

HARVARD BIOSCIENCE INC

FORM 10-Q (Quarterly Report)

Filed 11/02/17 for the Period Ending 09/30/17

Address	84 OCTOBER HILL RD HOLLISTON, MA, 01746
Telephone	5088938999
CIK	0001123494
Symbol	HBIO
SIC Code	3826 - Laboratory Analytical Instruments
Industry	Advanced Medical Equipment & Technology
Sector	Healthcare
Fiscal Year	12/31

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

WASHINGTON, DC 20549

FORM 10-Q

Quarterly report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

For the quarterly period ended September 30, 2017

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 001-33957

HARVARD BIOSCIENCE, INC.

(Exact Name of Registrant as Specified in Its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

84 October Hill Road, Holliston, MA
(Address of Principal Executive Offices)

04-3306140
(IRS Employer
Identification No.)

01746
(Zip Code)

(508) 893-8999
(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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). YES NO

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/> (Do not check if a smaller reporting company)	Smaller reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

As of October 27, 2017, there were 34,880,512 shares of common stock, par value \$0.01 per share, outstanding.

HARVARD BIOSCIENCE, INC.
FORM 10-Q
For the Quarter Ended September 30, 2017

INDEX

	Page
<u>PART I - FINANCIAL INFORMATION</u>	<u>3</u>
<u>Item 1. Financial Statements</u>	<u>3</u>
<u>Consolidated Balance Sheets as of September 30, 2017 and December 31, 2016 (unaudited)</u>	<u>3</u>
<u>Consolidated Statements of Operations and Comprehensive Income (Loss) for the Nine Months Ended September 30, 2017 and 2016 (unaudited)</u>	<u>4</u>
<u>Consolidated Statements of Cash Flows for the Nine Months Ended September 30, 2017 and 2016 (unaudited)</u>	<u>5</u>
<u>Notes to Unaudited Consolidated Financial Statements</u>	<u>6</u>
<u>Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations</u>	<u>18</u>
<u>Item 3. Quantitative and Qualitative Disclosures about Market Risk</u>	<u>29</u>
<u>Item 4. Controls and Procedures</u>	<u>30</u>
<u>PART II - OTHER INFORMATION</u>	<u>30</u>
<u>Item 1A. Risk Factors</u>	<u>30</u>
<u>Item 6. Exhibits</u>	<u>31</u>
<u>SIGNATURES</u>	<u>32</u>

PART I. FINANCIAL INFORMATION

Item 1. Financial Statements.

HARVARD BIOSCIENCE, INC.
CONSOLIDATED BALANCE SHEETS
(Unaudited, in thousands, except share and per share data)

	September 30, 2017	December 31, 2016
Assets		
Current assets:		
Cash and cash equivalents	\$ 5,836	\$ 5,596
Accounts receivable, net of allowance for doubtful accounts of \$600 and \$611, respectively	15,266	15,746
Inventories	21,380	19,955
Other receivables and other assets	4,917	4,175
Total current assets	47,399	45,472
Property, plant and equipment, net	4,265	4,296
Deferred income tax assets	1,273	1,157
Amortizable intangible assets, net	16,543	17,471
Goodwill	39,837	38,032
Other indefinite lived intangible assets	1,240	1,209
Other assets	121	128
Total assets	\$ 110,678	\$ 107,765
Liabilities and Stockholders' Equity		
Current liabilities:		
Current portion, long-term debt	\$ 2,765	\$ 2,372
Accounts payable	5,607	6,196
Deferred revenue	633	500
Accrued income taxes	207	223
Accrued expenses	4,483	4,550
Other liabilities - current	252	760
Total current liabilities	13,947	14,601
Long-term debt, less current installments	9,674	11,374
Deferred income tax liabilities	6,624	6,417
Other long term liabilities	3,528	3,177
Total liabilities	33,773	35,569
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, par value \$0.01 per share, 5,000,000 shares authorized	-	-
Common stock, par value \$0.01 per share, 80,000,000 shares authorized; 42,626,019 and 42,186,827 shares issued and 34,880,512 and 34,441,320 shares outstanding, respectively	418	418
Additional paid-in-capital	217,636	215,134
Accumulated deficit	(117,966)	(116,030)
Accumulated other comprehensive loss	(12,515)	(16,658)
Treasury stock at cost, 7,745,507 common shares	(10,668)	(10,668)
Total stockholders' equity	76,905	72,196
Total liabilities and stockholders' equity	\$ 110,678	\$ 107,765

See accompanying notes to unaudited consolidated financial statements.

HARVARD BIOSCIENCE, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)
(Unaudited, in thousands, except per share data)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
Revenues	\$ 25,050	\$ 25,007	\$ 74,419	\$ 78,106
Cost of revenues	13,411	13,317	39,994	41,796
Gross profit	<u>11,639</u>	<u>11,690</u>	<u>34,425</u>	<u>36,310</u>
Sales and marketing expenses	5,081	5,006	15,111	15,194
General and administrative expenses	4,534	4,783	14,144	15,979
Research and development expenses	1,538	1,309	4,119	4,236
Amortization of intangible assets	622	729	1,825	2,099
Impairment charges	-	676	-	676
Total operating expenses	<u>11,775</u>	<u>12,503</u>	<u>35,199</u>	<u>38,184</u>
Operating loss	<u>(136)</u>	<u>(813)</u>	<u>(774)</u>	<u>(1,874)</u>
Other (expense) income:				
Foreign exchange	(73)	138	(488)	411
Interest expense, net	(189)	(141)	(531)	(484)
Other expense, net	(12)	(64)	(122)	(143)
Other expense, net	<u>(274)</u>	<u>(67)</u>	<u>(1,141)</u>	<u>(216)</u>
Loss before income taxes	(410)	(880)	(1,915)	(2,090)
Income tax expense (benefit)	7	758	(51)	897
Net loss	<u>\$ (417)</u>	<u>\$ (1,638)</u>	<u>\$ (1,864)</u>	<u>\$ (2,987)</u>
Loss per share:				
Basic loss per common share	<u>\$ (0.01)</u>	<u>\$ (0.05)</u>	<u>\$ (0.05)</u>	<u>\$ (0.09)</u>
Diluted loss per common share	<u>\$ (0.01)</u>	<u>\$ (0.05)</u>	<u>\$ (0.05)</u>	<u>\$ (0.09)</u>
Weighted average common shares:				
Basic	<u>34,840</u>	<u>34,327</u>	<u>34,706</u>	<u>34,157</u>
Diluted	<u>34,840</u>	<u>34,327</u>	<u>34,706</u>	<u>34,157</u>
Comprehensive income (loss):				
Net loss	\$ (417)	\$ (1,638)	\$ (1,864)	\$ (2,987)
Foreign currency translation adjustments	1,181	(2,006)	4,189	(1,390)
Derivatives qualifying as hedges, net of tax:				
Gain (loss) on derivative instruments designated and qualifying as cash flow hedges	-	11	(89)	(37)
Amounts reclassified from accumulated other comprehensive loss to net loss	21	8	43	31
Total comprehensive income (loss)	<u>\$ 785</u>	<u>\$ (3,625)</u>	<u>\$ 2,279</u>	<u>\$ (4,383)</u>

See accompanying notes to unaudited consolidated financial statements.

HARVARD BIOSCIENCE, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited, in thousands)

	Nine Months Ended September 30,	
	2017	2016
Cash flows from operating activities:		
Net loss	\$ (1,864)	\$ (2,987)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock compensation expense	2,604	2,596
Depreciation	1,009	1,173
Impairment charges	-	676
Non-cash restructuring credits	-	(27)
Amortization of catalog costs	31	13
Provision for allowance for doubtful accounts	1	59
Amortization of intangible assets	1,825	2,099
Amortization of deferred financing costs	36	72
Deferred income taxes	-	455
Changes in operating assets and liabilities:		
Decrease in accounts receivable	1,000	2,145
(Increase) decrease in inventories	(608)	735
Increase in other receivables and other assets	(563)	(742)
Decrease in trade accounts payable	(786)	(2,785)
Increase (decrease) in accrued income taxes	35	(158)
(Decrease) increase in accrued expenses	(830)	296
Increase in deferred revenue	99	29
Increase in other liabilities	7	7
Net cash provided by operating activities	<u>1,996</u>	<u>3,656</u>
Cash flows used in investing activities:		
Additions to property, plant and equipment	(677)	(920)
Additions to catalog costs	(39)	(34)
Net cash used in investing activities	<u>(716)</u>	<u>(954)</u>
Cash flows used in financing activities:		
Proceeds from issuance of debt	2,250	3,000
Repayments of debt	(3,502)	(6,738)
(Net taxes paid for) net proceeds from issuance of common stock	(101)	80
Net cash used in financing activities	<u>(1,353)</u>	<u>(3,658)</u>
Effect of exchange rate changes on cash	313	(443)
Increase (decrease) in cash and cash equivalents	240	(1,399)
Cash and cash equivalents at the beginning of period	5,596	6,744
Cash and cash equivalents at the end of period	<u>\$ 5,836</u>	<u>\$ 5,345</u>
Supplemental disclosures of cash flow information:		
Cash paid for interest	\$ 503	\$ 468
Cash (refunded) paid for income taxes	\$ (96)	\$ 725

See accompanying notes to unaudited consolidated financial statements.

HARVARD BIOSCIENCE, INC.
NOTES TO UNAUDITED CONSOLIDATED FINANCIAL STATEMENTS

1. Basis of Presentation and Summary of Significant Accounting Policies

Basis of Presentation

The unaudited consolidated financial statements of Harvard Bioscience, Inc. and its wholly-owned subsidiaries (collectively, Harvard Bioscience or the Company) as of September 30, 2017 and for the three and nine months ended September 30, 2017 and 2016 have been prepared by the Company pursuant to the rules and regulations of the Securities and Exchange Commission (SEC). Certain information and footnote disclosures normally included in financial statements prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP) have been condensed or omitted pursuant to such rules and regulations. The December 31, 2016 consolidated balance sheet was derived from audited financial statements, but does not include all disclosures required by U.S. GAAP. However, the Company believes that the disclosures are adequate to make the information presented not misleading. These unaudited consolidated financial statements should be read in conjunction with the consolidated financial statements and the notes thereto included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2016, which was filed with the SEC on March 17, 2017.

In the opinion of management, all adjustments, which include normal recurring adjustments necessary to present a fair statement of financial position as of September 30, 2017, results of operations and comprehensive loss for the three and nine months ended September 30, 2017 and 2016 and cash flows for the nine months ended September 30, 2017 and 2016, as applicable, have been made. The results of operations for the nine months ended September 30, 2017 are not necessarily indicative of the operating results for the full fiscal year or any future periods.

Summary of Significant Accounting Policies

The accounting policies underlying the accompanying unaudited consolidated financial statements are those set forth in Note 2 to the consolidated financial statements included in the Company's Annual Report on Form 10-K for the year ended December 31, 2016, which was filed with the SEC on March 17, 2017.

2. Recently Issued Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers*, a new accounting standard that provides for a comprehensive model to use in the accounting for revenue arising from contracts with customers that will replace most existing revenue recognition guidance within generally accepted accounting principles in the United States. Under this standard, revenue will be recognized to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the Company expects to be entitled in exchange for those goods or services. The Company expects to adopt this standard as of January 1, 2018 using the modified retrospective approach.

The Company is in the process of evaluating the impact of the new standard on its consolidated financial position, results of operations and cash flows. As part of this process, the Company has conducted a comprehensive assessment of its contracts concerning any unique customer contract terms or transactions that could have implications under the new guidance. The Company has identified its significant revenue streams, which currently consist primarily of product revenue transactions, and to a lesser extent, extended warranty transactions on certain product sales, and revenues from government contracts. The Company is in the process of updating its revenue recognition policy, systems, and internal controls in response to the new update. The Company does not expect material changes to the timing of revenue recognition, nor does it expect significant changes to its systems or internal controls.

Finally, the Company is evaluating the disclosure requirements under the new standard, which are generally more expansive than current guidance. The Company expects these undertakings will be complete in the fourth quarter of 2017. Based on procedures to date, the Company does not anticipate material changes to its consolidated financial statements. The Company continues to work through the adoption process and it is possible that these preliminary conclusions could change.

In February 2016, the FASB issued ASU 2016-02, *Leases*, which is intended to improve financial reporting about leasing transactions. The update requires a lessee to record on the balance sheet the assets and liabilities for the rights and obligations created by lease terms of more than 12 months. The update is effective for fiscal years beginning after December 15, 2018. The Company has commenced the process of evaluating the requirements of the standard as well as collecting information on all its leases. The Company has not yet concluded on the impact of the adoption on its consolidated financial position, results of operations and cash flows, however, assets and liabilities will increase upon adoption for right-of-use assets and lease liabilities. The Company's future commitments under lease obligations are summarized in Note 10.

In May 2017, the FASB issued ASU 2017-09, *Stock compensation (Topic 718): Scope of modification accounting* which amends the scope of modification accounting for share-based payment arrangements. The ASU provides guidance on the types of changes to the terms or conditions of share-based payment awards to which an entity would be required to apply modification accounting under ASC 718. Specifically, an entity would not apply modification accounting if the fair value, vesting conditions, and classification of the awards are the same immediately before and after the modification. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2017. Early adoption is permitted, including adoption in any interim period. The Company has evaluated the requirements of this guidance and does not expect the adoption of the standard to have a material impact on its consolidated financial position, results of operations and cash flows.

In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815)* which amends the hedge accounting recognition and presentation requirements in ASC 815. The Board's objectives in issuing the ASU are to (1) improve the transparency and understandability of information conveyed to financial statement users about an entity's risk management activities by better aligning the entity's financial reporting for hedging relationships with those risk management activities and (2) reduce the complexity of and simplify the application of hedge accounting by preparers. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2018. Early adoption is permitted, including adoption in any interim period. The Company is evaluating the requirements of this guidance and has not yet determined the impact of the adoption on its consolidated financial position, results of operations and cash flows.

Recently Adopted Accounting Pronouncements

In March 2016, the FASB issued ASU 2016-09, *Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*, which simplifies the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities and classification on the statement of cash flows.

The standard requires an entity to recognize all excess tax benefits and tax deficiencies as income tax benefit or expense in the income statement as discrete items in the reporting period in which they occur, and such tax benefits and tax deficiencies are not included in the estimate of an entity's annual effective tax rate, applied on a prospective basis. Further, the standard eliminates the requirement to defer the recognition of excess tax benefits until the benefit is realized through a reduction to taxes payable. All excess tax benefits previously unrecognized, along with any valuation allowance, should be recognized on a modified retrospective basis as a cumulative adjustment to retained earnings as of the date of adoption. Under ASU 2016-09, an entity that applies the treasury stock method in calculating diluted earnings per share is required to exclude excess tax benefits and deficiencies from the calculation of assumed proceeds since such amounts are recognized in the income statement. Excess tax benefits should also be classified as operating activities in the same manner as other cash flows related to income taxes on the statement of cash flows, as such excess tax benefits no longer represent financing activities since they are recognized in the income statement, and should be applied prospectively or retrospectively to all periods presented.

The Company adopted ASU 2016-09 as of January 1, 2017. The Company recorded a cumulative increase in retained earnings of \$0.5 million at the beginning of the first quarter of 2017 with a corresponding increase in deferred tax assets related to the prior years' unrecognized excess tax benefits. An equal amount of valuation allowance was also recorded against these deferred tax assets with a corresponding decrease to retained earnings resulting in no net impact to retained earnings and deferred tax assets. In addition, tax deficiencies related to vested restricted stock units and canceled stock options during the nine months ended September 30, 2017 have been recognized in the current period's income statement.

ASU 2016-09 also allows an entity to elect as an accounting policy either to continue to estimate the total number of awards for which the requisite service period will not be rendered or to account for forfeitures for service based awards as they occur. An entity that elects to account for forfeitures as they occur should apply the accounting change on a modified retrospective basis as a cumulative effect adjustment to retained earnings as of the date of adoption. The Company elected as an accounting policy to account for forfeitures for service based awards as they occur, and as a result, the Company recorded a cumulative effect adjustment of \$0.1 million to reduce retained earnings with a corresponding increase in additional paid in capital related to the prior years' stock-based compensation expense as required under the modified retrospective approach. The tax effect of this adjustment, which included the impact of a valuation allowance was immaterial.

3. Accumulated Other Comprehensive Loss

Changes in each component of accumulated other comprehensive loss, net of tax are as follows:

(in thousands)	Foreign currency translation adjustments	Derivatives qualifying as hedges	Defined benefit pension plans	Total
Balance at December 31, 2016	\$ (14,200)	\$ -	\$ (2,458)	\$ (16,658)
Other comprehensive income before reclassifications	4,189	(89)	-	4,100
Amounts reclassified from AOCI	-	43	-	43
Other comprehensive income	4,189	(46)	-	4,143
Balance at September 30, 2017	<u>\$ (10,011)</u>	<u>\$ (46)</u>	<u>\$ (2,458)</u>	<u>\$ (12,515)</u>

4. Goodwill and Other Intangible Assets

Intangible assets consist of the following:

	September 30, 2017		December 31, 2016		Weighted Average Life	(a)
	(in thousands)					
	Gross	Accumulated Amortization	Gross	Accumulated Amortization		
Amortizable intangible assets:						
Existing technology	\$ 16,090	\$ (12,948)	\$ 15,082	\$ (11,710)	6.6	Years
Trade names	7,639	(3,931)	7,379	(3,479)	7.3	Years
Distribution agreements/customer relationships	23,713	(14,081)	22,976	(12,862)	8.3	Years
Patents	223	(162)	204	(119)	1.4	Years
Total amortizable intangible assets	<u>47,665</u>	<u>\$ (31,122)</u>	<u>45,641</u>	<u>\$ (28,170)</u>		
Indefinite-lived intangible assets:						
Goodwill	39,837		38,032			
Other indefinite-lived intangible assets	1,240		1,209			
Total goodwill and other indefinite-lived intangible assets	<u>41,077</u>		<u>39,241</u>			
Total intangible assets, gross	<u>\$ 88,742</u>		<u>\$ 84,882</u>			

(a) Weighted average life as of September 30, 2017.

The change in the carrying amount of goodwill for the nine months ended September 30, 2017 is as follows:

	(in thousands)
Balance at December 31, 2016	\$ 38,032
Effect of change in currency translation	1,805
Balance at September 30, 2017	<u>\$ 39,837</u>

Impairment of intangible assets

During the third quarter of 2016, the Company initiated plans to sell the operations of its AHN Biotechnologie GmbH subsidiary (AHN), a manufacturer of liquid handling products, located in Nordhausen, Germany. The Company assessed the held for sale accounting guidance, pursuant to ASC 360-10, and concluded that it had not met all the criteria for AHN's assets and liabilities to be classified as held for sale as of September 30, 2016. As such, AHN's assets and liabilities were presented as held and used, and the results of its operations included within continuing operations as of, and for the three and nine months ended September 30, 2016, respectively.

As a result of the Company initiating plans to sell the operations of AHN, the Company evaluated the long-lived assets for impairment, pursuant to ASC 360-10. Based on the impairment analysis, the carrying amount of the long-lived assets exceeded the fair value of the long-lived assets as determined using the probability weighted present value of future cash flows. As a result, the Company recognized an impairment charge of \$0.7 million for the three and nine months ended September 30, 2016 as part of operating expenses within its statements of operations. Of the overall charge, approximately \$0.1 million was allocated to its intangible assets (trade name and customer relationships), while the remainder of the charge was allocated to its property, plant and equipment (machinery and equipment).

On October 26, 2016, the Company sold AHN for \$1.7 million in cash proceeds.

Amortization of intangible assets

Intangible asset amortization expense was \$0.6 million and \$0.7 million for the three months ended September 30, 2017 and 2016, respectively. Intangible asset amortization expense was \$1.8 million and \$2.1 million for the nine months ended September 30, 2017 and 2016, respectively. Amortization expense of existing amortizable intangible assets is currently estimated to be \$2.5 million for the year ending December 31, 2017, \$2.4 million for the year ending December 31, 2018, \$2.2 million for the year ending December 31, 2019, \$2.2 million for the year ending December 31, 2020 and \$2.2 million for the year ending December 31, 2021.

5. Inventories

Inventories consist of the following:

	September 30, 2017	December 31, 2016
	(in thousands)	
Finished goods	\$ 9,737	\$ 9,340
Work in process	875	823
Raw materials	10,768	9,792
Total	<u>\$ 21,380</u>	<u>\$ 19,955</u>

6. Property, Plant and Equipment

As of September 30, 2017 and December 31, 2016, property, plant and equipment consist of the following:

	September 30, 2017	December 31, 2016
	(in thousands)	
Land, buildings and leasehold improvements	\$ 2,201	\$ 2,095
Machinery and equipment	7,844	7,224
Computer equipment and software	9,057	8,115
Furniture and fixtures	1,335	1,274
Automobiles	219	196
	<u>20,656</u>	<u>18,904</u>
Less: accumulated depreciation	<u>(16,391)</u>	<u>(14,608)</u>
Property, plant and equipment, net	<u>\$ 4,265</u>	<u>\$ 4,296</u>

7. Related Party Transactions

As part of the acquisitions of Multi Channel Systems MCS GmbH (MCS) and Triangle BioSystems, Inc. (TBSI) in 2014, the Company signed lease agreements with the former owners of the acquired companies. The principals of such former owners of MCS and TBSI were employees of the Company as of September 30, 2017 and 2016. Pursuant to a lease agreement, the Company incurred rent expense of approximately \$64 thousand and \$59 thousand to the former owners of MCS for the three months ended September 30, 2017 and 2016, respectively. The Company incurred rent expense of approximately \$11 thousand to the former owner of TBSI for both the three months ended September 30, 2017 and 2016. The Company incurred rent expense of approximately \$0.2 million to the former owners of MCS for both the nine months ended September 30, 2017 and 2016. The Company incurred rent expense of approximately \$32 thousand to the former owner of TBSI for both the nine months ended September 30, 2017 and 2016.

8. Warranties

Warranties are estimated and accrued at the time revenues are recorded. A rollforward of the Company's product warranty accrual is as follows:

	Beginning Balance	Payments	Additions	Ending Balance
	(in thousands)			
Year ended December 31, 2016	\$ 147	(97)	143	\$ 193
Nine months ended September 30, 2017	\$ 193	(21)	76	\$ 248

9. Employee Benefit Plans

One of the Company's subsidiaries in the United Kingdom, UK, Biochrom Limited, maintains contributory, defined benefit pension plans for substantially all of its employees. As of June 30, 2014, these defined benefit pension plans were closed to new employees, as well as closed to the future accrual of benefits for existing employees. The components of the Company's defined benefit pension expense were as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
	(in thousands)			
Components of net periodic benefit cost:				
Interest cost	\$ 141	\$ 156	\$ 399	\$ 492
Expected return on plan assets	(179)	(168)	(505)	(530)
Net amortization loss	98	74	276	233
Net periodic benefit cost	<u>\$ 60</u>	<u>\$ 62</u>	<u>\$ 170</u>	<u>\$ 195</u>

For the three months ended September 30, 2017 and 2016, the Company contributed \$0.2 million, for both periods, to its defined benefit pension plans. For the nine months ended September 30, 2017 and 2016, the Company contributed \$0.5 million, for both periods, to its defined benefit pension plans. The Company expects to contribute approximately \$0.1 million to its defined benefit pension plans during the remainder of 2017.

[Table of Contents](#)

The Company had an underfunded pension liability of approximately \$3.4 million and \$3.0 million, as of September 30, 2017 and December 31, 2016, respectively, included in the other long term liabilities line item in the consolidated balance sheets.

10. Leases

The Company has noncancelable operating leases for office and warehouse space expiring at various dates through 2022 and thereafter. Rent expense, which is recorded on a straight-line basis, is estimated to be \$1.9 million for the year ended December 31, 2017. Rent expense was approximately \$0.5 million for both the three months ended September 30, 2017 and 2016. Rent expense was approximately \$1.4 million for both the nine months ended September 30, 2017 and 2016, respectively.

Future minimum lease payments for operating leases, with initial or remaining terms in excess of one year at September 30, 2017, are as follows:

	Operating Leases
	(in thousands)
2018	\$ 1,739
2019	1,740
2020	1,537
2021	1,151
2022	1,133
Thereafter	1,879
Net minimum lease payments	<u>\$ 9,179</u>

11. Capital Stock

Common Stock

On February 5, 2008, the Company's Board of Directors adopted a Shareholder Rights Plan and declared a dividend distribution of one preferred stock purchase right for each outstanding share of the Company's common stock to shareholders of record as of the close of business on February 6, 2008. Initially, these rights will not be exercisable and will trade with the shares of the Company's common stock. Under the Shareholder Rights Plan, the rights generally will become exercisable if a person becomes an "acquiring person" by acquiring 20% or more of the common stock of the Company or if a person commences a tender offer that could result in that person owning 20% or more of the common stock of the Company. If a person becomes an acquiring person, each holder of a right (other than the acquiring person) would be entitled to purchase, at the then-current exercise price, such number of shares of preferred stock which are equivalent to shares of the Company's common stock having a value of twice the exercise price of the right. If the Company is acquired in a merger or other business combination transaction after any such event, each holder of a right would then be entitled to purchase, at the then-current exercise price, shares of the acquiring company's common stock having a value of twice the exercise price of the right. Unless the Board of Directors elects to extend such plan, the Shareholder Rights Plan will expire in February 2018.

Preferred Stock

The Company's Board of Directors has the authority to issue up to 5.0 million shares of preferred stock and to determine the price privileges and other terms of the shares. The Board of Directors may exercise this authority without any further approval of stockholders. As of September 30, 2017, the Company had no preferred stock issued or outstanding.

Employee Stock Purchase Plan (as amended, the ESPP)

In 2000, the Company approved the ESPP. Under this ESPP, participating employees can authorize the Company to withhold a portion of their base pay during consecutive six-month payment periods for the purchase of shares of the Company's common stock. At the conclusion of the period, participating employees can purchase shares of the Company's common stock at 85% of the lower of the fair market value of the Company's common stock at the beginning or end of the period. Shares are issued under the ESPP for the six-month periods ending June 30 and December 31. On May 18, 2017, the stockholders of the Company approved an increase of 300,000 shares of common stock in the number of shares available for issuance under the ESPP. Following such amendment, 1,050,000 shares of common stock are authorized for issuance, of which 762,141 shares were issued, as of September 30, 2017. There were 36,902 and 39,353 shares issued under the ESPP during the nine months ended September 30, 2017 and 2016, respectively.

Stock Option and Equity Incentive Plans

Third Amended and Restated 2000 Stock Option and Incentive Plan (as amended, the Third A&R Plan)

The Second Amendment to the Third A&R Plan (the Amendment) was adopted by the Board of Directors on April 3, 2015. Such Amendment was approved by the stockholders at the Company's 2015 Annual Meeting of Stockholders. Pursuant to the Amendment, the aggregate number of shares authorized for issuance under the Third A&R Plan was increased by 2,500,000 shares to 17,508,929.

Restricted Stock Units with a Market Condition (the Market Condition RSU's)

On August 3, 2015, the Compensation Committee of the Board of Directors of the Company approved and granted deferred stock awards of Market Condition RSU's to certain members of the Company's management team under the Third A&R Plan. The vesting of these Market Condition RSU's is cliff-based and linked to the achievement of a relative total shareholder return of the Company's common stock from August 3, 2015 to the earlier of (i) August 3, 2018 or (ii) upon a change of control (measured relative to the Russell 3000 index and based on the 20-day trading average price before each such date). As of September 30, 2017, the target number of these restricted stock units that may be earned is 170,903 shares; the maximum amount is 150% of the target number.

Stock-Based Payment Awards

The Company accounts for stock-based payment awards in accordance with the provisions of FASB ASC 718, which requires it to recognize compensation expense for all stock-based payment awards made to employees and directors including stock options, restricted stock units, Market Condition RSU's and employee stock purchases related to the ESPP.

The Company adopted ASU 2016-09 as of January 1, 2017. As disclosed in footnote 2, as a result of this adoption, the Company has elected as an accounting policy to account for forfeitures for service based awards as they occur, with no adjustment for estimated forfeitures. The Company recognized as of January 1, 2017, a cumulative effect adjustment of \$0.1 million to reduce retained earnings as required under the modified retrospective approach.

Stock option and restricted stock unit activity under the Company's Third A&R Plan for the nine months ended September 30, 2017 was as follows:

	Stock Options		Restricted Stock Units		Market Condition RSU's	
	Stock	Weighted Average	Restricted	Grant Date	Market Condition	Grant Date
	Options Outstanding	Exercise Price	Stock Units Outstanding	Fair Value	RSU's Outstanding	Fair Value
Balance at December 31, 2016	4,096,818	\$ 3.94	1,072,653	\$ 3.15	182,150	\$ 4.81
Granted	62,500	2.99	1,293,771	2.48	-	-
Exercised	(75,913)	2.49	-	-	-	-
Vested (RSUs)	-	-	(457,395)	3.09	-	-
Cancelled / forfeited	(303,013)	3.93	(70,486)	3.08	(11,247)	4.81
Balance at September 30, 2017	<u>3,780,392</u>	\$ 3.95	<u>1,838,543</u>	\$ 2.70	<u>170,903</u>	\$ 4.81

The weighted average fair value of the options granted under the Third A&R Plan during the three months ended September 30, 2017 and 2016 was \$1.24 and \$1.11, respectively. The weighted average fair value of the options granted under the Third A&R Plan during the nine months ended September 30, 2017 and 2016 was \$1.17 and \$1.21, respectively. The following assumptions were used to estimate the fair value, using the Black-Scholes option pricing model, of stock options granted during the three and nine months ended September 30, 2017 and 2016:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
Volatility	41.99%	43.05%	41.30%	41.97%
Risk-free interest rate	1.74%	1.01%	1.88%	1.29%
Expected holding period (in years)	5.10 years	5.08 years	5.16 years	5.21 years
Dividend yield	-%	-%	-%	-%

[Table of Contents](#)

The Company used historical volatility to calculate the expected volatility for each grant as of the grant date. Historical volatility was determined by calculating the mean reversion of the daily adjusted closing stock price. The risk-free interest rate assumption is based upon observed U.S. Treasury bill interest rates (risk-free) appropriate for the term of the Company's stock options and Market Condition RSU's. The expected holding period of stock options represents the period of time options are expected to be outstanding and is based on historical experience. The vesting period ranges from one to four years and the contractual life is ten years. The correlation coefficient, used to value the Market Condition RSU's, represents the way in which entities move in relation to the Russell 3000 index as a whole.

Stock-based compensation expense related to stock options, restricted stock units, Market Condition RSU's and the ESPP for the three and nine months ended September 30, 2017 and 2016 was allocated as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
	(in thousands)			
Cost of revenues	\$ 16	\$ 17	\$ 46	\$ 44
Sales and marketing	172	159	461	401
General and administrative	709	736	1,995	2,071
Research and development	36	31	102	80
Total stock-based compensation	\$ 933	\$ 943	\$ 2,604	\$ 2,596

The Company did not capitalize any stock-based compensation.

Earnings per share

Basic earnings per share is based upon net income divided by the number of weighted average common shares outstanding during the period. The calculation of diluted earnings per share assumes conversion of stock options, restricted stock units and Market Condition RSU's into common stock using the treasury method. The weighted average number of shares used to compute basic and diluted earnings per share consists of the following:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
Basic	34,840,324	34,327,459	34,705,947	34,156,606
Effect of assumed conversion of employee and director stock options, restricted stock units and Market Condition RSU's	-	-	-	-
Diluted	34,840,324	34,327,459	34,705,947	34,156,606

Excluded from the shares used in calculating the diluted earnings per common share in the above table are options, restricted stock units and Market Condition RSU's of approximately 5,789,838 and 5,300,945 shares of common stock for both the three and nine months ended September 30, 2017 and 2016, respectively, as the impact of these shares would be anti-dilutive.

12. Long Term Debt

On August 7, 2009, the Company entered into an Amended and Restated Revolving Credit Loan Agreement related to a \$20.0 million revolving credit facility with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co as lenders (as amended, the 2009 Credit Agreement). On March 29, 2013, the Company entered into a Second Amended and Restated Revolving Credit Agreement (as amended, the 2013 Credit Agreement) with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co, as lenders that amended and restated the 2009 Credit Agreement. Between September 2011 and May 2017, the Company entered into a series of amendments that among other things did the following:

- on September 30, 2011, reduced interest rates to the London Interbank Offered Rate plus 3.0%;
- on March 29, 2013, converted existing loan advances into a term loan in the principal amount of \$15.0 million (the 2013 Term Loan), provided a revolving credit facility in the maximum principal amount of \$25.0 million (the 2013 Revolving Line) and a delayed draw term loan (the 2013 DDTL) of up to \$15.0 million;
- on October 31, 2013, reduced the 2013 DDTL from up to \$15.0 million to up to \$10.0 million;
- on April 24, 2015, extended the maturity date of the 2013 Revolving Line to March 29, 2018 and reduced the interest rates on the 2013 Revolving Line, 2013 Term Loan and 2013 DDTL;
- on June 30, 2015, amended its quarterly minimum fixed charge coverage financial covenant;
- on March 9, 2016, amended the principal payment amortization of the 2013 Term Loan and 2013 DDTL to five years, as well as amended its quarterly minimum fixed charge coverage financial covenant; and
- on May 2, 2017, entered into a Third Amended and Restated Revolving Credit Agreement (as amended, the Credit Agreement) with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co, as lenders that amended and restated the 2013 Credit Agreement.

The Credit Agreement was entered into to, among other things, consolidate, combine and restate the outstanding indebtedness, on the date of the Credit Agreement, into a term loan (the Term Loan) in the principal amount of \$14.0 million, and also provide for a \$25.0 million revolving line of credit (the Revolving Line). The Term Loan and the Revolving Line each have a maturity date of May 1, 2022. Borrowings under the Term Loan accrue interest at a rate based on either the effective LIBOR for certain interest periods selected by the Company, or a daily floating rate based on the BBA LIBOR as published by Reuters (or other commercially available source providing quotations of BBA LIBOR), plus in either case, a margin of 2.75%. Additionally, the Revolving Line accrues interest at a rate based on either the effective LIBOR for certain interest periods selected by the Company, or a daily floating rate based on the BBA LIBOR, plus in either case, a margin of 2.25%.

The Term Loan and loans under the Revolving Line evidenced by the Credit Agreement, or the Loans, are guaranteed by all of the Company's direct and indirect domestic subsidiaries, and secured by substantially all of the assets of the Company and the guarantors. The Loans are subject to restrictive covenants under the Credit Agreement, and financial covenants that require the Company and its subsidiaries to maintain certain financial ratios on a consolidated basis, including a maximum leverage, minimum fixed charge coverage and minimum working capital. Prepayment of the Loans is allowed by the Credit Agreement at any time during the terms of the Loans. The Loans also contain limitations on the Company's ability to incur additional indebtedness and requires lender approval for acquisitions funded with cash, promissory notes and/or other consideration in excess of \$6.0 million and for acquisitions funded solely with equity in excess of \$10.0 million.

As of September 30, 2017 and December 31, 2016, the Company had borrowings net of debt issuance costs of \$12.4 million and \$13.7 million respectively, outstanding under its Credit Agreement. The carrying value of the debt approximates fair value because the interest rate under the obligation approximates market rates of interest available to the Company for similar instruments. As of September 30, 2017, the Company was in compliance with all financial covenants contained in the Credit Agreement, was subject to covenant and working capital borrowing restrictions and had available borrowing capacity under its Credit Agreement of \$5.5 million.

As of September 30, 2017, the weighted effective interest rate, net of the impact of the Company's interest rate swap, on its Term Loan was 4.61%.

As of September 30, 2017 and December 31, 2016, the Company's borrowings were comprised of:

	September 30, 2017	December 31, 2016
	(in thousands)	
Long-term debt:		
Term loan	\$ 12,598	\$ 5,400
DDTL	-	4,400
Revolving line	-	4,050
Total unamortized deferred financing costs	(159)	(104)
Total debt	12,439	13,746
Less: current installments	(2,800)	(2,450)
Current unamortized deferred financing costs	35	78
Long-term debt	<u>\$ 9,674</u>	<u>\$ 11,374</u>

13. Derivatives

The Company uses interest-rate-related derivative instruments to manage its exposure related to changes in interest rates on its variable-rate debt instruments. The Company does not enter into derivative instruments for any purpose other than cash flow hedging. The Company does not speculate using derivative instruments.

By using derivative financial instruments to hedge exposures to changes in interest rates, the Company exposes itself to credit risk and market risk. Credit risk is the failure of the counterparty to perform under the terms of the derivative contract. When the fair value of a derivative contract is positive, the counterparty owes the Company, which creates credit risk for the Company. When the fair value of a derivative contract is negative, the Company owes the counterparty and, therefore, the Company is not exposed to the counterparty's credit risk in those circumstances. The Company minimizes counterparty credit risk in derivative instruments by entering into transactions with carefully selected major financial institutions based upon their credit profile.

Market risk is the adverse effect on the value of a derivative instrument that results from a change in interest rates. The market risk associated with interest-rate contracts is managed by establishing and monitoring parameters that limit the types and degree of market risk that may be undertaken.

The Company assesses interest rate risk by continually identifying and monitoring changes in interest rate exposures that may adversely impact expected future cash flows and by evaluating hedging opportunities. The Company maintains risk management control systems to monitor interest rate risk attributable to both the Company's outstanding or forecasted debt obligations as well as the Company's offsetting hedge positions. The risk management control systems involve the use of analytical techniques, including cash flow sensitivity analysis, to estimate the expected impact of changes in interest rates on the Company's future cash flows.

The Company uses variable-rate London Interbank Offered Rate (LIBOR) debt to finance its operations. The debt obligations expose the Company to variability in interest payments due to changes in interest rates. Management believes that it is prudent to limit the variability of a portion of its interest payments. To meet this objective, management enters into LIBOR based interest rate swap agreements to manage fluctuations in cash flows resulting from changes in the benchmark interest rate of LIBOR. These swaps change the variable-rate cash flow exposure on the debt obligations to fixed cash flows. Under the terms of the interest rate swaps, the Company receives LIBOR based variable interest rate payments and makes fixed interest rate payments, thereby creating the equivalent of fixed-rate debt for the notional amount of its debt hedged.

As disclosed in Note 12, on May 2, 2017, the Company entered into the Credit Agreement to amend its credit facility with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co. as lenders. Immediately after entering into this Credit Agreement, the Company entered into an interest rate swap contract with Bank of America with a notional amount of \$14.0 million and a termination date of March 30, 2022 in order to hedge the risk of changes in the effective benchmark interest rate (LIBOR) associated with the Company's Term Loan. The swap contract converted specific variable-rate debt into fixed-rate debt and fixed the LIBOR rate associated with the Term Loan at 1.86% plus a bank margin of 2.75%. The interest rate swap was designated as a cash flow hedge instrument in accordance with ASC 815 "Derivatives and Hedging".

The notional amount of the Company's derivative instruments as of September 30, 2017 was \$12.6 million.

The following table presents the notional amount and fair value of the Company's derivative instruments as of September 30, 2017 and December 31, 2016.

		September 30, 2017		September 30, 2017	
		Notional Amount		Fair Value (a)	
Derivatives designated as hedging instruments under ASC 815	Balance sheet classification	(in thousands)			
Interest rate swaps	Other liabilities-non current	\$	12,600	\$	(46)
		December 31, 2016		December 31, 2016	
		Notional Amount		Fair Value (a)	
Derivatives designated as hedging instruments under ASC 815	Balance sheet classification	(in thousands)			
Interest rate swaps	Other liabilities-non current	\$	5,500	\$	-

(a) See Note 14 for the fair value measurements related to these financial instruments.

All of the Company's derivative instruments are designated as hedging instruments.

The Company has structured its interest rate swap agreements to be 100% effective and as a result, there was no impact to earnings resulting from hedge ineffectiveness. Changes in the fair value of interest rate swaps designated as hedging instruments that effectively offset the variability of cash flows associated with variable-rate, long-term debt obligations are reported in accumulated other comprehensive income (AOCI). These amounts subsequently are reclassified into interest expense as a yield adjustment of the hedged interest payments in the same period in which the related interest affects earnings. The Company's interest rate swap agreement was deemed to be fully effective in accordance with ASC 815, and, as such, unrealized gains and losses related to these derivatives were recorded as AOCI.

The following table summarizes the effect of derivatives designated as cash flow hedging instruments and their classification within comprehensive loss for the three and nine months ended September 30, 2017 and 2016:

Derivatives in Hedging Relationships	Amount of gain (loss) recognized in OCI on derivative (effective portion)			
	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
	(in thousands)			
Interest rate swaps	\$ -	\$ 11	\$ (89)	\$ (37)

The following table summarizes the reclassifications out of accumulated other comprehensive loss for the three and nine months ended September 30, 2017 and 2016:

Details about AOCI Components	Amount reclassified from AOCI into income (effective portion)				Location of amount reclassified from AOCI into income (effective portion)
	Three Months Ended September 30,		Nine Months Ended September 30,		
	2017	2016	2017	2016	
	(in thousands)				
Interest rate swaps	\$ 21	\$ 8	\$ 43	\$ 31	Interest expense

As of September 30, 2017, \$48 thousand of deferred losses on derivative instruments accumulated in AOCI are expected to be reclassified to earnings during the next twelve months. Transactions and events expected to occur over the next twelve months that will necessitate reclassifying these derivatives' losses to earnings include the repricing of variable-rate debt. As a result of entering into the May 2017 interest rate swap contract, the Company unwound its previous interest rate swap contracts, and received an immaterial amount in proceeds. There were no cash flow hedges discontinued during 2016.

14. Fair Value Measurements

Fair value measurement is defined as the price that would be received to sell an asset or paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants at the measurement date. A fair value hierarchy is established, which prioritizes the inputs used in measuring fair value into three broad levels as follows:

Level 1—Quoted prices in active markets for identical assets or liabilities.

Level 2—Inputs, other than the quoted prices in active markets, that are observable either directly or indirectly.

Level 3—Unobservable inputs based on the Company’s own assumptions.

The following tables present the fair value hierarchy for those liabilities measured at fair value on a recurring basis:

(In thousands)	Fair Value as of September 30, 2017			
	Level 1	Level 2	Level 3	Total
Liabilities:				
Interest rate swap agreements	\$ -	\$ (46)	\$ -	\$ (46)

(In thousands)	Fair Value as of December 31, 2016			
	Level 1	Level 2	Level 3	Total
Liabilities:				
Interest rate swap agreements	\$ -	\$ -	\$ -	\$ -

The Company uses the market approach technique to value its financial liabilities. The Company’s financial liabilities carried at fair value include derivative instruments used to hedge the Company’s interest rate risks. The fair value of the Company’s interest rate swap agreements was based on LIBOR yield curves at the reporting date.

15. Income Tax

Income tax expense was approximately \$7 thousand and \$0.8 million for the three months ended September 30, 2017 and 2016, respectively. The tax expense for the three months ended September 30, 2017 reflects the incremental expense recorded for the nine months ended September 30, 2017 associated with the actual results for the nine-month period, as described below.

Discrete items included in the tax expense for the three months ended September 30, 2017 included foreign currency gains and losses. Tax benefit for the three months ended September 30, 2016 included the recording of a full valuation allowance against the net deferred tax assets of one of the Company’s German subsidiaries, as well as the impact of an enacted tax rate change on the net deferred tax assets of one of the Company’s UK subsidiaries.

Income tax was an approximately \$0.1 million benefit and a \$0.9 million expense for the nine months ended September 30, 2017 and 2016, respectively. The effective income tax rate was 2.7% for the nine months ended September 30, 2017, compared with (42.9%) for the same period in 2016. The tax rates for the nine months ended September 30, 2017 and 2016 were based on actual results for the nine-month period rather than an effective tax rate estimated for the entire year. In 2017 and 2016, the Company determined that using a year-to-date approach resulted in a better estimate of income tax expense/benefit based on its forecast of pre-tax income/loss, the mix of taxable income/loss across several jurisdictions with different statutory tax rates, and the impact of the full valuation allowance against U.S. deferred tax assets.

The difference between the Company’s effective tax rate period over period was primarily attributable to higher pre-tax income at certain individual subsidiaries in 2017 versus 2016, despite an overall pre-tax loss in both periods, as well as the settlement of an uncertain tax position in 2017, and the recording of a valuation allowance at a German subsidiary in 2016. In addition, both periods included the tax impact of amortization of certain indefinite-lived intangibles which are amortized for tax purposes only, against which a valuation allowance is not established.

As disclosed in footnote 2, the Company adopted ASU 2016-09 as of January 1, 2017. As a result, the Company recorded a cumulative increase in retained earnings of \$0.5 million at the beginning of the first quarter of 2017 with a corresponding increase in deferred tax assets related to the prior years’ unrecognized excess tax benefits. An equal amount of valuation allowance was also recorded against these deferred tax assets with a corresponding decrease to retained earnings resulting in a net impact of \$0. In addition, tax deficiencies related to vested restricted stock units and canceled stock options during the nine months ended September 30, 2017 have been recognized in the current period’s income statement.

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

Forward-Looking Statements

This Quarterly Report on Form 10-Q contains statements that are not statements of historical fact and are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934 (the Exchange Act). The forward-looking statements are principally, but not exclusively, contained in "Item 2: Management's Discussion and Analysis of Financial Condition and Results of Operations." These 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. Forward-looking statements include, but are not limited to, statements about management's confidence or expectations, and our plans, objectives, expectations and intentions that are not historical facts. In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "could," "would," "seek," "expects," "plans," "aim," "anticipates," "believes," "estimates," "projects," "predicts," "intends," "think," "potential," "objectives," "optimistic," "strategy," "goals," "sees," "new," "guidance," "future," "continue," "drive," "growth," "long-term," "projects," "develop," "possible," "emerging," "opportunity," "pursue" and similar expressions intended to identify forward-looking statements. These statements reflect our current views with respect to future events and are based on assumptions and subject to risks and uncertainties. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Factors that may cause our actual results to differ materially from those in the forward-looking statements include reductions in customers' research budgets or government funding; domestic and global economic conditions; economic, political and other risks associated with international revenues and operations; currency exchange rate fluctuations; economic and political conditions generally and those affecting pharmaceutical and biotechnology industries; the seasonal nature of purchasing in Europe; our failure to expand into foreign countries and international markets; our failure to realize the expected benefits of facility consolidations; our inability to manage our growth; competition from our competitors; material weakness in our internal control over financial reporting; ineffective disclosure controls and procedures; failure or inadequacy of the our information technology structure; impact of difficulties implementing our enterprise resource planning systems; our failure to identify potential acquisition candidates and successfully close such acquisitions with favorable pricing or integrate acquired businesses or technologies; unanticipated costs relating to acquisitions and known and unknown costs arising in connection with our consolidation of business functions and any restructuring initiatives; our inability to effectively sell spectrophotometer products following the retirement of the GE Healthcare brand; failure of any banking institution in which we deposit our funds or its failure to provide services; our substantial debt and our ability to meet the financial covenants contained in our credit facility; our failure to raise or generate capital necessary to implement our acquisition and expansion strategy; the failure of our spin-off of Biostage, Inc., f/k/a Harvard Apparatus Regenerative Technology, Inc., to qualify as a transaction that is generally tax-free for U.S. federal income tax purposes; the failure of Biostage to indemnify us for any liabilities associated with Biostage's business; impact of any impairment of our goodwill or intangible assets; our ability to retain key personnel; failure or inadequacy or our information technology structure; rising commodity and precious metals costs; our ability to protect our intellectual property and operate without infringing on others' intellectual property; exposure to product and other liability claims; global stock market volatility, currency exchange rate fluctuations and regulatory changes caused by the United Kingdom's likely exit from the European Union; plus other factors described under the heading "Item 1A. Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2016, or described in our other public filings. Our results may also be affected by factors of which we are not currently aware. We may not update these forward-looking statements, even though our situation may change in the future, unless we have obligations under the federal securities laws to update and disclose material developments related to previously disclosed information.

Overview

Harvard Bioscience, Inc., a Delaware corporation, is a global developer, manufacturer and marketer of a broad range of scientific instruments, systems and lab consumables used to advance life science for basic research, drug discovery, clinical and environmental testing. Our products are sold to thousands of researchers around the world through our global sales organization, websites, catalogs, and through distributors including Thermo Fisher Scientific Inc., VWR, and other specialized distributors. We have sales and manufacturing operations in the United States, the United Kingdom, Germany, Sweden, Spain, France, Canada, and China.

Our Strategy

Our vision is to be a world leading life science company that excels in meeting the needs of our customers by providing a wide breadth of innovative products and solutions, while providing exemplary customer service. Our business strategy is to grow our top-line and bottom-line, and build shareholder value through a commitment to:

- commercial excellence;
- new product development;
- strategic acquisitions; and
- operational efficiencies.

Components of Operating Income

Revenues. We generate revenues by selling apparatus, instruments, devices and consumables through our distributors, direct sales force, websites and catalogs. Our websites and catalogs serve as the primary sales tools for our Cell and Animal Physiology product line. This product line includes both proprietary manufactured products and complementary products from various suppliers. Our reputation as a leading producer in many of our manufactured products creates traffic to our website, enables cross-selling and facilitates the introduction of new products. We have field sales teams in the U.S., Canada, the United Kingdom, Germany, France, Spain and China. In those regions where we do not have a direct sales team, we use distributors. Revenues from direct sales to end users represented approximately 68% and 64% of our revenues for the three months ended September 30, 2017 and 2016, respectively. For the nine months ended September 30, 2017 and 2016, revenues from direct sales to end users represented approximately 66% and 63% of our revenues, respectively.

Products in our Molecular Separation and Analysis product line are generally sold by distributors, and are typically priced in the range of \$5,000-\$15,000. They are mainly scientific instruments like spectrophotometers and plate readers that analyze light to detect and quantify a wide range of molecular and cellular processes, or apparatus like gel electrophoresis units. We also use distributors for both our catalog products and our higher priced products, as well as for sales in locations where we do not have subsidiaries or where we have existing distributors in place from acquired businesses. For the three months ended September 30, 2017 and 2016, approximately 32% and 36% of our total revenues, respectively, were derived from sales to distributors. For the nine months ended September 30, 2017 and 2016, approximately 34% and 37% of our total revenues, respectively, were derived from sales to distributors.

For the three and nine months ended September 30, 2017, approximately 62% of our revenues, for both periods, were derived from products we manufacture, approximately 13%, for both periods, were derived from complementary products we distribute in order to provide the researcher with a single source for all equipment needed to conduct a particular experiment, and approximately 25%, for both periods, were derived from distributed products sold under our brand names. For the three and nine months ended September 30, 2016, approximately 60% and 61% of our revenues, respectively, were derived from products we manufacture, approximately 14%, for both periods were derived from complementary products we distribute in order to provide the researcher with a single source for all equipment needed to conduct a particular experiment, and approximately 26% and 25%, respectively, were derived from distributed products sold under our brand names.

For the three months ended September 30, 2017 and 2016, approximately 34% and 36% of our revenues, respectively, were derived from sales made by our non-United States operations. For the nine months ended September 30, 2017 and 2016, approximately 33% and 38% of our revenues, respectively, were derived from sales made by our non-United States operations. As discussed later under “Selected Results of Operations”, the decrease in revenues derived by our non-United States operations is primarily attributable to currency translation and the sale of our AHN Biotechnologie GmbH subsidiary (AHN).

Changes in the relative proportion of our revenue sources between direct sales and distribution sales are primarily the result of changes in geographic mix.

[Table of Contents](#)

Cost of revenues. Cost of revenues includes material, labor and manufacturing overhead costs, obsolescence charges, packaging costs, warranty costs, shipping costs and royalties. Our cost of revenues may vary over time based on the mix of products sold. We sell products that we manufacture and products that we purchase from third parties. The products that we purchase from third parties typically have a higher cost of revenues as a percent of revenues because the profit is effectively shared with the original manufacturer. We anticipate that our manufactured products will continue to have a lower cost of revenues as a percentage of revenues as compared with the cost of non-manufactured products for the foreseeable future. Additionally, our cost of revenues as a percent of revenues will vary based on mix of direct to end user sales and distributor sales, mix by product line and mix by geography.

Sales and marketing expenses. Sales and marketing expense consists primarily of salaries and related expenses for personnel in sales, marketing and customer support functions. We also incur costs for travel, trade shows, demonstration equipment, public relations and marketing materials, consisting primarily of the printing and distribution of our catalogs, supplements and the maintenance of our websites. We may from time to time expand our marketing efforts by employing additional technical marketing specialists in an effort to increase sales of selected categories of products. We may also from time to time expand our direct sales organizations in an effort to concentrate on key accounts or promote certain product lines.

General and administrative expenses. General and administrative expense consists primarily of salaries and other related costs for personnel in executive, finance, accounting, information technology and human resource functions. Other costs include professional fees for legal and accounting services, information technology infrastructure, facility costs, investor relations, insurance and provision for doubtful accounts.

Research and development expenses. Research and development expense consists primarily of salaries and related expenses for personnel and spending to develop and enhance our products. Other research and development expense includes fees for consultants and outside service providers, and material costs for prototype and test units. We expense research and development costs as incurred. Grants received from governmental entities related to research projects are accounted for as a reduction in research and development expense over the period of the project. We believe that investment in product development is a competitive necessity and plan to continue to make these investments in order to realize the potential of new technologies that we develop, license or acquire for existing markets.

Stock-based compensation expenses. Stock-based compensation expense for the three months ended September 30, 2017 and 2016 was \$0.9 million for both periods. Stock-based compensation expense for the nine months ended September 30, 2017 and 2016 was \$2.6 million for both periods. The stock-based compensation expense related to stock options, restricted stock units, restricted stock units with a market condition and the employee stock purchase plan and was recorded as a component of cost of revenues, sales and marketing expenses, general and administrative expenses and research and development expenses.

Selected Results of Operations

Three Months Ended September 30, 2017 compared to Three Months Ended September 30, 2016

	Three Months Ended September 30,		Dollar Change	% Change
	2017	2016		
	(dollars in thousands)			
Revenues	\$ 25,050	\$ 25,007	\$ 43	0.2%
Cost of revenues	13,411	13,317	94	0.7%
Gross margin percentage	46.5%	46.7%	N/A	-0.6%
Sales and marketing expenses	5,081	5,006	75	1.5%
General and administrative expenses	4,534	4,783	(249)	-5.2%
Research and development expenses	1,538	1,309	229	17.5%
Amortization of intangible assets	622	729	(107)	-14.7%
Impairment charges	-	676	(676)	-100.0%

Revenues

Revenues for the three months ended September 30, 2017 were \$25.1 million, an increase of approximately 0.2%, or \$43 thousand, compared to revenues of \$25.0 million for the three months ended September 30, 2016.

The loss in revenues from the October 2016 AHN disposition negatively impacted revenues in the quarter by approximately \$0.7 million, while the impact of currency translation positively impacted revenues in the quarter by approximately \$0.2 million. The favorability in currency translation in the quarter was primarily from the strengthening of the Euro and British Pound against the U.S. dollar. Excluding the impact of the AHN disposition and currency translation, revenues grew approximately 2%, or \$0.5 million in the third quarter. This result was primarily due to growth in the U.S. and China, partially offset by a decline in Europe.

Reconciliation of Changes In Revenues Compared to the Same Period of the Prior Year

	For the Three Months Ended September 30, 2017
Organic and AHN change	-0.7%
Foreign exchange effect	0.9%
Total revenue change	0.2%

Each reporting period, we face currency exposure that arises from translating the results of our worldwide operations to the United States dollar at exchange rates that fluctuate from the beginning of such period. We evaluate our results of operations on both a reported and a foreign currency-neutral basis, which excludes the impact of fluctuations in foreign currency exchange rates. We believe that disclosing this non-GAAP financial information provides investors with an enhanced understanding of the underlying operations of the business. This non-GAAP financial information is used by our management to internally evaluate our operating results. The non-GAAP financial information provided in the table above should be considered in addition to, not as a substitute for, the financial information provided and presented in accordance with accounting principles generally accepted in the United States, or GAAP and may be different than other companies' non-GAAP financial information.

Cost of revenues

Cost of revenues were \$13.4 million for the three months ended September 30, 2017, an increase of \$0.1 million, or 0.7%, compared with \$13.3 million for the three months ended September 30, 2016. The increase in cost of revenues was primarily due to the effect of changes in volume and mix of distributed or manufactured products in comparison to the prior period. These increases were offset by the effect on cost of revenues of the sale of AHN which was approximately \$0.5 million. Gross profit margin as a percentage of revenues decreased slightly to 46.5% for the three months ended September 30, 2017 compared with 46.7% for 2016.

Sales and marketing expenses

Sales and marketing expenses were relatively flat, increasing \$0.1 million or 1.5% to \$5.1 million for the three months ended September 30, 2017 compared to \$5.0 million during the same period in 2016. The increase in sales and marketing expenses was due to increases in employee costs and stock compensation offset by decreases in consulting and purchased services as well as the impact of the sale of AHN.

General and administrative expenses

General and administrative expenses were \$4.5 million for the three months ended September 30, 2017, a decrease of \$0.3 million, or 5.2%, compared with \$4.8 million for the three months ended September 30, 2016. The reduction in these expenses was primarily due to a decrease in employee, consulting and purchased services costs, offset by an increase in facilities costs.

Research and development expenses

Research and development expenses were \$1.5 million for the three months ended September 30, 2017, an increase of \$0.2 million, or 17.5%, compared with \$1.3 million for the three months ended September 30, 2016. The increase in expense was primarily due to an increase in employee, consulting and other purchased services costs due to investments in new product development and compliance efforts.

Amortization of intangible assets

Amortization of intangible asset expenses was \$0.6 million and \$0.7 million for the three months ended September 30, 2017 and 2016, respectively. The decrease in amortization expense was primarily due to the effect of certain long-lived intangible assets becoming fully amortized towards the end of fiscal year 2016.

Impairment charges

Impairment charges were \$0.7 million for the three months ended September 30, 2016. During the third quarter of 2016, we initiated plans to sell the operations of AHN. As a result of initiating the plan to sell the operations of AHN, we evaluated the long-lived assets for impairment, pursuant to ASC 360-10. Based on the resulting impairment analysis, we recognized an impairment charge of \$0.7 million for the three months ended September 30, 2016.

Other expense, net

Other expense, net, was \$0.3 million and \$0.1 million for the three months ended September 30, 2017 and 2016, respectively. Included in other expense, net for three months ended September 30, 2017 and 2016 was interest expense of \$0.2 million and \$0.1 million, respectively. The increase in other expense, net was primarily due to an increase in foreign exchange losses. Currency exchange rate fluctuations included as a component of net loss resulted in approximately \$0.1 million in currency losses and \$0.1 million in currency gains for the three months ended September 30, 2017 and 2016, respectively.

Income taxes

Income tax expense was approximately \$7 thousand and \$0.8 million for the three months ended September 30, 2017 and 2016, respectively. The tax expense for the three months ended September 30, 2017 reflects the incremental expense recorded for the nine months ended September 30, 2017 associated with the actual results for the nine-month period. Discrete items included in the tax expense for the three months ended September 30, 2017 included foreign currency gains and losses. Discrete items for the three months ended September 30, 2016 included the recording of a full valuation allowance against the net deferred tax assets of one of the Company's German subsidiaries, as well as the impact of an enacted tax rate change on the net deferred tax assets of one of the Company's UK subsidiaries.

We have operations in the UK and several European countries where we historically had material current and deferred income tax balances related to those activities. As such, the UK's 2016 decision to withdraw from the European Union or the EU could have a material effect on our current and deferred income taxes. In March 2017, the UK initiated, through letter submission to the EU, a formal two-year process to officially withdraw its membership. During this two-year period, the UK and EU member states are expected to negotiate many provisions in the UK bilateral agreements and tax treaties with EU member states as well as EU rules governing the income tax treatment of deferred intercompany profits. The final outcome of these negotiations will not be known until both the EU and the UK approve them and the UK enacts the related changes in its tax laws. EU law will cease to apply in the UK at the end of the two-year process in March 2019, unless the negotiations are extended. The letter submission in March 2017 is an administrative step required to begin the formal withdrawal process and is not considered a tax law enactment under ASC 740. Additionally, in order to ensure that all EU laws remain in place until specifically repealed, the UK government has announced its intention to enact a 'Repeal Bill' which enshrines all EU law into domestic UK legislation. As of the filing date of this Form 10-Q, this Repeal Bill has not been enacted. Consequently, we plan to adjust our current and deferred taxes when tax law changes related to UK's withdrawal from the EU are actually enacted and/or when EU law ceases to apply in the UK.

Nine Months Ended September 30, 2017 compared to Nine Months Ended September 30, 2016

	Nine Months Ended September 30,		Dollar Change	% Change
	2017	2016		
	(dollars in thousands)			
Revenues	\$ 74,419	\$ 78,106	\$ (3,687)	-4.7%
Cost of product revenues	39,994	41,796	(1,802)	-4.3%
Gross margin percentage	46.3%	46.5%	N/A	-0.5%
Sales and marketing expenses	15,111	15,194	(83)	-0.5%
General and administrative expenses	14,144	15,979	(1,835)	-11.5%
Research and development expenses	4,119	4,236	(117)	-2.8%
Amortization of intangible assets	1,825	2,099	(274)	-13.1%
Impairment charges	-	676	(676)	-100.0%

Revenues

Revenues for the nine months ended September 30, 2017 were \$74.4 million, a decrease of 4.7%, or \$3.7 million, compared to revenues of \$78.1 million for the same period in 2016.

Excluding the effects of currency translation, primarily from the weakening of the British Pound against the U.S. dollar, our revenues decreased 3.4%, or \$2.7 million from the same period in 2016. Also included in the revenue decline for the quarter is a decrease of \$2.0 million, due to the AHN disposition in October 2016. Excluding the unfavorable currency translation and the revenue impact of the AHN disposition, revenues declined by approximately 1%. The decrease was primarily due to continued softness in Europe, partially offset with revenue growth in the U.S. and China for the nine months ended September 30, 2017.

Reconciliation of Changes In Revenues Compared to the Same Period of the Prior Year

	For the Nine Months Ended September 30, 2017
Organic and AHN change	-3.4%
Foreign exchange effect	-1.3%
Total revenue change	-4.7%

Each reporting period, we face currency exposure that arises from translating the results of our worldwide operations to the United States dollar at exchange rates that fluctuate from the beginning of such period. We evaluate our results of operations on both a reported and a foreign currency-neutral basis, which excludes the impact of fluctuations in foreign currency exchange rates. We believe that disclosing this non-GAAP financial information provides investors with an enhanced understanding of the underlying operations of the business. This non-GAAP financial information approximates information used by our management to internally evaluate our operating results. The non-GAAP financial information provided in the table above should be considered in addition to, not as a substitute for, the financial information provided and presented in accordance with accounting principles generally accepted in the United States, or GAAP.

Cost of revenues

Cost of revenues decreased \$1.8 million, or 4.3%, to \$40 million for the nine months ended September 30, 2017 compared with \$41.8 million for the nine months ended September 30, 2016. The decrease in cost of revenues was primarily due to the decrease in revenues, including the effect on cost of revenues of the sale of AHN which was approximately \$1.4 million. Gross profit margin as a percentage of revenues was relatively flat at 46.3% for the nine months ended September 30, 2017 compared with 46.5% for 2016.

Sales and marketing expenses

Sales and marketing expenses decreased \$0.1 million, or 0.5%, to \$15.1 million for the nine months ended September 30, 2017 compared with \$15.2 million for the nine months ended September 30, 2016. The decrease was primarily due to currency fluctuation and also included the effect of a decrease in sales commissions, and the impact of the sale of AHN. Sales commissions decreased due to lower revenues during the nine months ended September 30, 2017 in comparison to the same period in 2016. These decreases were offset by increases in freight and stock compensation costs.

General and administrative expenses

General and administrative expenses decreased \$1.9 million, or 11.5%, to \$14.1 million for the nine months ended September 30, 2017 compared with \$16.0 million for the nine months ended September 30, 2016. The decrease was primarily due to forensic investigation costs incurred during the nine months ended September 30, 2016, as well as a decrease in consulting fees, and lower travel costs compared to the same period in 2016.

Research and development expenses

Research and development expenses were \$4.1 million for the nine months ended September 30, 2017, a decrease of \$0.1 million, or 2.8%, compared with \$4.2 million for the nine months ended September 30, 2016. The decrease was primarily due to a reduction in payroll related costs.

Amortization of intangible assets

Amortization of intangible asset expenses was \$1.8 million and \$2.1 million for the nine months ended September 30, 2017 and 2016, respectively. The decrease in amortization expense was primarily due to the effect of certain long-lived intangible assets becoming fully amortized towards the end of fiscal year 2016, as well as the sale of AHN during October 2016.

Impairment charges

Impairment charges were \$0.7 million for the nine months ended September 30, 2016. During the third quarter of 2016, we initiated plans to sell the operations of AHN. As a result of initiating the plan to sell the operations of AHN, we evaluated the long-lived assets for impairment, pursuant to ASC 360-10. Based on the resulting impairment analysis, we recognized an impairment charge of \$0.7 million for the nine months ended September 30, 2016.

Other expense, net

Other expense, net, was \$1.1 million and \$0.2 million for the nine months ended September 30, 2017 and 2016, respectively. The increase in other expense, net was primarily due to an increase in foreign currency losses as compared to foreign currency gains in the prior period. Currency exchange rate fluctuations included as a component of net loss resulted in approximately \$0.4 million in currency losses and \$0.4 million in currency gains during the nine months ended September 30, 2017 and 2016, respectively. Interest expense was \$0.5 million for both the nine months ended September 30, 2017 and 2016.

Income taxes

Income tax was an approximately a \$0.1 million benefit and a \$0.9 million expense for the nine months ended September 30, 2017 and 2016, respectively. The effective income tax rate was 2.7% for the nine months ended September 30, 2017, compared with (42.9%) for the same period in 2016. The tax rates for the nine months ended September 30, 2017 and 2016, respectively, were based on actual results for the nine-month period rather than an effective tax rate estimated for the entire year. We determined that using a year-to-date approach resulted in a better estimate of income tax expense based on our updated forecasts of pre-tax income, mix of income across several jurisdictions with different statutory tax rates as well as the impact of the full valuation allowance against U.S. deferred tax assets.

The difference between our effective tax rate period over period was primarily attributable to higher pre-tax income at certain individual subsidiaries in 2017 versus 2016 despite an overall pre-tax loss in both periods, as well as the settlement of an uncertain tax position in 2017, and the recording of a valuation allowance at a German subsidiary in 2016. In addition, both periods included the tax impact of amortization of certain indefinite-lived intangibles which are amortized for tax purposes only, against which a valuation allowance is not established.

We have operations in the UK and several European countries where we historically had material current and deferred income tax balances related to those activities. As such, the UK's 2016 decision to withdraw from the European Union or the EU could have a material effect on our current and deferred income taxes. In March 2017, the UK initiated, through letter submission to the EU, a formal two-year process to officially withdraw its membership. During this two-year period, the UK and EU member states are expected to negotiate many provisions in the UK bilateral agreements and tax treaties with EU member states as well as EU rules governing the income tax treatment of deferred intercompany profits. The final outcome of these negotiations will not be known until both the EU and the UK approve them and the UK enacts the related changes in its tax laws. EU law will cease to apply in the UK at the end of the two-year process in March 2019, unless the negotiations are extended. The letter submission in March 2017 is an administrative step required to begin the formal withdrawal process and is not considered a tax law enactment under ASC 740. Additionally, in order to ensure that all EU laws remain in place until specifically repealed, the UK government has announced its intention to enact a 'Repeal Bill' which enshrines all EU law into domestic UK legislation. As of the filing date of this Form 10-Q, this Repeal Bill has not been enacted. Consequently, we plan to adjust our current and deferred taxes when tax law changes related to UK's withdrawal from the EU are actually enacted and/or when EU law ceases to apply in the UK.

Liquidity and Capital Resources

Historically, we have financed our business through cash provided by operating activities, the issuance of common stock, and bank borrowings. Our liquidity requirements arise primarily from investing activities, including funding of acquisitions, and other capital expenditures.

As of September 30, 2017, we held cash and cash equivalents of \$5.8 million, compared with \$5.6 million at December 31, 2016. As of September 30, 2017 and December 31, 2016, we had \$12.4 million and \$13.7 million of borrowings outstanding under our credit facility, net of deferred financing costs. Total debt, net of cash and cash equivalents was \$6.6 million at September 30, 2017, compared to \$8.1 million at December 31, 2016, respectively. In addition, we had an underfunded United Kingdom pension liability of approximately \$3.4 million and \$3.0 million at September 30, 2017 and December 31, 2016, respectively.

As of September 30, 2017 and December 31, 2016, cash and cash equivalents held by our foreign subsidiaries was \$4.6 million and \$4.5 million, respectively. Funds held by our foreign subsidiaries are not available for domestic operations unless the funds are repatriated. If we planned to or did repatriate these funds, then United States federal and state income taxes would have to be recorded on such amounts. Our reinvestment determination is based on the future operational and capital requirements of our U.S. and non-U.S. operations. As of December 31, 2015, we determined that the assertion of permanent reinvestment at our foreign subsidiaries in Canada and France was no longer appropriate and we repatriated approximately \$3.5 million during the nine months ended September 30, 2016. We did not repatriate any funds during the nine months ended September 30, 2017. Cash balances did not exceed the level required for normal business operations at our subsidiaries in Canada and France as of September 30, 2017. With no funds available to repatriate, no deferred tax liability was recorded as of that date. The total tax liability associated with the repatriation of undistributed earnings in Canada and France during the nine months ended September 30, 2016 was approximately \$1.2 million, however it is anticipated that any taxable income generated by the repatriation will be offset by the use of carried forward net operating losses. We currently have no plans to repatriate any of our undistributed foreign earnings in any other countries outside of Canada and France. These balances are considered permanently reinvested and will be used for foreign items including foreign acquisitions, capital investments, pension obligations and operations. It is impracticable to estimate the total tax liability, if any, which would be created by the future distribution of these earnings.

We currently intend to retain all of our earnings to finance the expansion and development of our business and do not anticipate paying any cash dividends to holders of our common stock in the near future. As a result, capital appreciation, if any, of our common stock will be a stockholder's sole source of gain for the near future.

**Condensed Cash Flow Statements
(unaudited)**

	Nine Months Ended September 30,	
	2017	2016
	(in thousands)	
Cash flows from operations:		
Net loss	\$ (1,864)	\$ (2,987)
Other adjustments to operating cash flows	5,506	7,116
Changes in assets and liabilities	(1,646)	(473)
Net cash provided by operating activities	1,996	3,656
Investing activities:		
Additions to property, plant and equipment	(677)	(920)
Other investing activities	(39)	(34)
Net cash used in investing activities	(716)	(954)
Financing activities:		
Net repayments of debt	(1,252)	(3,738)
Other financing activities	(101)	80
Net cash used in financing activities	(1,353)	(3,658)
Effect of exchange rate changes on cash	313	(443)
Increase (decrease) in cash and cash equivalents	\$ 240	\$ (1,399)

[Table of Contents](#)

Our operating activities provided cash of \$2.0 million and \$3.7 million for the nine months ended September 30, 2017 and 2016, respectively. The decrease in net cash flow from operations was primarily due to the effect of changes in working capital quarter over quarter.

Our investing activities used cash of \$0.7 million and \$1.0 million for the nine months ended September 30, 2017 and 2016, respectively. Investing activities during the nine months ended September 30, 2017 and 2016 primarily included cash used for purchases of property, plant and equipment. We spent \$0.7 million and \$0.9 million on capital expenditures during the nine months ended September 30, 2017 and 2016, respectively.

Our financing activities have historically consisted of borrowings and repayments under our revolving credit facility and term loans, payments of debt issuance costs and the issuance of common stock. During the nine months ended September 30, 2017, financing activities used cash of \$1.4 million, compared with \$3.7 million of cash used by financing activities for the nine months ended September 30, 2016. During the nine months ended September 30, 2017, we borrowed \$2.3 million under our credit facility, repaid \$3.5 million of debt under our credit facility and term loans and ended the quarter with \$12.4 million of borrowings, net of deferred financing costs of \$0.2 million. Net cash paid for tax withholdings from the issuance of common stock for the nine months ended September 30, 2017 was \$0.1 million, which related to the vesting of restricted stock units. During the nine months ended September 30, 2016, we borrowed \$3.0 million under our credit facility, repaid \$6.7 million of debt under our credit facility and term loans and ended with \$15.0 million of borrowings at September 30, 2016, net of deferred financing costs of \$0.1 million. Net proceeds from the issuance of common stock for the nine months ended September 30, 2016 were \$0.1 million, which related to the exercise of stock options and vesting of restricted stock units.

Borrowing Arrangements

On August 7, 2009, we entered into an Amended and Restated Revolving Credit Loan Agreement related to a \$20.0 million revolving credit facility with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co as lenders (as amended, the 2009 Credit Agreement). On March 29, 2013, we entered into a Second Amended and Restated Revolving Credit Agreement (as amended, the 2013 Credit Agreement) with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co, as lenders that amended and restated the 2009 Credit Agreement. Between September 2011 and May 2017, we entered into a series of amendments that among other things did the following:

- on September 30, 2011, reduced interest rates to the London Interbank Offered Rate plus 3.0%;
- on March 29, 2013, converted existing loan advances into a term loan in the principal amount of \$15.0 million (the 2013 Term Loan), provided a revolving credit facility in the maximum principal amount of \$25.0 million (the 2013 Revolving Line) and a delayed draw term loan (the 2013 DDTL) of up to \$15.0 million;
- on October 31, 2013, reduced the 2013 DDTL from up to \$15.0 million to up to \$10.0 million;
- on April 24, 2015, extended the maturity date of the 2013 Revolving Line to March 29, 2018 and reduced the interest rates on the 2013 Revolving Line, 2013 Term Loan and 2013 DDTL;
- on June 30, 2015, amended its quarterly minimum fixed charge coverage financial covenant;
- on March 9, 2016, amended the principal payment amortization of the 2013 Term Loan and 2013 DDTL to five years, as well as amended its quarterly minimum fixed charge coverage financial covenant; and
- on May 2, 2017, entered into a Third Amended and Restated Revolving Credit Agreement (as amended, the Credit Agreement) with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co, as lenders that amended and restated the 2013 Credit Agreement.

The Credit Agreement was entered into to, among other things, consolidate, combine and restate the outstanding indebtedness, on the date of the Credit Agreement, into a term loan (the Term Loan) in the principal amount of \$14.0 million, and also provide for a \$25.0 million revolving line of credit (the Revolving Line). The Term Loan and the Revolving Line each have a maturity date of May 1, 2022. Borrowings under the Term Loan accrue interest at a rate based on either the effective LIBOR for certain interest periods selected by us, or a daily floating rate based on the BBA LIBOR as published by Reuters (or other commercially available source providing quotations of BBA LIBOR), plus in either case, a margin of 2.75%. Additionally, the Revolving Line accrues interest at a rate based on either the effective LIBOR for certain interest periods selected by us, or a daily floating rate based on the BBA LIBOR, plus in either case, a margin of 2.25%.

At September 30, 2017, the weighted effective interest rate, net of the impact of our interest rate swap, on the Term Loan was 4.61%. The Credit Agreement includes covenants relating to income, debt coverage and cash flow, as well as minimum working capital requirements. The Credit Agreement also contains limitations on our ability to incur additional indebtedness and requires lender approval for acquisitions funded with cash, promissory notes and/or other consideration in excess of \$6.0 million and for acquisitions funded solely with equity in excess of \$10.0 million. As of September 30, 2017, we were in compliance with all financial covenants contained in the Credit Agreement; we were subject to covenant and working capital borrowing restrictions, and had available borrowing capacity under the Credit Agreement of \$5.5 million.

The Term Loan and loans under the Revolving Line as evidenced by the Credit Agreement, or the Loans, are guaranteed by all of our direct and indirect domestic subsidiaries, and secured by substantially all of our assets and the guarantors. The Loans are subject to restrictive covenants under the Credit Agreement, and financial covenants that require us and our subsidiaries to maintain certain financial ratios on a consolidated basis, including a maximum leverage, minimum fixed charge coverage and minimum working capital. Prepayment of the Loans is allowed by the Credit Agreement at any time during the terms of the Loans. The Loans also contain limitations on our ability to incur additional indebtedness and requires lender approval for acquisitions funded with cash, promissory notes and/or other consideration in excess of \$6.0 million and for acquisitions funded solely with equity in excess of \$10.0 million.

Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement that involves risks and uncertainties, and actual results could vary as a result of a number of factors. Based on our current operations and current operating plans, we expect that our available cash, cash generated from current operations and debt capacity will be sufficient to finance current operations, any potential future acquisitions and capital expenditures for the next 12 months and beyond. This may involve incurring additional debt or raising equity capital for our business. Additional capital raising activities will dilute the ownership interests of existing stockholders to the extent we raise capital by issuing equity securities and we cannot guarantee that we will be successful in raising additional capital on favorable terms or at all.

Critical Accounting Policies

The critical accounting policies underlying the accompanying unaudited consolidated financial statements are those set forth in Part II, Item 7 included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, which was filed with the SEC on March 17, 2017.

Impact of Foreign Currencies

Our international operations in some instances operate in a natural hedge as we sell our products in many countries and a substantial portion of our revenues, costs and expenses are denominated in foreign currencies, especially the British pound sterling, the Euro, the Canadian dollar and the Swedish krona.

During the nine months ended September 30, 2017, changes in foreign currency exchange rates resulted in an unfavorable translation effect on our consolidated revenues and a neutral effect on our consolidated net loss. Changes in foreign currency exchange rates resulted in an unfavorable effect on revenues of approximately \$1.0 million and a favorable effect on expenses of approximately \$1.0 million. During the nine months ended September 30, 2016, changes in foreign currency exchange rates resulted in an unfavorable effect on revenues of \$1.2 million and a favorable effect on expenses of \$1.1 million.

The gain associated with the translation of foreign equity into U.S. dollars included as a component of comprehensive loss during the three months ended September 30, 2017, was approximately \$1.2 million, compared to a loss of \$2.0 million for the three months ended September 30, 2016. The gain associated with the translation of foreign equity into U.S. dollars included as a component of comprehensive loss during the nine months ended September 30, 2017, was approximately \$4.2 million, compared to a loss of \$1.4 million for the nine months ended September 30, 2016.

In addition, currency exchange rate fluctuations included as a component of net loss resulted in approximately \$0.1 million in currency losses and \$0.1 million in currency gains during the three months ended September 30, 2017 and 2016, respectively. Currency exchange rate fluctuations included as a component of net loss resulted in approximately \$0.5 million in currency losses and \$0.4 million in currency gains during the nine months ended September 30, 2017 and 2016, respectively.

Recently Issued Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers*, a new accounting standard that provides for a comprehensive model to use in the accounting for revenue arising from contracts with customers that will replace most existing revenue recognition guidance within generally accepted accounting principles in the United States. Under this standard, revenue will be recognized to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. We expect to adopt this standard as of January 1, 2018 using the modified retrospective approach.

We are in the process of evaluating the impact of the new standard on our consolidated financial position, results of operations and cash flows. As part of this process, we have conducted a comprehensive assessment of our contracts concerning any unique customer contract terms or transactions that could have implications under the new guidance. We have identified our significant revenue streams, which currently consist primarily of product revenue transactions, and to a lesser extent, extended warranty transactions on certain product sales, and revenues from government contracts. We are in the process of updating our revenue recognition policy, systems, and internal controls in response to the new update. We do not expect material changes to the timing of revenue recognition, nor do we expect significant changes to our systems or internal controls.

Finally, we are evaluating the disclosure requirements under the new standard, which are generally more expansive than current guidance. We expect these undertakings will be complete in the fourth quarter of 2017. Based on procedures to date, we do not anticipate material changes to our consolidated financial statements. We continue to work through the adoption process and it is possible that these preliminary conclusions could change.

In February 2016, the FASB issued ASU 2016-02, *Leases*, which is intended to improve financial reporting about leasing transactions. The update requires a lessee to record on the balance sheet the assets and liabilities for the rights and obligations created by lease terms of more than 12 months. The update is effective for fiscal years beginning after December 15, 2018. We have commenced the process of evaluating the requirements of the standard as well as collecting information on all our leases. We have not yet concluded on the impact of the adoption on our consolidated financial position, results of operations and cash flows, however, assets and liabilities will increase upon adoption for right-of-use assets and lease liabilities. Our future commitments under lease obligations are summarized in Note 10.

In May 2017, the FASB issued ASU 2017-09, *Stock compensation (Topic 718): Scope of modification accounting* which amends the scope of modification accounting for share-based payment arrangements. The ASU provides guidance on the types of changes to the terms or conditions of share-based payment awards to which an entity would be required to apply modification accounting under ASC 718. Specifically, an entity would not apply modification accounting if the fair value, vesting conditions, and classification of the awards are the same immediately before and after the modification. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2017. Early adoption is permitted, including adoption in any interim period. We have evaluated the requirements of this guidance and do not expect the adoption of the standard to have a material impact on our consolidated financial position, results of operations and cash flows.

In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815)* which amends the hedge accounting recognition and presentation requirements in ASC 815. The Board's objectives in issuing the ASU are to (1) improve the transparency and understandability of information conveyed to financial statement users about an entity's risk management activities by better aligning the entity's financial reporting for hedging relationships with those risk management activities and (2) reduce the complexity of and simplify the application of hedge accounting by preparers. The ASU is effective for annual reporting periods, including interim periods within those annual reporting periods, beginning after December 15, 2018. Early adoption is permitted, including adoption in any interim period. We are evaluating the requirements of this guidance and have not yet determined the impact of the adoption on our consolidated financial position, results of operations and cash flows.

Recently Adopted Accounting Pronouncements

In March 2016, the FASB issued ASU 2016-09, *Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*, which simplifies the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities and classification on the statement of cash flows.

The standard requires an entity to recognize all excess tax benefits and tax deficiencies as income tax benefit or expense in the income statement as discrete items in the reporting period in which they occur, and such tax benefits and tax deficiencies are not included in the estimate of an entity's annual effective tax rate, applied on a prospective basis. Further, the standard eliminates the requirement to defer the recognition of excess tax benefits until the benefit is realized through a reduction to taxes payable. All excess tax benefits previously unrecognized, along with any valuation allowance, should be recognized on a modified retrospective basis as a cumulative adjustment to retained earnings as of the date of adoption. Under ASU 2016-09, an entity that applies the treasury stock method in calculating diluted earnings per share is required to exclude excess tax benefits and deficiencies from the calculation of assumed proceeds since such amounts are recognized in the income statement. Excess tax benefits should also be classified as operating activities in the same manner as other cash flows related to income taxes on the statement of cash flows, as such excess tax benefits no longer represent financing activities since they are recognized in the income statement, and should be applied prospectively or retrospectively to all periods presented.

We adopted ASU 2016-09 as of January 1, 2017. We recorded a cumulative increase in retained earnings of \$0.5 million at the beginning of the first quarter of 2017 with a corresponding increase in deferred tax assets related to the prior years' unrecognized excess tax benefits. An equal amount of valuation allowance was also recorded against these deferred tax assets with a corresponding decrease to retained earnings resulting in no net impact to retained earnings and deferred tax assets. In addition, tax deficiencies related to vested restricted stock units and canceled stock options during the nine months ended September 30, 2017 have been recognized in the current period's income statement.

ASU 2016-09 also allows an entity to elect as an accounting policy either to continue to estimate the total number of awards for which the requisite service period will not be rendered or to account for forfeitures for service based awards as they occur. An entity that elects to account for forfeitures as they occur should apply the accounting change on a modified retrospective basis as a cumulative effect adjustment to retained earnings as of the date of adoption. We elected as an accounting policy to account for forfeitures for service based awards as they occur, and as a result, we recorded a cumulative effect adjustment of \$0.1 million to reduce retained earnings with a corresponding increase in additional paid in capital related to the prior years as required under the modified retrospective approach. The tax effect of this adjustment, which included the impact of a valuation allowance was immaterial.

Item 3. *Quantitative and Qualitative Disclosures about Market Risk.*

The majority of our manufacturing and testing of products occurs in our facilities in the United States, Germany, Sweden and Spain. We sell our products globally through our distributors, direct sales force, websites and catalogs. As a result, our financial results are affected by factors such as changes in foreign currency exchange rates and weak economic conditions in foreign markets.

We collect amounts representing a substantial portion of our revenues and pay amounts representing a substantial portion of our operating expenses in foreign currencies. As a result, changes in currency exchange rates from time to time may affect our operating results.

We are exposed to market risk from changes in interest rates primarily through our financing activities. As of September 30, 2017, we had \$12.4 million outstanding under our Credit Agreement, net of deferred financing costs.

As noted above under the heading "Borrowing Arrangements", on May 2, 2017, we entered into the Credit Agreement to amend our credit facility with Bank of America, as agent, and Bank of America and Brown Brothers Harriman & Co. as lenders. Immediately after entering into this Credit Agreement, we entered into a new interest rate swap contract with Bank of America with a notional amount of \$14.0 million and a termination date of March 30, 2022 in order to hedge the risk of changes in the effective benchmark interest rate (LIBOR) associated with our Term Loan. The swap contract converted specific variable-rate debt into fixed-rate debt and fixed the LIBOR rate associated with the Term Loan at 1.86%. The interest rate swap was designated as a cash flow hedge instrument in accordance with ASC 815 "Derivatives and Hedging". As a result of entering into the new interest rate swap contract, we unwound the previous interest rate swap contracts, and received an immaterial amount in proceeds.

As of September 30, 2017, the weighted effective interest rates, net of the impact of our interest rate swaps, on our Term Loan was 4.61%. Assuming no other changes which would affect the margin of the interest rate under our Term Loan, due to interest rate on the Term Loan being fixed at a rate of 1.86% plus a bank margin of 2.75%, there would be no effect of interest rate fluctuations on outstanding borrowings under our Credit Agreement as of September 30, 2017, over the next twelve months.

Item 4. Controls and Procedures.

Disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) are designed to ensure that information required to be disclosed in reports filed or submitted under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms and that such information is accumulated and communicated to management, including the Chief Executive Officer and the Chief Financial Officer, to allow timely decisions regarding required disclosures.

As required by Rules 13a-15(e) and 15d-15(e) under the Exchange Act, our management, under the supervision and with the participation of our Chief Executive Officer and Chief Financial Officer, conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures as of September 30, 2017. Our disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and our management necessarily was required to apply its judgment in evaluating and implementing our disclosure controls and procedures. Based upon the evaluation described above, our management concluded that our disclosure controls and procedures for the periods covered by this report were not effective, as of September 30, 2017, because of the material weaknesses in internal control over financial reporting described in Part II, Item 9A of our Annual Report on Form 10-K for the year ended December 31, 2016, filed with the SEC on March 17, 2017 (the 2016 Form 10-K). Management has concluded that the material weaknesses that were present at December 31, 2016 were also present at September 30, 2017.

Notwithstanding the assessment that our internal controls over financial reporting were not effective and that there were material weaknesses as identified in the 2016 Form 10-K, we believe that our financial statements contained in our Quarterly Report on Form 10-Q for the fiscal quarter ended September 30, 2017, fairly present our financial condition, results of operations and cash flows in all material respects.

As previously disclosed in the 2016 Form 10-K, to remediate the material weaknesses described under the subheading "Management's Report on Internal Control Over Financial Reporting" in Item 9A of the 2016 Form 10-K, we have continued to implement the remediation initiatives described under the subheading "Remediation Plan" in Item 9A of the 2016 Form 10-K. Specifically, we have implemented a new ERP system at MCS, continue to review authority and reporting lines at MCS, and continue to design and implement additional income tax related controls. We will continue to evaluate the remediation and may in the future implement additional measures. While improvements have been made, there were no changes in our internal control over financial reporting identified in connection with the evaluation required by Rules 13a-15 and 15d-15 under the Exchange Act that occurred during the quarter ended September 30, 2017 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1A. Risk Factors.

To our knowledge, and except to the extent additional factual information disclosed in this Quarterly Report on Form 10-Q relates to such risk factors, there has been no material changes in the risk factors described in "Item 1A. Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2016, which was filed with the SEC on March 17, 2017.

Item 6. Exhibits

Exhibit Index	
31.1	Certification of Chief Financial Officer of Harvard Bioscience, Inc., pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Executive Officer of Harvard Bioscience, Inc., pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Chief Financial Officer of Harvard Bioscience, Inc., pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Chief Executive Officer of Harvard Bioscience, Inc., pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document

* This certification shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, or otherwise subject to the liability of that section, nor shall it be deemed to be incorporated by reference into any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934.

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 undersigned thereunto duly authorized.

Date: November 2, 2017

HARVARD BIOSCIENCE, INC.

By: /S/ JEFFREY A. DUCHEMIN

Jeffrey A. Duchemin
Chief Executive Officer

By: /S/ ROBERT E. GAGNON

Robert E. Gagnon
Chief Financial Officer

INDEX TO EXHIBITS

31.1	Certification of Chief Financial Officer of Harvard Bioscience, Inc., pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Executive Officer of Harvard Bioscience, Inc., pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Chief Financial Officer of Harvard Bioscience, Inc., pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Chief Executive Officer of Harvard Bioscience, Inc., pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document

* This certification shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, or otherwise subject to the liability of that section, nor shall it be deemed to be incorporated by reference into any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934.

Certification

I, Robert E. Gagnon, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Harvard Bioscience, 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: November 2, 2017

/s/ ROBERT E. GAGNON

Robert E. Gagnon
Chief Financial Officer

Certification

I, Jeffrey A. Duchemin, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Harvard Bioscience, 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: November 2, 2017

/s/ JEFFREY A. DUCHEMIN

Jeffrey A. Duchemin
Chief Executive Officer

**CERTIFICATION OF PERIODIC FINANCIAL REPORT
PURSUANT TO 18 U.S.C. SECTION 1350**

The undersigned officer of Harvard Bioscience, Inc. (the Company) hereby certifies to his knowledge that the Company's Quarterly Report on Form 10-Q for the quarterly period ended September 30, 2017 (the Report) to which this certification is being furnished as an exhibit, as filed with the Securities and Exchange Commission on the date hereof, fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended (the Exchange Act), and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company. This certification is provided solely pursuant to 18 U.S.C. Section 1350 and Item 601(b)(32) of Regulation S-K (Item 601(b)(32)) promulgated under the Securities Act of 1933, as amended (the Securities Act), and the Exchange Act. In accordance with clause (ii) of Item 601(b)(32), this certification (A) shall not be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section, and (B) shall not be deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act, except to the extent that the Company specifically incorporates it by reference.

Date: November 2, 2017

/s/ ROBERT E. GAGNON

Name: Robert E. Gagnon

Title: Chief Financial Officer

**CERTIFICATION OF PERIODIC FINANCIAL REPORT
PURSUANT TO 18 U.S.C. SECTION 1350**

The undersigned officer of Harvard Bioscience, Inc. (the Company) hereby certifies to his knowledge that the Company's Quarterly Report on Form 10-Q for the quarterly period ended September 30, 2017 (the Report) to which this certification is being furnished as an exhibit, as filed with the Securities and Exchange Commission on the date hereof, fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended (the Exchange Act), and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company. This certification is provided solely pursuant to 18 U.S.C. Section 1350 and Item 601(b)(32) of Regulation S-K (Item 601(b)(32)) promulgated under the Securities Act of 1933, as amended (the Securities Act), and the Exchange Act. In accordance with clause (ii) of Item 601(b)(32), this certification (A) shall not be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section, and (B) shall not be deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act, except to the extent that the Company specifically incorporates it by reference.

Date: November 2, 2017

/s/ JEFFREY A. DUCHEMIN

Name: Jeffrey A. Duchemin

Title: Chief Executive Officer