comply with the In Vitro Diagnostic Directive

98/79/EC and transition to the In Vitro Diagnostic Regulation 2017/746, which became effective May 26, 2017, with an application date of May 26, 2022. 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.

In February 2021, we announced a supply and distribution agreement to market our CyTOF technology, panels, and reagents to clinical labs in China. As part of the agreement, we are working to seek National Medical Products Administration (NMPA) approval for our CyTOF instrument for diagnostic use in China. As we increase our operations outside of the United States, our compliance and operational costs will increase, and we will be exposed to greater liability under additional laws and regulations.

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.

In August 2020, as part of the U.S. government's efforts to combat COVID-19 and consistent with the direction in Executive Orders 13771 and 13924, the Department of Health and Human Services (HHS) announced rescission of guidances and other informal issuances of the FDA regarding premarket review of LDTs absent notice-and-comment rulemaking, stating that, absent notice-and-comment rulemaking, those seeking approval or clearance of, or an emergency use authorization, for an LDT may nonetheless voluntarily submit a premarket approval application, premarket notification or an EUA request, respectively, but are not required to do so. However, laboratories opting to use LDTs without FDA premarket review or authorization would not be eligible for liability protection under the Public Readiness and Emergency Preparedness Act, or the PREP Act. Following this HHS announcement, the FDA announced in October 2020 that it will no longer review EUA requests for COVID-19 LDTs at this time and will continue to prioritize review of EUA requests for point-of-care tests, home collection tests, at-home tests, tests that reduce reliance on test supplies, and high-throughput tests that are widely distributed. While these actions by HHS and the FDA are expected to reduce the regulatory burden on clinical laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 that develop LDTs, it is unclear how this action as well as legislation and

executive orders by the Biden administration and state governments and FDA regulation will impact the industry, including our business and that of our customers. In an FDA FAQ updated on January 13, 2021, FDA indicated that it is reviewing EUA requests from laboratories that offer COVID-19 diagnostic tests and appears to take a different position from the HHS rescission policy. HHS's policy and the FDA's position with respect to LDTs in the short term and in general in the long-term may change, especially as the leadership at FDA changes under the Biden administration. Congress recently introduced an updated legislation called the Verifying Accurate, Leading-edge IVCT Development Act (VALID Act), which, if enacted, will establish a new risk-based regulatory framework for in vitro clinical tests (IVCTs), which include IVDs, LDTs, collection devices, and instruments used with such tests, and a technology certification program, among other proposals. The adoption of new restrictions on IVDs, LDTs, or RUOs, whether by the FDA or Congress, could adversely affect demand for our specialized reagents and instruments. Further, we could be required to obtain premarket clearance or approval from the FDA before we can sell our products to certain customers.

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

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.

RISKS RELATED TO ECONOMIC CONDITIONS AND OPERATING A GLOBAL BUSINESS

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 2020, 2019, and 2018, approximately 54%, 63%, and 57% 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 and REACH regulation, which regulate the use and importation 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 Assets 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 (including the ongoing COVID-19 pandemic), 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.

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 worldwide economic disruption related to the COVID-19 pandemic, have negatively affected our revenues and operating results and may continue to do so. Even before the current public health crisis took hold, the global credit and financial markets had been experiencing 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. Geopolitical events including the COVID-19 pandemic, 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.

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.

FINANCIAL, TAX, AND ACCOUNTING RISKS

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 believe that our existing cash and cash equivalents and availability under our $15.0 million revolving senior credit facility (Revolving Credit Facility) will be sufficient to meet our anticipated cash requirements for at least the next 18 months. However, 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 (including the COVID-19 pandemic);
- 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 significant disruption and volatility in the global capital markets, increasing the cost of—and adversely impacting access to—capital. We entered into an Open Market Sale Agreement (Sale Agreement) with Jefferies LLC (Jefferies) to sell shares of our common stock having aggregate sales proceeds of up to $50 million, from time to time, through an at-the-market (ATM) equity offering program under which Jefferies acts as sales agent. During the third quarter of 2020, we sold approximately 2.5 million shares of our common stock pursuant to the Sale Agreement, for aggregate gross proceeds of $20.9 million. Our net proceeds were approximately $20.1 million, after deducting related expenses, including commissions of approximately $0.6 million and issuance costs of approximately $0.2 million. If we raise additional funds by issuing equity securities, either under the ATM program or otherwise, our stockholders will 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 the impact of the COVID-19 pandemic on the economy.

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 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 Stock Market LLC, the SEC, or other regulatory authorities, which would require additional financial and management resources.

We may not realize the value of our goodwill or other intangible assets, which would be reflected in an impairment charge.

Our business acquisitions typically result in goodwill and other intangible assets, which affect the amount of future period amortization expense and possible impairment expense. We make estimates and assumptions in valuing such intangible assets that affect our condensed consolidated financial statements. As of March 31, 2021, we had approximately $145.2 million of goodwill and net intangible assets, including approximately $106.5 million of goodwill and $38.8 million of net intangible assets. These assets represent a significant portion of the assets recorded on our condensed consolidated balance sheet and relate primarily to our acquisition of DVS Sciences, Inc. (DVS) in February 2014 and InstruNor in 2020. 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.

We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses. If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

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 April 2020, we amended our Revolving Credit Facility, which provides for secured revolving loans in an aggregate amount of up to $15.0 million, to extend the maturity date to August 2, 2022. 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 Loan and Security Agreement dated as of August 2, 2018, between the Company and Silicon Valley Bank (SVB) (as amended by the Default Waiver and First Amendment to Loan and Security

Agreement dated September 7, 2018, the Second Amendment to Loan and Security Agreement dated November 20, 2019, and the Third Amendment to Loan and Security Agreement dated April 21, 2020, the Revolving Credit Agreement) and, if they are not repaid, could foreclose upon the assets securing our obligations under the Revolving Credit Facility.

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.

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.

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 accounting principles generally accepted in the United States of America (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.

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, 2021, we had outstanding $0.6 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. Pursuant to the terms of the indenture governing the 2014 Notes (2014 Notes Indenture), holders of the 2014 Notes may require us to repurchase all or a portion of the 2014 Notes at a repurchase price in cash equal to 100% of the principal amount of such 2014 Notes plus accrued and unpaid interest thereon, on each of February 6, 2024 and February 6, 2029. 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 2014 Notes Indenture or the indenture governing the 2019 Notes, as applicable (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 all or any portion of the Convertible 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 which 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 which 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 which 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 which our employees may have been previously affiliated. Litigation may be necessary to defend against these claims. A resulting 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 such claims, 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. (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 is volatile.

Our stock is currently traded on the Nasdaq Global Select Market (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, 2020, we had 74,543,141 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 33.6% of such shares. 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 38.3% held by our top six stockholders) means that a relatively small number of stockholders have significant control over the outcomes of stockholder voting.

The trading price of our common stock is highly volatile and 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;
- our failure to achieve performance consistent with our financial guidance and/or market expectations;
- 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 contract research organization 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. As discussed in the Legal Proceedings section of this quarterly report on Form 10-Q, a class action securities lawsuit against us is currently pending. While we are continuing to defend such action vigorously, the defense of this action and any additional actions can be costly, divert the time and attention of our management, and harm our operating results, and any judgment against us or any future stockholder litigation could result in substantial costs.

Future sales of our common stock in the public market could cause our stock price to fall.

Our stock price could decline as a result of sales of a large number of shares of our common stock or the perception that these sales could occur. These sales, or the possibility that these sales may occur, also might make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

In addition, in the future, we may issue additional shares of common stock or other equity or debt securities convertible into common stock in connection with a financing, acquisition, litigation settlement, employee arrangements or otherwise. Any such future issuance, including any issuances pursuant to our ATM equity offering program under our Sale Agreement with Jefferies, could result in substantial dilution to our existing stockholders and could cause our stock price to decline.

We will have broad discretion over the use of the proceeds to us from our ATM equity offering program and may apply the proceeds to uses that do not improve our operating results or the value of your securities.

We will have broad discretion to use the net proceeds to us from our ATM equity offering program, and investors will be relying solely on the judgment of our board of directors and management regarding the application of these proceeds. Investors will not have the opportunity, as part of their investment decision, to assess whether the proceeds are being used appropriately. Our use of the proceeds may not improve our operating results or increase the value of the securities offered pursuant to the ATM equity offering program.

If securities or industry analysts publish unfavorable research about us 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 (DGCL), which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

The forum selection provision in our bylaws could limit the ability of our stockholders to bring a claim in a judicial forum viewed by the stockholders as more favorable for disputes with us or our directors, officers or other employees.

Our bylaws provide that the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, another State court in Delaware or the federal district court for the District of Delaware) is the exclusive forum for the following (except for any claim as to which such court determines that there is an indispensable party not subject to the jurisdiction of such court (and the indispensable party does not consent to the personal jurisdiction of such court within 10 days following such determination), which is vested in the exclusive jurisdiction of a court or forum other than such court or for which such court does not have subject matter jurisdiction):

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

This provision does not apply to suits brought to enforce a duty or liability created by the Exchange Act or any other claim for which the U.S. federal courts have exclusive jurisdiction.

Our bylaws further provide that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act.

These exclusive-forum provisions may limit a stockholder’s ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage lawsuits against us and our directors, officers and other employees. Any person or entity purchasing or otherwise acquiring any interest in any of our securities shall be deemed to have notice of and consented to these provisions. There is uncertainty as to whether a court would enforce such provisions, and the enforceability of similar choice of forum provisions in other companies’ charter documents has been challenged in legal proceedings.

It is possible that a court could find these types of provisions to be inapplicable or unenforceable, and if a court were to find either exclusive-forum provision in our bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving the dispute in other jurisdictions, which could seriously harm our business.

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

None.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

None.

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
10.1*	Contract by and between the National Institutes of Health and the registrant effective as of July 30, 2020, as amended September 28, 2020 and February 18, 2021.	Filed herewith		
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-Q 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.

* Portions of this exhibit have been redacted in compliance with Regulation S-K Item 601(b)(10)(iv).

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 7, 2021

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

Dated: May 7, 2021

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

Certain identified information marked with [***] has been excluded from this exhibit because it is not material and is of the type that the registrant treats as private and confidential.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1. CONTRACT ID CODE	PAGE OF PAGES
		1 / 4

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
P00002	See Block 16C	5942874	

6. ISSUED BY CODE	NHLBI	7. ADMINISTERED BY *(If other than item 6)* CODE	NIBIB
National Institutes of Health National Heart, Lung, and Blood Institute Bethesda, MD 20892-7511		National Institutes of Health National Institute of Biomedical Imaging and Bioengineering Bethesda, MD 20892-7511	

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*		
FLUIDIGM CORPORATION:1157584 2 TOWER PLACE SUITE 2000 SOUTH SAN FRANCISCO CA 940801826	(x)	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED *(SEE ITEM 11)*
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. 75N92020C00009
		10B. DATED *(SEE ITEM 13)* 07/30/2020
CODE FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended. ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended , by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted ; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted , such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	OTHER *(Specify type of modification and authority)* FAR 52.243-1 - Changes-Fixed Price (August 1987)

E. IMPORTANT: Contractor ☐ is not. ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

The purpose of this Modification is to amend "Article B.2 Prices" by canceling and de-obligating funds from Lines #4, 5, 7 and 8 and to add new Lines #9 through #18 and to amend "Article G.2" to update the Contracting Officer's Representative (COR); and to attach the revised Performance Work Statement and deliverable schedule.

All other terms and conditions of this contract remain the same.

Delivery Location Code: TDP, BTHOFF
Two Democracy Plaza, Bethesda Off C
2 Democracy Plaza
6707 Democracy Blvd
Bethesda MD 20817 US
Continued …

Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
Andrew Quong, CSO		ROXANE S. BURKETT	
15B. CONTRACTOR/OFFEROR Digitally signed by Andrew Quong Date: 2021.02.18 22:16:38 -08'00' /s/ Andrew Quong *(Signature of person authorized to sign)*	15C. DATE SIGNED 2/18/21	1 16B. UNITED STATES OF AMERICA Digitally signed by Roxane S. Burkett -S Date: 2021.02.19 07:46:34 -05'00' /s/ Roxane S. Burkett -S *(Signature of Contracting Office!)*	16C. DATE SIGNED

NSN 7540-01-152-8070 STANDARD FORM 30 (REV. 10-83)
Previous edition unusable Prescribed by GSA

FAR (48 CFR) 53.243

NAME OF OFFEROR OR CONTRACTOR
FLUIDIGM CORPORATION:1157584

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Payment: Approved By, NHLBI Branch A Invoice Paid By: NIH Commercial Accounts Br 2115 East Jefferson St, MSC 8500 Room 4B-432 Bethesda, MD 20892-8500 Period of Performance: [***] Cancel Item 4 in its entirety. Cancel Item 5 in its entirety. Cancel Item 7 in its entirety. Cancel Item 8 in its entirety. Add Item 9 as follows:				
9	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 10 as follows:				[***]
10	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 11 as follows:				[***]
11	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Continued...				[***]

NAME OF OFFEROR OR CONTRACTOR
FLUIDIGM CORPORATION:1157584

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 12 as follows:				
12	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 13 as follows:				[***]
13	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 14 as follows:				[***]
14	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 15 as follows:				[***]
15	[***] Continued...				[***]

NAME OF OFFEROR OR CONTRACTOR
FLUIDIGM CORPORATION:1157584

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 16 as follows::				
16	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 17 as follows:				[***]
17	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***] Add Item 18 as follows:				[***]
18	[***] Obligated Amount: [***] Delivery To: Bldg.31/RM 1C31 Product/Service Code: Q301 Product/Service Description: MEDICAL- LABORATORY TESTING Delivery: [***]				[***]

BEGINNING WITH THE EFFECTIVE DATE OF THIS MODIFICATION, THE GOVERNMENT AND THE CONTRACTOR MUTUALLY AGREE AS FOLLOWS:

ARTICLE B.2. PRICES shall be amended by canceling and de-obligating lines 4, 5, 7 and 8 and to add the flowing lines, 9 through 18, below and shall read as follows:

ARTICLE B.2. PRICES

a. The total Firm Fixed Price (FFP) amount for this contract is $34,016,056.

Prism Line Item	Milestone	**Invoice Line Item** - description	Date	Amount
9	4	**Equipment Procurement, Construction, Initiation of Installation - [***]**	[***]	[***]
10	5	**Equipment Installation - [***]**	[***]	[***]
11	6	**Performance Qualification - [***]**	[***]	[***]
12	A2	Design Lock - [***]	[***]	[***]
13	A3	Clinical Studies - [***]	[***]	[***]
14	A4	**Submit EUA to FDA - [***]**	[***]	[***]
15	A5	Clinical Samples - [***]	[***]	[***]
16	7a	Full Production Capacity on Line 2 - [***]	[***]	[***]
17	7b	Full Production Capacity on Line 3 - [***]	[***]	[***]
18	8	**Final Report - [***]**	[***]	[***]
			Total	**$34,016,056**

ARTICLE C.1. STATEMENT OF OBJECTIVES shall be amended and read as follows:
Independently and not as an agent of the Government, the Contractor shall furnish all the necessary services, qualified personnel, material, equipment, and facilities, not otherwise provided by the Government as needed to perform the Statement of Objectives, dated July 27, 2020 and the Performance Work Statement (PWS) dated January 19, 2021, set forth in SECTION J – List of Attachments, attached hereto and made a part of this Contract. Work to be performed shall be consistent with the application and preliminary work file submitted by the Contractor and subsequent documentation submitted during the application review process and the discussions between the parties that have taken place between date of application submission through contract award.

ARTICLE C.2. REPORTING REQUIREMENTS shall be amended and read as follows:
All reports required herein shall be submitted in electronic format only. All electronic reports submitted shall be compliant with Section 508 of the Rehabilitation Act of 1973. Additional information about testing documents for Section 508 compliance, including guidance and specific checklists, by application, can be found at: http://www.hhs.gov/web/508/index.html under "Making Files Accessible."

The following reporting requirements shall be submitted electronically to the Contracting Officer and Contracting Officer's Representative in accordance with the due dates specified below:

Item No.	Reporting Requirements	Due Date
1	Bi-weekly Production Status Report – to include the following: • current plant production capacity and output on a per-week basis, • a breakdown of capacity and output on a per-line/per week basis, • a description of any issues/problems encountered with plans for solution/mitigation (e.g., delays in meeting deliverables, supply chain issues, design/validation issues, etc.) • sales reporting to include the name and kind of organization, as well as the number of IFCs sold to that organization during the reporting period. Sales reports may be submitted in every other bi-weekly report (i.e. monthly).	[***]
2	Final Report - Summary of salient results of the entire contract period, including number of lines built, production capacity over time, production output over time, and a summary of the sales reports. It shall include evidence of sustained production at capacity levels or higher assuming demand has not decreased.	[***]

ARTICLE F.1. PERIOD OF PERFORMANCE shall be amended and read as follows:
The period of performance of the contract is **[***].**

ARTICLE F.2. DELIVERIES shall be amended and read as follows:
Satisfactory performance shall be deemed to occur upon performance of the work described in the Statement of Objectives Article in SECTION C of this Contract and upon notice and acceptance by the Contracting Officer, or the duly authorized representative, in accordance with the stated deliverables schedule as listed in the Performance Work Statement (PWS) dated January 19, 2021 (See Attachment 2).

The deliverables or documentation shall be submitted to the Contracting Officer and designated Contracting Officer Representative (COR) by email.

ARTICLE G.2. CONTRACTING OFFICER'S REPRESENTATIVE (COR) shall be amended and read as follows:

The following Contracting Officer's Representative (COR) is anticipated to represent the Government for the purpose of this contract:

Matthew Sanders
301.480.1863
matthew.sanders@nih.gov

The COR is responsible for:
(1) monitoring the Contractor's technical progress, including the surveillance and assessment of performance and recommending to the Contracting Officer changes in requirements.
(2) interpreting the Statement of Objectives and any other technical performance requirements.
(3) performing technical evaluation as required.
(4) performing technical inspections and acceptances required by this Contract; and
(5) assisting in the resolution of technical problems encountered during performance.

The Government may unilaterally change the COR designation.

SECTION J - LIST OF ATTACHMENTS shall be amended and read as follows:

1. Statement of Objectives
2. Performance Work Statement dated January 19, 2021
   Appendix 1: Cost-Price Quote
   Appendix 2: Quality Assurance Surveillance Plan (QASP)

All other terms and conditions of the contract remain the same.

RADx #6114
Fluidigm Corporation
Letter Contract number: 75N92020C00009

Performance Work Statement

PWS Title: Rapid Acceleration of Diagnostics (RADx) Program: Tech Project # 6114 Fluidigm – Advanta Dx SARS-CoV-2 RT-PCR Assay for Saliva

1.0 Background

Fluidigm has developed a diagnostic molecular test for the qualitative detection of SARS-CoV-2 in saliva specimens under FDA Emergency Use Authorization (EUA). The Advanta™ Dx SARS-CoV-2 RT-PCR Assay is a qPCR-based test that, by taking advantage of Fluidigm's proprietary microfluidics technology and Juno™ and Biomark™ HD systems, enables high throughput and scalable testing of saliva samples from patients suspected of COVID-19 (coronavirus) infection. Featuring extraction-free sample processing, a modular workflow and large batch-sample size, the Advanta Dx SARS-CoV-2 RT-PCR Assay aims to meet the RADx goal of enhance laboratory SARS-CoV-2 testing capacity.

Fluidigm's BioMark HD microfluidics platform addresses the massive demand for SARS-CoV-2PCR testing- combining speed, minimal cost, and massive throughput unparalleled in the industry. Further advantages include flexibility to rapidly integrate new mutational markers or increase panel size to include additional infectious agents. This platform works with all clinical sample types.

Our solution leverages Advanta™ Dx SARS-CoV-2 RT-PCR Assay submitted for an EUA, and two assays under development that can change the landscape for detection. This assay allows for up to 6000 samples per day on a single system. Additional assays address different needs in testing, throughput, specificity and sensitivity.

Our technology offers significant advantages overcoming many supply chain barriers and provides a robust platform for scale up of testing for SARS-CoV-2.

Fluidigm has been able to detect both N1 and N2 SARS-CoV-2 targets across all samples provided by Washington University, including the lowest dilution (10 cp/ul). Highlights from that work are the detection of:

- 10 copies in the reaction using 4 ul of saliva sample
- 1.x copies in the reaction using 1 ul of saliva sample
- Across all dilution buffer and RNase inhibitor conditions

Of the amplification chemistries tested, optimum results were obtained from the FLDM 1-Step RT-PCR Master Mix, 2.5 hour 1-step RT-PCR protocol.

2.0 Objectives

The baseline technology provided in Fluidigm's EUA filing allows for performing 6000 tests per day on each Biomark HD system and Fluidigm currently has the ability to manufacture approximately 50,000 tests per day. The rate limiting component is the Integrated Fluidic Circuit (IFC), which is the microfluidic chip that is required for running the assay. The two types of IFCs described herein are the 192.24 IFC which is used in the current Advanta™ Dx SARS-CoV-2 RT-PCR Assay under EUA, and cartridge-based solution IFC which is the basis for a simplified workflow. Each 192.24 IFC has the capacity to run 192 tests and each cartridge-based solution IFC has the capacity to run 96 tests. This project has two major

deliverables: 1) to increase manufacturing capacity of IFCs and to develop and 2) to manufacture a cartridge-based solution that will simplify the workflow and increase the likelihood of sales and deployment of the COVID tests to a broader customer base.

The cartridge-based solution incorporates two independent reactions necessary to process the sample into the same chip to simplify the overall workflow. Compared to the 192.24 IFC approach, each individual sample in the cartridge-based solution increases the number of reaction chambers in the microfluidic chip. Thus, the overall sample capacity of the chip is reduced as there is more chemistry being performed on chip. As a result, switching to the production of the cartridge will result in a simplified workflow but lower volume of tests because it has half the sample capacity of the 192.24 IFC.

The cartridge-based solution requires the redevelopment of the assay to include on IFC Reverse Transcription and a solid-phase bead-based capture of the target nucleic acid sequences. This solid-phase bead-based capture is a novel addition which is a departure from the EUA for the Advanta Dx SARS-CoV-2 assay. Therefore, the full development of the cartridge-based assay will require a new clinical study and EUA submission.

The limiting factor to Fluidigm provided testing is the manufacture of the IFCs. This is because the Fluidigm test does not require extraction, and only nano-liters of reagents are used for each PCR reaction. Scale up for IFC production will occur in Fluidigm's Singapore facility by first maximizing production in the existing manufacturing line which will increase production capacity to 12,000 IFCs per month from the current 7,000 per month. Simultaneously, Fluidigm will add two additional manufacturing lines to the Singapore facility which will ultimately provide manufacturing capacity of 36,000 IFCs per month. The investment into the capital equipment to construct additional manufacturing lines and expand the production of the IFCs can be leveraged to produce the cartridge-based solution. The cartridge-based solution requires a new process and molds but uses the existing equipment.

3.0 Scope

Fluidigm will deploy a complete testing solution using a saliva based, extraction free, viral detection assay for broad distribution. This section describes the scope of work for RADx 6114.

Currently Fluidigm has the capability to deliver testing capacity of approximately 50,000 tests/day. The cartridge-based solution will deliver testing capacity of up to 115,200 tests/day by Q3 2021.

The Contractor shall accomplish the following milestones in the stages outlined below:

- Stage 1: Test Verification
  - Deliver 1plex tests to Verification Core at Emory University
  - Provide final report from the Verification Core
- Stage 2: Scale Up
  - Increase production capacity of Line 1 with 24/7 operation
- Stage 3: Scale Up and Facility Construction
  - Increase production capacity of Line 1 to full scale
  - Begin construction of facility to build two additional production lines

- Stage 4: Quality Systems, Equipment and Performance Qualification
  - Expansion of Quality Control (QC) systems
  - Equipment procurement, delivery, and initiation of installation
- Stage 5: Achieve Full Production Capacity
  - Capital equipment installed, qualified, and validated for two additional production lines
  - Demonstrate full IFC production capacity on all three production lines
  - Full production capacity for cartridge-based solution on 1 line

The Contractor shall accomplish the following milestones which have been defined by subtasks

- Stage A1: Multi-plex design finalized
  - Determine final design for barcoding solution and the requirements for the clinical study
- Stage A2: Cartridge-based solution design finalized
  - Determine final design for the cartridge-based solution and the requirements for the clinical study
- Stage A3 - A5: Clinical/FDA studies and EUA Submission
  - Complete clinical studies required for EUA Submission
  - Submission of EUA for cartridge-based solution
  - Purchase of clinical samples if applicable

4.0 Tasks

Tasks to be completed by the Contractor are divided into three main objectives:

1) Maximizing throughput on the existing manufacturing line to 12k IFCs per month

2) Addition of two manufacturing lines in the Singapore facility

3) Simplifying the workflow of the current RT-PCR assay by developing the cartridge-based solution.

Progress on the tasks will be included in the project workstream tracker. Updates will be provided to the COR and RADx program personnel in the weekly meetings.

5.0 Deliverables

Deliverables for the PWS include deliverables outlined in the final Statement of Objectives, and reports which shall be paired with the agreed upon Payment Schedule.

The list of milestones and deliverables for the PWS is available in Appendix 1: Cost-Price Quote.

6.0 Quality Assurance

The Contractor shall ensure that all deliverables are reviewed and edited to ensure that documents are free of typographical, grammatical and technical errors. The Contracting Officer Representative (COR), shall have final authority over the format, style, editing and content of all deliverables. Further, the contractor will be responsible for ensuring that final documents incorporate all comments, modifications, and editing recommended by the COR.

7.0 Quality Assurance Surveillance Plan (QASP)

The QASP is attached as Appendix 2. Additional quality assurance processes are included in the attached file: Fluidigm Corporate Quality Manual.

8.0 Period of Performance

The period of performance is as follows:

Base Period	[***]

9.0 Appendices

Appendix 1: Cost-Price Quote

Appendix 2: QASP

10.0 Additional Documents

Fluidigm Corporate Quality Manual

RADx #6114
Fluidigm Corporation
Letter Contract number: 75N92020C00009

QUALITY ASSURANCE SURVEILLANCE PLAN (QASP)

PWS Appendix 2

1 INTRODUCTION

This quality assurance surveillance plan (QASP) is pursuant to the milestone deliverables attached to the Performance Work Statement (PWS) entitled Rapid Acceleration of Diagnostics (RADx) Program: Tech Project # 6114 Fluidigm – Advanta Dx SARS-CoV-2 RT-PCR Assay for Saliva. This plan sets forth the procedures and guidelines the RADx-Tech Contracting Officers and Contracting Officer's Representatives (CORs) will use in ensuring the required performance standards or service levels are achieved by the contractor.

1.1 Purpose

1.1.1 The purpose of the QASP is to describe the systematic methods used to monitor performance and to identify the required documentation and the resources to be employed. The QASP provides a means for evaluating whether the contractor is meeting the performance standards/quality levels identified in the PWS and the contractor's quality control plan (QCP), and to ensure that the government pays only for the level of services received.

1.1.2 This QASP defines the roles and responsibilities of all members of the integrated project team (IPT), identifies the performance objectives, defines the methodologies used to monitor and evaluate the contractor's performance, describes quality assurance documentation requirements, and describes the analysis of quality assurance monitoring results.

1.2 Performance Management Approach

1.2.1 The PWS structures the acquisition around "what" service or quality level is required, as opposed to "how" the contractor should perform the work (i.e., results, not compliance). This QASP will define the performance management approach taken by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to monitor and manage the contractor's performance to ensure the expected outcomes or performance objectives communicated in the PWS are achieved. Performance management rests on developing a capability to review and analyze information generated through performance assessment. The ability to make decisions based on the analysis of performance data is the cornerstone of performance management; this analysis yields information that indicates whether expected outcomes for the project are being achieved by the contractor.

1.2.2 Performance management represents a significant shift from the more traditional quality assurance (QA) concepts in several ways. Performance management focuses on assessing whether outcomes are being achieved and to what extent. This approach migrates away from scrutiny of compliance with the processes and practices used to achieve the outcome. A performance-based approach enables the contractor to play a large role in how the work is performed, as long as the proposed processes are within the stated constraints. The only exceptions to process reviews are those required by law (federal, state, and local) and compelling business situations, such as safety and health. A "results" focus provides the contractor flexibility to continuously improve and innovate over the course of the contract as long as the critical outcomes expected are being achieved and/or the desired performance levels are being met.

1.3 Performance Management Strategy

1.3.1 The contractor is responsible for the quality of all work performed. The contractor measures that quality through the contractor's own quality control (QC) program. QC is work output, not workers, and therefore includes all work performed under this contract regardless of whether the work is performed by contractor employees or by subcontractors. The contractor's quality control program (QCP) will set forth the staffing and procedures for self-inspecting the quality, timeliness, responsiveness, customer satisfaction, and other performance requirements in the PWS. The contractor will develop and implement a performance management system with processes to assess and report its performance to the designated government representative. The contractor's QCP will set forth the staffing and procedures for self-inspecting the quality, timeliness, responsiveness, customer satisfaction, and other performance requirements in the PWS. This QASP enables the government to take advantage of the contractor's QC program.

1.3.2 The government representatives will monitor performance and review performance reports/milestone deliverables furnished by the contractor. If a milestone deliverable is delayed, the contractor will be responsible for reporting the reason and providing an updated schedule.

2 ROLES AND RESPONSIBILITIES

2.1 The Contracting Officer

The Contracting Officer (CO) is responsible for monitoring contract compliance, contract administration, and cost control and for resolving any differences between the observations documented by the Contracting Officer's Representative (COR). The CO will designate one full-time COR as the government authority for performance management. The number of additional representatives serving as technical inspectors depends on the complexity of the services measured, as well as the contractor's performance, and must be identified and designated by the CO.

2.2 The Contracting Officer's Representative

The Contracting Officer's Representative (COR) is designated in writing by the CO to act as his or her authorized representative to assist in administering a contract. COR limitations are contained in the written appointment letter. The COR is responsible for technical administration of the project and ensures proper government surveillance of the contractor's performance. The COR is not empowered to make any contractual commitments or to authorize any contractual changes on the government's behalf. Any changes that the contractor deems may affect contract price, terms, or conditions shall be referred to the CO for action. The COR will have the responsibility for completing QA monitoring forms used to document the inspection and evaluation of the contractor's work performance. Government surveillance may occur under the inspection of services clause for any service relating to the contract.

3 IDENTIFICATION OF REQUIRED PERFORMANCE STANDARDS/QUALITY LEVELS

The required milestone deliverables are included in the PWS. If the contractor meets the milestone deliverable, it will be paid the representative milestone payment agreed on in the contract. If the contractor does not meet the milestone deliverable, the milestone payment will be delayed, and it will put the future milestone payments at risk.

4 METHODOLOGIES TO MONITOR PERFORMANCE

4.1 Surveillance Techniques

In an effort to minimize the performance management burden, simplified surveillance methods shall be used by the government to evaluate contractor performance when appropriate. The primary methods of surveillance are:

- 100% Inspection – As determined appropriate, the COR shall review the generated documentation and enter summary results into the Surveillance Activity Checklist.

4.2 Acceptable Performance Levels

Milestone payments will be issued upon meeting milestone deliverables.

5 QUALITY ASSURANCE DOCUMENTATION

5.1 Monitoring Form

The government's QA surveillance, accomplished by the COR, will be reported using the monitoring form in Attachment 1. The form will document the government's assessment of the contractor's performance under the contract to ensure that the required results are being achieved.

5.1.1 The COR and CO will retain a copy of all completed QA surveillance forms.

6 ANALYSIS OF QUALITY ASSURANCE ASSESSMENT

6.1 Determining Performance

6.1.1 Government shall use the monitoring methods cited to determine whether the milestone deliverables have been met. If the contractor has not met milestone deliverable, it may be asked to develop a corrective action plan to show how and by what date it intends to meet the milestone deliverable. Failure to meet the milestone deliverable may result in a delay of the milestone payment and may put future milestone payments at risk.

6.2 Reporting

6.2.1 At the end of each contract month, the COR will prepare a written report summarizing the overall results of the quality assurance surveillance of the contractor's performance. This written report will become part of the QA documentation. It will enable the government to demonstrate whether the contractor is meeting the stated objectives.

6.3 Reviews and Resolution

6.3.1 The COR may require the contractor's project manager, or a designated alternate, to meet with the CO and other government IPT personnel as deemed necessary to discuss performance evaluation. The COR will define a frequency of in-depth reviews with the contractor, including appropriate self-assessments by the contractor; however, if the need arises, the contractor will meet with the COR as often as required or per the contractor's request. The agenda of the reviews may include:

- Weekly performance assessment data and trend analysis;
- Issues and concerns of both parties;

- Projected outlook for upcoming months and progress against expected trends, including a corrective action plan analysis;
- Recommendations for improved efficiency and/or effectiveness;
- Issues arising from the performance monitoring processes.

The COR and the CO must coordinate and communicate with the contractor to resolve issues and concerns regarding marginal or unacceptable performance.

6.4 Performance Requirements

For performance requirements, see Milestone table in Cost Price Quote (Performance Work Statement, Appendix 1)

ATTACHMENT 1: SAMPLE QUALITY ASSURANCE MONITORING FORM

SERVICE: _____

_____

_____

_____

_____

SURVEY PERIOD: _____

SURVEILLANCE METHOD (Check):

Random Sampling 100% Inspection Periodic Inspection Customer Complaint

LEVEL OF SURVEILLANCE (Check):

Monthly Quarterly As needed

PERCENTAGE OF ITEMS SAMPLED DURING SURVEY PERIOD: _____ %

ANALYSIS OF RESULTS:

Observed Service Provider Performance Measurement Rate: _____%

Service Provider's Performance (Check): Meets Standards

Does Not Meet Standards

Narrative of Performance During Survey Period: _____

_____

_____

_____

_____

PREPARED BY: _____ **DATE:** _____

RADx Proposal Modifications: 1/15/2021				
Date	**Milestone**	**Deliverable**	**Amount**	**Prism Line item #**
[***]	[***]	[***]	[***]	1
[***]	[***]	[***]	[***]	2
[***]	[***]	[***]	[***]	3
[***]	[***]	[***]	[***]	6
[***]	[***]	[***]	[***]	9
[***]	[***]	[***]	[***]	10
[***]	[***]	[***]	[***]	11
[***]	[***]	[***]	[***]	12
[***]	[***]	[***]	[***]	13
[***]	[***]	[***]	[***]	14
[***]	[***]	[***]	[***]	15
[***]	[***]	[***]	[***]	16
[***]	[***]	[***]	[***]	17

[***]	[***]	[***]	[***]
		Total	**$34,016,056**

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 7, 2021

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 7, 2021

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, 2021 (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 7, 2021

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 ended March 31, 2021 (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 7, 2021

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