

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-Q**

(Mark One)

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

For the quarterly period ended March 31, 2019

Or

o 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 000-30941

AXCELIS TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

34-1818596
(IRS Employer
Identification No.)

108 Cherry Hill Drive
Beverly, Massachusetts 01915
(Address of principal executive offices, including zip code)

(978) 787-4000
(Registrant's telephone number, including area code)

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 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, 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
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if 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

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

Title of each class	Trading symbol	Name of each exchange on which registered
Common Stock, \$.001 par value	ACLS	Nasdaq Global Select Market

As of May 6, 2019 there were 32,942,184 shares of the registrant's common stock outstanding.

Table of Contents

PART I - FINANCIAL INFORMATION

<u>Item 1. Financial Statements (Unaudited)</u>	
<u>Consolidated Statements of Operations for the three months ended March 31, 2019 and 2018</u>	3
<u>Consolidated Statements of Comprehensive Income for the three months ended March 31, 2019 and 2018</u>	4
<u>Consolidated Balance Sheets as of March 31, 2019 and December 31, 2018</u>	5
<u>Consolidated Statements of Stockholders' Equity – For the three month periods ended March 31, 2019 and 2018</u>	6
<u>Consolidated Statements of Cash Flows for the three months ended March 31, 2019 and 2018</u>	7
<u>Notes to Consolidated Financial Statements (Unaudited)</u>	8
<u>Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations</u>	17
<u>Overview</u>	17
<u>Critical Accounting Estimates</u>	17
<u>Results of Operations</u>	18
<u>Liquidity and Capital Resources</u>	23
<u>Item 3. Quantitative and Qualitative Disclosures About Market Risk</u>	24
<u>Item 4. Controls and Procedures</u>	24
<u>PART II - OTHER INFORMATION</u>	25
<u>Item 1. Legal Proceedings</u>	25
<u>Item 1A. Risk Factors</u>	25
<u>Item 2. Unregistered Sales of Equity Securities and Use of Proceeds</u>	25
<u>Item 3. Defaults Upon Senior Securities</u>	25
<u>Item 4. Mine Safety Disclosures</u>	25
<u>Item 5. Other Information</u>	25
<u>Item 6. Exhibits</u>	26

PART 1—FINANCIAL INFORMATION**Item 1. Financial Statements.**

Axcelis Technologies, Inc.
Consolidated Statements of Operations
(In thousands, except per share amounts)
(Unaudited)

	Three months ended March 31,	
	2019	2018
Revenue:		
Product	\$ 84,197	\$ 116,022
Services	7,280	6,163
Total revenue	<u>91,477</u>	<u>122,185</u>
Cost of revenue:		
Product	47,338	68,374
Services	6,633	6,655
Total cost of revenue	<u>53,971</u>	<u>75,029</u>
Gross profit	<u>37,506</u>	<u>47,156</u>
Operating expenses:		
Research and development	13,685	12,233
Sales and marketing	8,918	8,411
General and administrative	7,807	8,010
Total operating expenses	<u>30,410</u>	<u>28,654</u>
Income from operations	<u>7,096</u>	<u>18,502</u>
Other (expense) income:		
Interest income	841	410
Interest expense	(1,230)	(1,337)
Other, net	(173)	(102)
Total other expense	<u>(562)</u>	<u>(1,029)</u>
Income before income taxes	<u>6,534</u>	<u>17,473</u>
Income tax provision	472	3,558
Net income	<u>\$ 6,062</u>	<u>\$ 13,915</u>
Net income per share:		
Basic	<u>\$ 0.19</u>	<u>\$ 0.43</u>
Diluted	<u>\$ 0.18</u>	<u>\$ 0.41</u>
Shares used in computing net income per share:		
Basic weighted average common shares	<u>32,683</u>	<u>32,094</u>
Diluted weighted average common shares	<u>34,224</u>	<u>34,123</u>

See accompanying Notes to these Consolidated Financial Statements

Axcelis Technologies, Inc.
Consolidated Statements of Comprehensive Income
(In thousands)
(Unaudited)

	Three months ended	
	March 31,	
	2019	2018
Net income	\$ 6,062	\$ 13,915
Other comprehensive (loss) income:		
Foreign currency translation adjustments	(495)	1,021
Amortization of actuarial loss and other adjustments from pension plan	30	30
Total other comprehensive (loss) income	(465)	1,051
Comprehensive income	<u>\$ 5,597</u>	<u>\$ 14,966</u>

See accompanying Notes to these Consolidated Financial Statements

Axcelis Technologies, Inc.
Consolidated Balance Sheets
(In thousands, except per share amounts)
(Unaudited)

	March 31,	December 31,
	2019	2018
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 163,104	\$ 177,993
Short-term restricted cash	149	—
Accounts receivable, net	70,947	78,727
Inventories, net	134,051	129,000
Prepaid expenses and other current assets	12,161	11,051
Total current assets	380,412	396,771
Property, plant and equipment, net	19,638	41,149
Operating lease assets	7,453	—
Finance lease assets, net	22,895	—
Long-term restricted cash	6,715	6,909
Deferred income taxes	71,357	71,939
Other assets	34,985	31,673
Total assets	<u>\$ 543,455</u>	<u>\$ 548,441</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 29,641	\$ 35,955
Accrued compensation	6,153	19,218
Warranty	4,319	4,819
Income taxes	491	462
Deferred revenue	16,639	19,513
Other current liabilities	8,815	5,030
Total current liabilities	66,058	84,997
Finance lease obligation	48,549	47,757
Long-term deferred revenue	3,842	3,071
Other long-term liabilities	7,853	4,279
Total liabilities	126,302	140,104
Commitments and contingencies (Note 15)		
Stockholders' equity:		
Common stock, \$0.001 par value, 75,000 shares authorized; 32,881 shares issued and outstanding at March 31, 2019; 32,558 shares issued and outstanding at December 31, 2018	33	33
Additional paid-in capital	568,335	565,116
Accumulated deficit	(151,198)	(157,260)
Accumulated other comprehensive income	(17)	448
Total stockholders' equity	417,153	408,337
Total liabilities and stockholders' equity	<u>\$ 543,455</u>	<u>\$ 548,441</u>

See accompanying Notes to these Consolidated Financial Statements

Axcelis Technologies, Inc.
Consolidated Statements of Stockholders' Equity
(In thousands)
(Unaudited)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2017	32,048	\$ 32	\$ 556,147	\$ (204,745)	\$ 2,176	\$ 353,610
Net income	—	—	—	13,915	—	13,915
Adjustment to Retained Earnings upon ASC 606 Adoption	—	—	—	1,600	—	1,600
Foreign currency translation adjustments	—	—	—	—	1,021	1,021
Change in pension obligation	—	—	—	—	30	30
Exercise of stock options	75	—	446	—	—	446
Issuance of restricted common shares	19	—	(227)	—	—	(227)
Stock-based compensation expense	—	—	1,132	—	—	1,132
Balance at March 31, 2018	32,142	\$ 32	\$ 557,498	\$ (189,230)	\$ 3,227	\$ 371,527

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2018	32,558	\$ 33	\$ 565,116	\$ (157,260)	\$ 448	\$ 408,337
Net income	—	—	—	6,062	—	6,062
Foreign currency translation adjustments	—	—	—	—	(495)	(495)
Change in pension obligation	—	—	—	—	30	30
Exercise of stock options	288	—	1,828	—	—	1,828
Issuance of restricted common shares	35	—	(281)	—	—	(281)
Stock-based compensation expense	—	—	1,672	—	—	1,672
Balance at March 31, 2019	32,881	\$ 33	\$ 568,335	\$ (151,198)	\$ (17)	\$ 417,153

See accompanying Notes to these Consolidated Financial Statements

Axcelis Technologies, Inc.
Consolidated Statements of Cash Flows
(In thousands)
(Unaudited)

	Three months ended March 31,	
	2019	2018
Cash flows from operating activities		
Net income	\$ 6,062	\$ 13,915
Adjustments to reconcile net income to net cash (used in) provided by operating activities:		
Depreciation and amortization	1,615	1,448
Deferred income taxes	582	2,451
Stock-based compensation expense	1,672	1,132
Provision for excess and obsolete inventory	607	485
Changes in operating assets & liabilities:		
Accounts receivable	7,642	16
Inventories	(6,171)	(11,462)
Prepaid expenses and other current assets	(1,174)	592
Accounts payable and other current liabilities	(16,911)	(1,836)
Deferred revenue	(2,098)	1,963
Income taxes	32	113
Other assets and liabilities	(4,207)	(317)
Net cash (used in) provided by operating activities	(12,349)	8,500
Cash flows from investing activities		
Expenditures for property, plant and equipment and capitalized software	(4,255)	(723)
Net cash used in investing activities	(4,255)	(723)
Cash flows from financing activities		
Net settlement on restricted stock grants	(281)	(226)
Proceeds from exercise of stock options	1,828	446
Net cash provided by financing activities	1,547	220
Effect of exchange rate changes on cash and cash equivalents	123	(406)
Net (decrease) increase in cash, cash equivalents and restricted cash	(14,934)	7,591
Cash, cash equivalents and restricted cash at beginning of period	184,902	140,880
Cash, cash equivalents and restricted cash at end of period	<u>\$ 169,968</u>	<u>\$ 148,471</u>

See accompanying Notes to these Consolidated Financial Statements

Axcelis Technologies, Inc.
Notes to Consolidated Financial Statements (Unaudited)

Note 1. Nature of Business

Axcelis Technologies, Inc. (“Axcelis” or the “Company”) was incorporated in Delaware in 1995, and is a producer of ion implantation and other processing equipment used in the fabrication of semiconductor chips in the United States, Europe and Asia. In addition, we provide extensive worldwide aftermarket service and support, including spare parts, equipment upgrades, used equipment and maintenance services to the semiconductor industry.

The accompanying unaudited consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles for interim financial information and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, they do not include all of the information and footnotes required by generally accepted accounting principles for complete financial statements. In the opinion of management, all adjustments which are of a normal recurring nature and considered necessary for a fair presentation of these financial statements have been included. Operating results for the interim periods presented are not necessarily indicative of the results that may be expected for other interim periods or for the year as a whole.

The balance sheet at December 31, 2018 has been derived from the audited consolidated financial statements at that date but does not include all of the information and footnotes required by generally accepted accounting principles for complete financial statements. For further information, refer to the consolidated financial statements and footnotes thereto included in Axcelis Technologies, Inc.’s Annual Report on Form 10-K for the year ended December 31, 2018.

Note 2. Stock-Based Compensation

We maintain the Axcelis Technologies, Inc. 2012 Equity Incentive Plan (the “2012 Equity Plan”), which became effective on May 2, 2012, and permits the issuance of options, restricted stock, restricted stock units and performance awards to selected employees, directors and consultants of the Company. Our 2000 Stock Plan (the “2000 Stock Plan”) expired on May 1, 2012 and no new grants may be made under that plan after that date. However, unexpired awards granted under the 2000 Stock Plan remain outstanding and subject to the terms of the 2000 Stock Plan. We also maintain the Axcelis Technologies, Inc. Employee Stock Purchase Plan (the “ESPP”), an Internal Revenue Code Section 423 plan.

The 2012 Equity Plan and the ESPP are more fully described in Note 13 to the consolidated financial statements in our 2018 Annual Report on Form 10-K.

We recognized stock-based compensation expense of \$1.7 million and \$1.1 million for the three month periods ended March 31, 2019 and 2018, respectively. These amounts include compensation expense related to restricted stock units (“RSUs”) and non-qualified stock options.

In the three month periods ended March 31, 2019 and 2018, we issued 0.3 million and 0.1 million shares of common stock, respectively, upon stock option exercises and vesting of RSUs. In the three month periods ended March 31, 2019 and 2018, we received proceeds of \$1.8 million and \$0.4 million, respectively, upon the exercise of stock options.

Note 3. Leases

We have operating leases for office space, warehouse space, computer and office equipment and vehicles used in our business operations. We have a finance lease in relation to the 2015 sale-leaseback of our corporate headquarters in Beverly, Massachusetts. We review all contract agreements to determine if the agreement contains a lease component. An agreement contains a lease component if it provides the use of a specific physical space or a specific physical item. We recognize the lease obligation on a discounted basis using the explicit or implicit discount rate stated within the agreement. For those lease agreements that do not indicate the applicable discount rate, we use the corporate borrowing rate. The value of the right-of-use asset is initially determined based on the net present value of the associated liability, and is adjusted for deferred costs and possible impairments, if any. We have made certain policy elections. Operating leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet. We recognize lease expense for operating

leases on a straight-line basis over the lease term. We account for lease components and non-lease components that are fixed payments as one component. Some of our operating leases include one or more options to renew, with renewal terms that can extend the respective lease term 1 to 3 years. The exercise of lease renewal options are at our sole discretion. For lease extensions that are reasonably certain to occur, we have included these renewal periods in our calculation of the net present value of the lease obligation and related right-of-use asset. Certain leases also include options to purchase the leased property. The depreciable life of certain assets and leasehold improvements are limited by the expected lease term, unless there is a transfer of title or purchase option reasonably certain of exercise. Our lease agreements do not contain any material residual value guarantees or material restrictive covenants. The amounts of operating and finance lease right-of-use assets and related lease obligations recorded within our consolidated balance sheet are as follows:

Leases	Classification	March 31,
		2019
		(in thousands)
Assets		
Operating lease	Operating lease assets	\$ 7,453
Finance lease	Finance lease assets *	22,895
Total leased assets		<u>\$ 30,348</u>
Liabilities		
Current		
Operating	Other current liabilities	\$ 3,646
Finance	Other current liabilities	—
Noncurrent		
Operating	Other long-term liabilities	3,805
Finance	Finance lease obligation	48,549
Total lease liabilities		<u>\$ 56,000</u>

* Finance lease assets are recorded net of accumulated depreciation of \$46.7 million and include \$0.8 million of prepaid financing costs as of March 31, 2019.

All of our office locations support selling and servicing functions. Lease expense, depreciation expense relating to finance leased assets and interest expense relating to our finance lease obligation recognized within our consolidated statement of operations for the three months ended March 31, 2019 are as follows:

Lease cost	Classification	Three months ended
		March 31, 2019
		(in thousands)
Operating lease cost		
Service	Cost of revenue	\$ 597
Research & development	Operating expenses	66
Selling*	Operating expenses	355
General & administrative*	Operating expenses	208
Total operating lease cost		<u>\$ 1,226</u>
Finance lease cost		
Depreciation of leased assets	COGS, R&D, Selling and G&A	\$ 333
Interest on lease liabilities	Interest expense	1,230
Total finance lease cost		<u>\$ 1,563</u>
Total lease cost		<u>\$ 2,789</u>

* Selling, general and administrative expense includes short-term lease and variable lease costs of approximately \$0.2 million.

Our corporate headquarters facility, shown below under finance leases, has an original lease term of 22 years. All other locations are treated as operating leases, with lease terms ranging from 1 to 10 years. The tables below reflect the minimum cash outflow regarding our current lease obligations as well as the weighted-average remaining lease term and weighted-average discount rates used on our calculation of our lease obligations and right-of-use assets:

Maturity of Lease Liabilities	Finance Leases	Operating Leases	Total Leases
	(in thousands)		
2019	\$ 4,203	\$ 2,859	\$ 7,062
2020	5,720	3,107	8,827
2021	5,848	1,447	7,295
2022	5,980	372	6,352
2023	6,114	43	6,157
Thereafter	85,905	21	85,926
Total lease payments	<u>\$ 113,770</u>	<u>\$ 7,849</u>	<u>\$ 121,619</u>
Less interest portion*	(65,221)	(398)	(65,619)
Finance lease and operating lease obligations	<u>\$ 48,549</u>	<u>\$ 7,451</u>	<u>\$ 56,000</u>

* Finance lease interest calculated using the implied interest rate; operating lease interest calculated using estimated corporate borrowing rate

Lease term and discount rate	March 31,
	2019
Weighted-average remaining lease term (years)	
Operating leases	2.4
Finance leases	17.8
Weighted-average discount rate	
Operating leases	4.5%
Finance leases	10.5%

Our cash outflows from our operating leases include rent expense and other charges associated with these leases. These cash flows are included within the operating section of our statement of cash flows. Our cash flows from our finance lease currently include an interest only component and starting in April 2020, both an interest and payment of principal component. The table below shows our cash outflows, by lease type and related section of our statement of cash flows as well as the non-cash amount capitalized on our balance sheet in relation to our operating lease right-of-use assets:

	Three months ended
	March 31,
	2019
Cash paid for amounts included in the measurement of lease liabilities	(in thousands)
Operating cash outflows from operating leases	\$ 1,226
Operating cash outflows from finance leases	1,391
Financing cash outflows from finance leases	—
Operating lease assets obtained in exchange for new operating lease liabilities	7,453
Finance lease assets obtained in exchange for new finance lease liabilities	\$ —

Note 4. Revenue

To reflect the organization of our business operations, we divide revenue into two categories: revenue from sales of ion implant and revenue arising from the sale of used systems, parts and labor to customers who own systems, which we refer to as Aftermarket.

Revenue by categories used by management are as follows:

	Three months ended	
	March 31,	
	2019	2018
	(in thousands)	
Ion Implant	\$ 57,092	\$ 85,475
Aftermarket	34,385	36,710
	<u>\$ 91,477</u>	<u>\$ 122,185</u>

Revenue by geographic markets is determined based upon the location of where our products are shipped and our services are performed. Revenue in our principal geographic markets is as follows:

	Three months ended	
	March 31,	
	2019	2018
	(in thousands)	
North America	\$ 11,607	\$ 10,523
Asia Pacific	62,927	97,689
Europe	16,943	13,973
	<u>\$ 91,477</u>	<u>\$ 122,185</u>

Contract assets and contract liabilities are as follows:

	March 31,	December 31,
	2019	2018
	(in thousands)	
Contract assets	<u>\$ —</u>	<u>\$ —</u>
Contract liabilities	<u>\$ 20,481</u>	<u>\$ 22,584</u>

Contract liabilities are reflected as deferred revenue on the consolidated balance sheet and relate to payments invoiced or received in advance of completion of performance obligations under a contract. Contract liabilities are recognized as revenue upon the fulfillment of performance obligations.

	Three months ended	
	March 31,	
	2019	2018
	(in thousands)	
Revenue recognized in the period from:		
Amounts included in contract liability at the beginning of the period	<u>\$ 6,181</u>	<u>\$ 6,342</u>
Performance obligations satisfied in previous periods	<u>\$ —</u>	<u>\$ —</u>

The majority of our system transactions have payment terms of 90% due upon shipment of the tool and 10% due upon installation. Aftermarket transaction payment terms are such that payment is due either within 30 or 60 days of service provided or delivery of parts.

Note 5. Computation of Net Earnings per Share

Basic earnings per share is computed by dividing income available to common stockholders (the numerator) by the weighted-average number of common shares outstanding (the denominator) for the period. The computation of diluted earnings per share is similar to basic earnings per share, except that the denominator is increased by the number of additional common shares that would have been outstanding if the potentially dilutive common shares issuable for stock options and RSUs had been issued, calculated using the treasury stock method.

The components of net earnings per share are as follows:

	Three months ended March 31,	
	2019	2018
	(in thousands, except per share amounts)	
Net income available to common stockholders	\$ 6,062	\$ 13,915
Weighted average common shares outstanding used in computing basic income per share	32,683	32,094
Incremental options and RSUs	1,541	2,029
Weighted average common shares used in computing diluted net income per share	34,224	34,123
Net income per share		
Basic	\$ 0.19	\$ 0.43
Diluted	\$ 0.18	\$ 0.41

Diluted weighted average common shares outstanding does not include options and RSUs outstanding to purchase ten thousand common equivalent shares for the three month periods ended March 31, 2019 and 2018, respectively, as their effect would have been anti-dilutive.

Note 6. Accumulated Other Comprehensive Loss

The following table presents the changes in accumulated other comprehensive income, net of tax, by component, for the three months ended March 31, 2019:

	Foreign currency	Defined benefit pension plan	Total
	(in thousands)		
Balance at December 31, 2018	\$ 962	\$ (514)	\$ 448
Other comprehensive loss and pension reclassification	(495)	30	(465)
Balance at March 31, 2019	\$ 467	\$ (484)	\$ (17)

Note 7. Cash, cash equivalents and restricted cash

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the consolidated balance sheet that sum to the total of the amounts shown in the statement of cash flows.

	March 31, 2019	December 31, 2018
	(in thousands)	
Cash and cash equivalents	\$ 163,104	\$ 177,993
Short-term and long-term restricted cash	6,864	6,909
Total cash, cash equivalents and restricted cash	\$ 169,968	\$ 184,902

As of March 31, 2019, we had \$6.9 million in restricted cash which relates to a \$5.9 million letter of credit associated with a security deposit for the lease of our corporate headquarters in Beverly, Massachusetts, a \$0.7 million letter

of credit relating to workers' compensation insurance, a bank guarantee of our performance relating to a customer payment in the amount of \$0.2 million and a \$0.1 million deposit relating to customs activity.

Note 8. Inventories, net

The components of inventories are as follows:

	March 31, 2019	December 31, 2018
	(in thousands)	
Raw materials	\$ 95,639	\$ 91,875
Work in process	19,078	23,857
Finished goods (completed systems)	19,334	13,268
Inventories, net	<u>\$ 134,051</u>	<u>\$ 129,000</u>

When recorded, inventory reserves reduce the carrying value of inventories to their net realizable value. We establish inventory reserves when conditions exist that indicate inventory may be in excess of anticipated demand or is obsolete based upon assumptions about future demand for the Company's products or market conditions. We regularly evaluate the ability to realize the value of inventories based on a combination of factors including the following: forecasted sales or usage, estimated product end of life dates, estimated current and future market value and new product introductions. Purchasing and usage alternatives are also explored to mitigate inventory exposure.

Note 9. Product Warranty

We generally offer a one year warranty for all of our systems, the terms and conditions of which vary depending upon the product sold. For all systems sold, we accrue a liability for the estimated cost of standard warranty at the time of system shipment and defer the portion of systems revenue attributable to the fair value of non-standard warranty. Costs for non-standard warranty are expensed as incurred. Factors that affect our warranty liability include the number of installed units, historical and anticipated product failure rates, material usage and service labor costs. We periodically assess the adequacy of our recorded liability and adjust the amount as necessary.

The changes in our standard product warranty liability are as follows:

	Three months ended March 31,	
	2019	2018
	(in thousands)	
Balance at January 1 (beginning of year)	\$ 5,091	\$ 4,502
Warranties issued during the period	954	1,540
Settlements made during the period	(1,475)	(1,334)
Changes in estimate of liability for pre-existing warranties during the period	89	260
Balance at March 31 (end of period)	<u>\$ 4,659</u>	<u>\$ 4,968</u>
Amount classified as current	\$ 4,319	\$ 4,583
Amount classified as long-term	340	385
Total warranty liability	<u>\$ 4,659</u>	<u>\$ 4,968</u>

Note 10. Fair Value Measurements

Certain assets on our balance sheets are reported at their fair value. Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date.

(a) Fair Value Hierarchy

The accounting guidance for fair value measurement requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard establishes a fair value hierarchy based on the level of independent, objective evidence surrounding the inputs used to measure fair value. A financial instrument's categorization within the fair value hierarchy is based upon the lowest level of input that is significant to the fair value measurement. The fair value hierarchy is as follows:

Level 1 - applies to assets or liabilities for which there are quoted prices in active markets for identical assets or liabilities.

Level 2 - applies to assets or liabilities for which there are inputs other than quoted prices that are observable for the asset or liability, such as quoted prices for similar assets or liabilities in active markets; quoted prices for identical assets or liabilities in markets with insufficient volume or infrequent transactions (less active markets); or model-derived valuations in which significant inputs are observable or can be derived principally from, or corroborated by, observable market data.

Level 3 - applies to assets or liabilities for which there are unobservable inputs to the valuation methodology that are significant to the measurement of the fair value of the assets or liabilities.

(b) Fair Value Measurements

Our money market funds and short-term investments are included in cash and cash equivalents in the consolidated balance sheets.

The following table sets forth our assets by level within the fair value hierarchy:

	March 31, 2019			
	Fair Value Measurements			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets				
Cash equivalents:				
Money market funds, U.S. Government Securities and Agency Investments	\$ 146,502	\$ —	\$ —	\$ 146,502

	December 31, 2018			
	Fair Value Measurements			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets				
Cash equivalents:				
Money market funds, U.S. Government Securities and Agency Investments	\$ 138,510	\$ 21,700	\$ —	\$ 160,210

(c) Other Financial Instruments

The carrying amounts reflected in the consolidated balance sheets for accounts receivable, prepaid expenses and other current assets and non-current assets, restricted cash, accounts payable and accrued expenses approximate fair value due to their short-term maturities.

Note 11. Financing Arrangements

On January 30, 2015, we sold our corporate headquarters facility in Beverly Massachusetts for \$48.9 million. As part of the sale, we also entered into a 22-year lease agreement of our headquarters facility. This sale leaseback is accounted for as a financing lease under generally accepted accounting principles and, as such, we have recorded a financing obligation of \$48.5 million as of March 31, 2019. Our current lease payments are interest only payments. Commencing in April, 2020, the associated lease payments will include both an interest component and payment of principal, with the

underlying liability being extinguished at the end of the original lease term. We posted a security deposit of \$5.9 million in the form of an irrevocable letter of credit at the time of the closing. This letter of credit is cash collateralized and the associated cash is included in long-term restricted cash.

Note 12. Income Taxes

The income tax provision was \$0.5 million during the three months ended March 31, 2019, a decrease of \$3.1 million, when compared to the three months ended March 31, 2018. Of the \$3.1 million decrease, \$2.3 million was attributable to the decrease in pretax income of \$10.9 million, \$0.3 million related to an increase in excess tax benefit on the exercise of non-qualified stock options and the vesting of restricted stock and a \$0.3 million tax benefit recognized upon the expiration of the statute of limitations regarding an uncertain tax position previously recorded. The related interest and penalties previously recorded were reversed resulting in a reduction of interest expense of \$0.1 million.

We have significant net operating loss carryforwards in the United States and certain European jurisdictions, and, as a result, we do not currently pay significant income taxes in those jurisdictions. Tax expense reflects the tax liability that would be payable without consideration of the usage of any net operating loss carryforwards. At December 31, 2018, we had \$71.9 million of deferred tax assets worldwide relating to net operating loss carryforwards, tax credit carryforwards and other temporary differences, which are available to reduce income tax liabilities in future years. As of March 31, 2019, there were no known facts, that when considered, would require us to change our position on our ability to realize our deferred tax assets.

Note 13. Concentration of Risk

For the three months ended March 31, 2019, three customers accounted for 16.4%, 13.4% and 10.2% of total revenue, respectively. For the three months ended March 31, 2018, two customers accounted for 25.9% and 15.4% of total revenue, respectively.

At March 31, 2019, three customers accounted for 18.3%, 15.7% and 11.0% of accounts receivable, respectively. At December 31, 2018, two customers accounted for 21.9% and 11.5% of accounts receivable, respectively.

Note 14. Share Repurchase

Under the current stock repurchase plan, announced on January 14, 2019, we are authorized to repurchase up to \$35 million of our common stock through the end of 2019. No shares were repurchased during the three months ended March 31, 2019. The timing and actual number of shares repurchased will depend on various factors including price, corporate and regulatory requirements, alternative investment opportunities and other market conditions.

Shares repurchased by us are accounted for when the transaction is settled. There were no unsettled share repurchases at March 31, 2019. Shares repurchased and retired are deducted from common stock for par value and from additional paid-in capital for the excess over par value. If additional paid-in capital has been exhausted, the excess over par value is deducted from retained earnings. Direct costs incurred to acquire the shares are included in the total cost of the shares.

Note 15. Contingencies

(a) Litigation

We are, from time to time, a party to litigation that arises in the normal course of our business operations. We are not presently a party to any litigation that we believe might have a material adverse effect on our business operations.

(b) Indemnifications

Our system sales agreements typically include provisions under which we agree to take certain actions, provide certain remedies and defend our customers against third-party claims of intellectual property infringement under specified conditions and to indemnify customers against any damage and costs awarded in connection with such claims. We have not

incurred any material costs as a result of such indemnifications and have not accrued any liabilities related to such obligations in the accompanying consolidated financial statements.

Note 16. Recent Accounting Guidance

(a) Accounting Standards Update 2016-02 on Leases Effective January 1, 2019

We adopted Accounting Standards Update (“ASU”) No. 2016-02, “*Leases*” and ASU No. 2018-11 “*Leases (Topic 842)*”, collectively (“Topic 842”) as of January 1, 2019, using the modified retrospective approach, applying the new lease standard at the adoption date. We elected the package of practical expedients permitted under the transition guidance within the new standard, carrying forward the historical lease classification for both operating and finance leases. We made an accounting policy election to keep leases with an initial term of 12 months or less off of the balance sheet. We recognize the lease expense relating to operating leases on a straight-line basis over the respective lease term and report the associated expense within the operating activities section of our statement of cash flows. We recognize the interest expense on our finance lease within the operating activities section of our statement of cash flows and recognize the payment of principal of our finance lease obligation within the financing activities section of our statement of cash flows.

The adoption of Topic 842 resulted in the recording of additional net operating lease assets and related lease liabilities of \$7.5 million as of January 1, 2019. We also reclassified \$22.1 million net, of previously capitalized property, plant and equipment associated with the sale of our corporate headquarters, as well as \$0.8 million of prepaid transaction costs, as finance lease assets, within our balance sheet. The related finance lease liability associated with the sale-leaseback increased \$0.8 million as a result of the reclassification of the prepaid transaction costs. The standard had no impact on our consolidated net earnings and cash flows.

(b) Accounting Standards Update 2018-13 on Fair Value Measurements to be Effective January 1, 2020

We adopted ASU No. 2018-13 “*Fair Value Measurement (Topic 820)*” as of January 1, 2019. The amendments in ASU No. 2018-13 modify the disclosure requirements on fair value measurements in Topic 820, removing disclosure requirements for transfers between Level 1 and Level 2 within the fair value hierarchy, as well as modifying the disclosure requirement relating to the timing of liquidation for investments calculated on net asset value. The ASU also requires the disclosure of unrealized gains and losses for the period included in other comprehensive income for Level 3 instruments. The amendments on changes for unrealized gains and losses should be applied prospectively for only the most recent interim or annual period presented in the initial fiscal year of adoption. The adoption of ASU 2018-13 did not have any impact on our consolidated financial statements and disclosures.

(c) Accounting Standards Update 2019-04 on Financial Instruments; Topic 326, Topic 815 and Topic 825 to be Effective January 1, 2020

In April 2019, the Financial Accounting Standards Board issued ASU No. 2019-04 “*Codification Improvements to Topic 326, Financial Instruments – Credit Losses, Topic 815, Derivatives and Hedging, and Topic 825, Financial Instruments.*” The amendments in this Update clarify the guidance within Topic 326 relating to credit losses. The guidance is effective for annual reporting periods beginning after December 15, 2019, and interim periods within those years. Early adoption is permitted in any interim period after issuance of this Update as long as the entity has adopted the amendments in Update 2016-13. The amendments in these Updates should be applied on a modified-retrospective basis by means of a cumulative-effect adjustment to the opening retained earnings balance in the statement of financial position as of the date of adoption of Update 2016-13. The adoption of these Updates is not expected to have a material impact on our results of operations or cash flows.

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

Certain statements within "Management's Discussion and Analysis of Financial Condition and Results of Operations" are forward-looking statements that involve risks and uncertainties. Words such as may, will, should, would, anticipates, expects, intends, plans, believes, seeks, estimates and similar expressions identify such forward-looking statements. The forward-looking statements contained herein are based on current expectations and entail various risks and uncertainties that could cause actual results to differ materially from those expressed in such forward-looking statements. Factors that might cause such a difference include, among other things, those set forth under "Liquidity and Capital Resources" below and under "Risk Factors" in Part II, Item 1A to our [annual report on Form 10-K for the year ended December 31, 2018](#), which discussion is incorporated herein by reference. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect management's analysis only as of the date hereof. We assume no obligation to update these forward-looking statements to reflect actual results or changes in factors or assumptions affecting forward-looking statements, except as may be required by law.

Overview

We are a producer of ion implantation and other processing equipment used in the fabrication of semiconductor chips in the United States, Europe and Asia. In addition, we provide extensive worldwide aftermarket service and support, including spare parts, equipment upgrades and maintenance services to the semiconductor industry. Consolidation and partnering within the semiconductor manufacturing industry has resulted in a small number of customers representing a substantial portion of our business. Our ten largest customers accounted for 83.2% of total revenue for the three months ended March 31, 2019.

Our product development and manufacturing activities occur primarily in the United States. Our equipment and service products are highly technical and are sold primarily through a direct sales force in the United States, Europe and Asia. In the first quarter of 2019, our revenues were adversely affected by the current industry slowdown, but we delivered solid financial performance driven by improved gross margin.

Critical Accounting Estimates

Management's discussion and analysis of our financial condition and results of operations included herein and in our Annual Report on Form 10-K for the year ended December 31, 2018 are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent assets and liabilities. On an on-going basis, we evaluate our estimates and assumptions. Management's estimates are based on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Management has not identified any need to make any material change in, and has not changed, any of our critical accounting estimates and judgments as described in Management's Discussion and Analysis of Financial Conditions and Results of Operations included in our Annual Report on Form 10-K for the year ended December 31, 2018.

Results of Operations

The following table sets forth our results of operations as a percentage of total revenue:

	Three months ended March 31,	
	2019	2018
Revenue:		
Product	92.0 %	95.0 %
Services	8.0	5.0
Total revenue	100.0	100.0
Cost of revenue:		
Product	51.7	56.0
Services	7.3	5.4
Total cost of revenue	59.0	61.4
Gross profit	41.0	38.6
Operating expenses:		
Research and development	15.0	10.0
Sales and marketing	9.7	6.9
General and administrative	8.5	6.6
Total operating expenses	33.2	23.5
Income from operations	7.8	15.1
Other (expense) income:		
Interest income	0.9	0.3
Interest expense	(1.3)	(1.1)
Other, net	(0.2)	(0.1)
Total other expense	(0.6)	(0.9)
Income before income taxes	7.2	14.2
Income tax provision	0.5	2.9
Net income	6.7 %	11.3 %

Revenue

The following table sets forth our revenue:

	Three months ended March 31,		Period-to-Period Change	
	2019	2018	\$	%
(dollars in thousands)				
Revenue:				
Product	\$ 84,197	\$ 116,022	\$(31,825)	(27.4)%
Percentage of revenue	92.0 %	95.0 %		
Services	7,280	6,163	1,117	18.1 %
Percentage of revenue	8.0 %	5.0 %		
Total revenue	\$ 91,477	\$ 122,185	\$(30,708)	(25.1)%

Three months ended March 31, 2019 Compared with Three months ended March 31, 2018

Product

Product revenue, which includes systems sales, sales of spare parts, product upgrades and used systems was \$84.2 million, or 92.0% of revenue during the three months ended March 31, 2019, compared with \$116.0 million, or 95.0% of revenue for the three months ended March 31, 2018. The \$31.8 million decrease in product revenue for the three

month period ending March 31, 2019, in comparison to the same period in 2018, was primarily driven by a decrease in the number of systems sold.

A portion of our revenue from systems sales is deferred until installation and other services related to future performance obligations are performed. The total amount of deferred revenue at March 31, 2019 and December 31, 2018 was \$20.5 million and \$22.6 million, respectively. The net decrease in deferred revenue is primarily due to the timing of systems acceptances.

Services

Services revenue, which includes the labor component of maintenance and service contracts and fees for service hours provided by on-site service personnel, was \$7.3 million, or 8.0% of revenue for the three months ended March 31, 2019, compared with \$6.2 million, or 5.0% of revenue for the three months ended March 31, 2018. Although services revenue typically increases with the expansion of the installed base of systems, it can fluctuate from period to period based on capacity utilization at customers' manufacturing facilities, which affects the need for equipment service.

Revenue Categories used by Management

In addition to the line item revenue categories discussed above, management also regularly disaggregates revenue in the following categories, which it finds relevant and useful:

- Ion implant revenue separate from revenue from legacy non-implant product lines, given that ion implantation systems are critical to our growth and strategic objectives;
- Systems and aftermarket revenues, in which "Aftermarket" is
 - A. the portion of Product revenue relating to spare parts, product upgrades and used systems combined with
 - B. Services revenue, which is the labor component of aftermarket revenues;

Aftermarket purchases reflect current fab utilization as opposed to Systems purchases which reflect capital investment decisions by our customers, which have differing economic drivers;

- Revenue by geographic regions, since economic factors impacting customer purchasing decisions may vary by geographic region; and
- Revenue by our customer market segments, since they can be subject to different economic drivers at different periods of time, impacting a customer's likelihood of purchasing capital equipment during any particular period. Currently, management references three customer market segments: memory, mature technology processes and leading edge foundry and logic.

The ion implant and aftermarket revenue categories for recent periods are discussed below.

Three months ended March 31, 2019 Compared with Three months ended March 31, 2018

Ion Implant

Included in total revenue of \$91.5 million during the three months ended March 31, 2019 is revenue from sales of ion implant of \$57.1 million, or 62.4% of total revenue, compared with \$85.5 million, or 70.0%, of total revenue for the three months ended March 31, 2018.

Aftermarket

Included in total revenue of \$91.5 million during the three months ended March 31, 2019 is revenue from our aftermarket business of \$34.4 million, compared to \$36.7 million for the three months ended March 31, 2018. Aftermarket

revenue fluctuates from period to period based on capacity utilization at customers' manufacturing facilities, which affects the sale of spare parts and demand for equipment service. Aftermarket revenue can also fluctuate from period to period based on the demand for system upgrades or used tools.

Gross Profit / Gross Margin

The following table sets forth our gross profit / gross margin:

	Three months ended March 31,		Period-to-Period Change	
	2019	2018	\$	%
	(dollars in thousands)			
Gross Profit:				
Product	\$ 36,859	\$ 47,648	\$ (10,789)	(22.6)%
<i>Product gross margin</i>	43.8 %	41.1 %		
Services	647	(492)	1,139	231.5 %
<i>Services gross margin</i>	8.9 %	(8.0)%		
Total gross profit	\$ 37,506	\$ 47,156	\$ (9,650)	(20.5)%
Gross margin	41.0 %	38.6 %		

Three months ended March 31, 2019 Compared with Three months ended March 31, 2018

Product

Gross margin from product revenue was 43.8% for the three months ended March 31, 2019, compared to 41.1% for the three months ended March 31, 2018. The increase in gross margin of 2.7 percentage points resulted from a higher mix of parts and upgrade revenue and a lower mix of systems revenue.

Services

Gross margin from services revenue was 8.9% for the three months ended March 31, 2019, compared to (8.0)% for the three months ended March 31, 2018. The increase in gross margin is attributable to changes in the mix of service contracts.

Operating Expenses

The following table sets forth our operating expenses:

	Three months ended March 31,		Period-to-Period Change	
	2019	2018	\$	%
	(dollars in thousands)			
Research and development	\$ 13,685	\$ 12,233	\$ 1,452	11.9 %
<i>Percentage of revenue</i>	15.0 %	10.0 %		
Sales and marketing	8,918	8,411	507	6.0 %
<i>Percentage of revenue</i>	9.7 %	6.9 %		
General and administrative	7,807	8,010	(203)	(2.5)%
<i>Percentage of revenue</i>	8.5 %	6.6 %		
Total operating expenses	\$ 30,410	\$ 28,654	\$ 1,756	6.1 %
<i>Percentage of revenue</i>	33.2 %	23.5 %		

Our operating expenses consist primarily of personnel costs, including salaries, commissions, expected incentive plan payouts, stock-based compensation and related benefits and taxes; project material costs related to the design and development of new products and enhancement of existing products; and professional fees, travel and depreciation expenses.

Personnel costs are our largest expense, representing \$17.8 million or 58.4% of our total operating expenses for the three month period ended March 31, 2019, relatively flat when compared to \$17.9 million or 62.5% of our total operating expenses for the three month period ended March 31, 2018.

Research and Development

	Three months ended March 31,		Period-to-Period Change	
	2019	2018	\$	%
	(dollars in thousands)			
Research and development	\$ 13,685	\$ 12,233	\$ 1,452	11.9 %
<i>Percentage of revenue</i>	15.0 %	10.0 %		

Our ability to remain competitive depends largely on continuously developing innovative technology, with new and enhanced features and systems and introducing them at competitive prices on a timely basis. Accordingly, based on our strategic plan, we establish annual R&D budgets to fund programs that we expect will provide customers with competitive performance advantages.

Three months ended March 31, 2019 Compared with Three months ended March 31, 2018

Research and development expense was \$13.7 million during the three months ended March 31, 2019, a \$1.5 million, or 11.9%, increase from \$12.2 million during the three months ended March 31, 2018. The increase is primarily due to increased outside services and project materials cost to support the development of new products and enhancements of existing products.

Sales and Marketing

	Three months ended March 31,		Period-to-Period Change	
	2019	2018	\$	%
	(dollars in thousands)			
Sales and marketing	\$ 8,918	\$ 8,411	\$ 507	6.0 %
<i>Percentage of revenue</i>	9.7 %	6.9 %		

Our sales and marketing expenses result primarily from the sale of our equipment and services through our direct sales force. Moving forward, we will incur expenses associated with implementing the agreement with Screen Semiconductor Solutions Co. Ltd., to distribute Purion products to customers in Japan.

Three months ended March 31, 2019 Compared with Three months ended March 31, 2018

Sales and marketing expense was \$8.9 million during the three months ended March 31, 2019, an increase of \$0.5 million, or 6.0%, compared with \$8.4 million during the three months ended March 31, 2018. The increase is primarily due to an increase in expense associated with evaluation tools.

General and Administrative

	Three months ended March 31,		Period-to-Period Change	
	2019	2018	\$	%
	(dollars in thousands)			
General and administrative	\$ 7,807	\$ 8,010	\$ (203)	(2.5)%
<i>Percentage of revenue</i>	8.5 %	6.6 %		

Our general and administrative expenses result primarily from the costs associated with our executive, finance, information technology, legal and human resource functions.

Three months ended March 31, 2019 Compared with Three months ended March 31, 2018

General and administrative expense was \$7.8 million during the three months ended March 31, 2019, relatively flat when compared with \$8.0 million during the three months ended March 31, 2018.

Other (Expense) Income

	Three months ended March 31,		Period-to-period change	
	2019	2018	\$	%
	(dollars in thousands)			
Other expense	\$ (562)	\$ (1,029)	\$ 467	45.4 %
<i>Percentage of revenue</i>	<i>(0.6)%</i>	<i>(0.9)%</i>		

Other (expense) income consists primarily of interest relating to the finance lease obligation we incurred in connection with the 2015 sale of our headquarters facility (“sale leaseback”) and other financing obligations, foreign exchange gains and losses attributable to fluctuations of the U.S dollar against local currencies of certain of the countries in which we operate as well as interest earned on our invested cash balances.

Other expense was \$0.6 million for the three months ended March 31, 2019, compared with \$1.0 million for the three months ended March 31, 2018. The decrease in other expense for the three month period ended March 31, 2019 compared to the three month period ended March 31, 2018, was primarily due to increased interest earned on our invested cash balances.

During the three month period ended March 31, 2019, we had no significant off-balance-sheet risk such as exchange contracts, option contracts or other hedging arrangements. During the three month period ended March 31, 2018, with the exception of operating lease agreements entered into by us, we had no significant off-balance-sheet risk such as exchange contracts, option contracts or other hedging arrangements

Income Tax Provision

	Three months ended March 31,		Period-to-period change	
	2019	2018	\$	%
	(dollars in thousands)			
Income tax provision	\$ 472	\$ 3,558	\$ (3,086)	86.7 %
<i>Percentage of revenue</i>	<i>0.5 %</i>	<i>2.9 %</i>		

The income tax provision was \$0.5 million during the three months ended March 31, 2019, a decrease of \$3.1 million, when compared to the three months ended March 31, 2018. Of the \$3.1 million decrease, \$2.3 million was attributable to the decrease in pretax income of \$10.9 million, \$0.3 million related to an increase in excess tax benefit on the exercise of non-qualified stock options and the vesting of restricted stock and a \$0.3 million tax benefit recognized upon the expiration of the statute of limitations regarding an uncertain tax position previously recorded. The related interest and penalties previously accrued associated with the uncertain tax position were reversed, resulting in a reduction to interest expense of \$0.1 million.

At December 31, 2018, we had \$71.9 million of deferred tax assets worldwide relating to net operating loss carryforwards, tax credit carryforwards and other temporary differences, which are available to reduce income taxes in future years. Management considered the weight of all available evidence in determining whether a valuation allowance was required against our deferred tax assets at December 31, 2018. After consideration of both positive and negative evidence, management concluded in 2018 that it is more likely than not that a substantial portion of the Company’s deferred tax assets will be realized. The positive evidence considered was three year U.S. historical cumulative profitability, projected future taxable income and length of carry-forward periods of net operating losses and tax credits. The primary negative evidence considered was the volatility of the semiconductor industry in which we operate. We have continued to maintain a \$6.8 million valuation allowance in the U.S. against certain tax credits and state net operating losses due to the uncertainty of their realization based on our long-term forecasts and the expiration dates on these attributes. As of March

31, 2019, there were no known facts, that when considered, would require us to change our position on our ability to realize our deferred tax assets.

Liquidity and Capital Resources

We had \$163.1 million in unrestricted cash and cash equivalents at March 31, 2019, in addition to \$6.9 million in restricted cash, primarily comprised of the \$5.9 million security deposit for the lease of our corporate headquarters. Management believes that maintaining a strong cash balance is necessary to provide funding for potential ramps in our business which can require significant cash investment to meet sudden demand. Additionally, we have begun efforts to identify both organic and inorganic opportunities to drive future growth, for which cash resources will be necessary.

Our liquidity is affected by many factors. Some of these relate specifically to the operations of our business, for example, the rate of sale of our products, and others relate to the uncertainties of global economic conditions, including the availability of credit and the condition of the overall semiconductor equipment industry. Our established cost structure, other than cost of goods sold, does not vary significantly with changes in volume. We experience fluctuations in operating results and cash flows depending on these factors.

During the three months ended March 31, 2019, we used \$12.4 million of cash related to operating activities. This was predominately driven by inventory purchases and payments to our vendors. In comparison, during the three months ended March 31, 2018, we generated \$8.5 million of cash from operations.

Investing activities for the three months ended March 31, 2019 and 2018 resulted in cash outflows of \$4.3 million and \$0.7 million, respectively, used for capital expenditures.

Financing activities for the three months ended March 31, 2019 provided net cash proceeds of \$1.5 million, relating to exercise of stock options, partially offset by cash payments made to government tax authorities for income tax withholding on RSU vesting, where shares are withheld by the Company. Financing activities for the three months ended March 31, 2018 provided net cash of \$0.2 million primarily relating to the proceeds from the exercise of stock options.

We believe that based on our current market, revenue, expense and cash flow forecasts, our existing cash, cash equivalents and borrowing capacity will be sufficient to satisfy our anticipated cash requirements for the short and long-term. We currently have no credit facility but management believes we would be able to borrow on reasonable terms if needed.

On January 14, 2019 we announced that our Board of Directors authorized a one-year share repurchase program of up to \$35 million of our common stock. These shares may be purchased in the open market or through privately negotiated transactions. We have no obligation to repurchase shares under the authorization, and the timing, actual number and value of shares which are repurchased will depend on a number of factors, including the price of our common stock, general business and market conditions, and alternative investment opportunities. We may suspend or discontinue the repurchase program at any time.

Commitments and Contingencies

Significant commitments and contingencies at March 31, 2019 are consistent with those discussed in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and Note 16 to the consolidated financial statements in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018.

Item 3. Quantitative and Qualitative Disclosures about Market Risk.

As of March 31, 2019, there have been no material changes to the quantitative information about market risk disclosed in Item 7A to our annual report on Form 10-K for the year ended December 31, 2018.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”) as of the end of the period covered by this report (the “Evaluation Date”). Based on this evaluation, our principal executive officer and principal financial officer concluded that, as of the Evaluation Date, these disclosure controls and procedures are effective.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) identified in connection with the evaluation of our internal control that occurred during the three months ended March 31, 2019 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings.

We are, from time to time, a party to litigation that arises in the normal course of our business operations. We are not presently a party to any litigation that we believe might have a material adverse effect on our business operations.

Item 1A. Risk Factors.

As of March 31, 2019, there have been no material changes to the risk factors described in Item 1A to our annual report on Form 10-K for the year ended December 31, 2018.

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

Our Board of Directors has approved a program for us to repurchase shares of our common stock. As of March 31, 2019, \$35 million remained available for stock repurchases pursuant to our stock repurchase program.

Our stock repurchase authorization expires at the end of 2019 and the pace of our repurchase activity will depend on factors such as our working capital needs, our cash requirements for business development, our stock price, and economic and market conditions. Our stock repurchases may be effected from time to time through open market purchases or pursuant to a Rule 10b5-1 plan, if one is adopted. Our stock repurchase program may be accelerated, suspended, delayed or discontinued at any time.

The following table summarizes the stock repurchase activity for the three months ended March 31, 2019 and the approximate dollar value of shares that may yet be purchased pursuant to our stock repurchase program:

(in thousands, except per share amounts)	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Program	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Program
January 1, 2019 - March 31, 2019	—	N/A	—	\$ 35,000
Total	—		—	

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not Applicable.

Item 5. Other Information.

None.

Item 6. Exhibits.

The following exhibits are filed herewith:

Exhibit No	Description
3.1	Restated Certificate of Incorporation of the Company filed November 2, 2017. Incorporated by reference to Exhibit 3.1 of the Company's Form 10-Q filed with the Commission on November 3, 2017.
3.2	Bylaws of the Company, as amended as of May 13, 2014. Incorporated by reference to Exhibit 3.2 of the Company's Form 8-K filed with the Commission on May 19, 2014.
10.1	Axcelis Technologies, Inc. 2012 Equity Incentive Plan, as amended through February 5, 2019. Incorporated by reference to Exhibit 10.2 of the Company's Annual Report on Form 10-K, for the year ended December 31, 2018 filed with the Commission on March 11, 2019.
31.1	Certification of the Principal Executive Officer under Exchange Act Rule 13a-14(a)/15d-14(a) (Section 302 of the Sarbanes-Oxley Act), dated May 8, 2019. Filed herewith.
31.2	Certification of the Principal Financial Officer under Exchange Act Rule 13a-14(a)/15d-14(a) (Section 302 of the Sarbanes-Oxley Act), dated May 8, 2019. Filed herewith.
32.1	Certification of the Principal Executive Officer pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code (Section 906 of the Sarbanes-Oxley Act), dated May 8, 2019. Filed herewith.
32.2	Certification of the Principal Financial Officer pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code (Section 906 of the Sarbanes-Oxley Act), dated May 8, 2019. Filed herewith.
101	The following materials from the Company's Form 10-Q for the quarter ended March 31, 2019, formatted in eXtensible Business Reporting Language (XBRL): (i) Consolidated Statements of Operations, (ii) Consolidated Statements of Comprehensive Income, (iii) Consolidated Balance Sheets, (iv) Consolidated Statements of Cash Flows and (v) Notes to Consolidated Financial Statements (Unaudited). Filed herewith.

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.

DATED: May 8, 2019

AXCELIS TECHNOLOGIES, INC.

By: /s/ KEVIN J. BREWER

Kevin J. Brewer
Executive Vice President and Chief Financial Officer
Duly Authorized Officer and Principal Financial Officer

**CERTIFICATION
of the Principal Executive Officer
Pursuant to Rule 13a-14(a)/15d-14(a) (implementing Section 302 of the Sarbanes-Oxley Act)**

I, Mary G. Puma, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Axcelis Technologies, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) 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(s) 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 8, 2019

/s/ MARY G. PUMA

Mary G. Puma,
President and Chief Executive Officer

**CERTIFICATION
of the Principal Financial Officer
Pursuant to Rule 13a-14(a)/15d-14(a) (implementing Section 302 of the Sarbanes-Oxley Act)**

I, Kevin J. Brewer, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Axcelis Technologies, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) 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(s) 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 8, 2019

/s/ KEVIN J. BREWER

Kevin J. Brewer,
Executive Vice President and Chief Financial Officer

AXCELIS TECHNOLOGIES, INC.
Certification of the Principal Executive Officer
Pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code

The undersigned Chief Executive Officer of Axcelis Technologies, Inc., a Delaware corporation, hereby certifies, for the purposes of Section 1350 of Chapter 63 of title 18 of the United States Code (as implemented by Section 906 of the Sarbanes-Oxley Act of 2002) as follows:

This Form 10-Q quarterly report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)) and the information contained herein fairly presents, in all material respects, the financial condition and results of operations of the Company.

IN WITNESS WHEREOF, the undersigned has executed this Certification as of May 8, 2019.

/s/ MARY G. PUMA

Mary G. Puma
*President and Chief Executive Officer of Axcelis
Technologies, Inc.*

AXCELIS TECHNOLOGIES, INC.
Certification of the Principal Financial Officer
Pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code

The undersigned Chief Financial Officer of Axcelis Technologies, Inc., a Delaware corporation, hereby certifies, for the purposes of Section 1350 of Chapter 63 of title 18 of the United States Code (as implemented by Section 906 of the Sarbanes-Oxley Act of 2002) as follows:

This Form 10-Q quarterly report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)) and the information contained herein fairly presents, in all material respects, the financial condition and results of operations of the Company.

IN WITNESS WHEREOF, the undersigned has executed this Certification as of May 8, 2019.

/s/ KEVIN J. BREWER

Kevin J. Brewer
*Executive Vice President and Chief Financial Officer of
Axcelis Technologies, Inc.*
