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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 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, 2019

OR

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

For the transition period from _____ to _____.

Commission File Number: 001-36042

INTREXON CORPORATION

(Exact name of registrant as specified in its charter)

Virginia	**26-0084895**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification Number)**
20374 Seneca Meadows Parkway Germantown, Maryland	**20876**
(Address of principal executive offices)	**(Zip Code)**

(301) 556-9900

(Registrant's telephone number, including area code)

N/A

(Former name, former address and former fiscal year, if changed since last report date)

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

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common Stock, no par value	XON	Nasdaq Global Select Market

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

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

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

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

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

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

As of October 31, 2019, 162,682,637 shares of common stock, no par value per share, were outstanding.

INTREXON CORPORATION

FORM 10-Q
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Special Note Regarding Forward-Looking Statements

This Quarterly Report contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, which statements involve substantial risks and uncertainties. All statements, other than statements of historical facts, included in this Quarterly Report, including statements regarding our strategy, future events, future operations, future financial position, future revenue, projected costs, prospects, plans, objectives of management, and expected market growth are forward-looking statements. The words "anticipate", "believe", "estimate", "expect", "intend", "may", "plan", "predict", "project", "would", and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. These forward-looking statements include, among other things, statements about:

- our strategy and overall approach to our business model;
- our efforts to realign our business and our ability to exercise more control and ownership over the development process and commercialization path;
- our efforts to hold or generate significant operating capital, including through partnering, potential asset sales, and operating cost reductions;
- our ability to successfully enter new markets or develop additional products, including the expected timing and results of investigational studies and preclinical and clinical trials, whether independently or with our collaborators;
- our ability to successfully enter into optimal strategic relationships with our subsidiaries and operating companies that we may form in the future;
- competition from existing technologies and products or new technologies and products that may emerge;
- actual or anticipated variations in our operating results;
- our current and future joint ventures, or JVs, exclusive channel collaborations, or ECCs, license agreements and other collaborations;
- developments concerning our collaborators and licensees;
- actual or anticipated fluctuations in our competitors' or our collaborators' and licensees' operating results or changes in their respective growth rates;
- our cash position;
- market conditions in our industry;
- our ability to protect our intellectual property and other proprietary rights and technologies;
- our ability to adapt to changes in laws, regulations and policies;
- our ability and the ability of our collaborators and licensees to adapt to changes in laws, regulations and policies and to secure any necessary regulatory approvals to commercialize any products developed by us or under our ECCs, license agreements and JVs;
- the ability of our collaborators and licensees to protect our intellectual property and other proprietary rights and technologies;
- our ability and the ability of our collaborators and licensees to develop and successfully commercialize products enabled by our technologies;
- the rate and degree of market acceptance of any products developed by us, our subsidiaries, a collaborator under an ECC, or through a JV or license under a license agreement;

- our ability to retain and recruit key personnel;
- the result of litigation proceedings or investigations that we currently face or may face in the future;
- our expectations related to the use of proceeds from our public offerings and other financing efforts; and
- our estimates regarding expenses, future revenue, capital requirements, and need for additional financing.

Forward-looking statements may also concern our expectations relating to our subsidiaries and other affiliates. We caution you that the foregoing list may not contain all of the forward-looking statements made in this Quarterly Report.

We may not actually achieve the plans, intentions, or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this Quarterly Report, particularly in Part II, Item 1A. "Risk Factors," that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, JVs, or investments that we may make.

You should read this Quarterly Report, the documents that we reference in this Quarterly Report, our Annual Report on Form 10-K for the year ended December 31, 2018, the other reports we have filed with the Securities and Exchange Commission, or SEC, and the documents that we have filed as exhibits to our filings with the SEC completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

PART I. FINANCIAL INFORMATION

Item 1. Consolidated Financial Statements

Intrexon Corporation and Subsidiaries
Consolidated Balance Sheets
(Unaudited)

(Amounts in thousands, except share data)	September 30, 2019	December 31, 2018
Assets		
Current assets		
Cash and cash equivalents	$ 44,428	$ 102,768
Restricted cash	—	6,987
Short-term investments	45,285	119,688
Equity securities	16,320	384
Receivables		
Trade, net	20,413	21,195
Related parties, net	2,588	4,129
Other, net	1,970	2,754
Inventory	17,295	21,447
Prepaid expenses and other	9,033	6,131
Total current assets	157,332	285,483
Equity securities, noncurrent	6,515	1,798
Property, plant and equipment, net	122,706	128,874
Intangible assets, net	107,141	129,291
Goodwill	147,949	149,585
Investments in affiliates	17,487	18,859
Right-of-use assets	43,211	—
Other assets	2,564	2,287
Total assets	$ 604,905	$ 716,177

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Consolidated Balance Sheets
(Unaudited)

(Amounts in thousands, except share data)	September 30, 2019	December 31, 2018
Liabilities and Total Equity		
Current liabilities		
Accounts payable	$ 7,395	$ 13,420
Accrued compensation and benefits	9,862	10,687
Other accrued liabilities	13,664	20,620
Deferred revenue, including $4,205 and $6,945 from related parties as of September 30, 2019 and December 31, 2018, respectively	12,764	15,554
Lines of credit	569	466
Current portion of long-term debt, including $30,974 to related parties as of September 30, 2019	31,433	559
Current portion of lease liabilities	6,224	—
Related party payables	44	256
Total current liabilities	81,955	61,562
Long-term debt, net of current portion, including $25,000 and $55,290 to related parties as of September 30, 2019 and December 31, 2018, respectively	184,034	211,235
Deferred revenue, net of current portion, including $51,900 and $52,227 from related parties as of September 30, 2019 and December 31, 2018, respectively	66,360	54,210
Lease liabilities, net of current portion	38,182	—
Deferred tax liabilities, net	5,732	7,213
Other long-term liabilities	221	3,235
Total liabilities	376,484	337,455
Commitments and contingencies (Note 16)		
Total equity		
Common stock, no par value, 400,000,000 and 200,000,000 shares authorized as of September 30, 2019 and December 31, 2018, respectively; 162,511,940 and 160,020,466 shares issued and outstanding as of September 30, 2019 and December 31, 2018, respectively	—	—
Additional paid-in capital	1,745,177	1,722,012
Accumulated deficit	(1,483,654)	(1,330,545)
Accumulated other comprehensive loss	(33,102)	(28,612)
Total Intrexon shareholders' equity	228,421	362,855
Noncontrolling interests	—	15,867
Total equity	228,421	378,722
Total liabilities and total equity	$ 604,905	$ 716,177

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Consolidated Statements of Operations
(Unaudited)

(Amounts in thousands, except share and per share data)	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018
Revenues				
Collaboration and licensing revenues, including $3,428 and $11,952 from related parties during the three months ended September 30, 2019 and 2018, respectively, and $14,350 and $41,740 during the nine months ended September 30, 2019 and 2018, respectively	$ 6,185	$ 14,324	$ 21,252	$ 51,622
Product revenues	5,852	6,829	18,528	23,549
Service revenues	9,924	10,414	39,707	40,379
Other revenues	1,082	881	2,877	1,839
Total revenues	23,043	32,448	82,364	117,389
Operating Expenses				
Cost of products	8,263	8,877	25,729	28,046
Cost of services	6,550	6,449	21,860	21,127
Research and development	31,480	44,885	99,060	124,072
Selling, general and administrative	24,741	38,708	79,818	112,872
Impairment loss	626	—	626	—
Total operating expenses	71,660	98,919	227,093	286,117
Operating loss	(48,617)	(66,471)	(144,729)	(168,728)
Other Expense, Net				
Unrealized and realized appreciation (depreciation) in fair value of equity securities and preferred stock, net	(3,068)	(7,287)	2,634	(27,565)
Interest expense	(4,471)	(3,999)	(13,140)	(4,240)
Interest and dividend income	885	6,107	3,280	17,323
Other income, net	2,772	1,452	673	571
Total other expense, net	(3,882)	(3,727)	(6,553)	(13,911)
Equity in net loss of affiliates	(1,647)	(2,870)	(5,034)	(9,880)
Loss before income taxes	(54,146)	(73,068)	(156,316)	(192,519)
Income tax benefit	512	14,322	1,615	19,535
Net loss	$ (53,634)	$ (58,746)	$ (154,701)	$ (172,984)
Net loss attributable to the noncontrolling interests	—	1,422	1,592	4,113
Net loss attributable to Intrexon	$ (53,634)	$ (57,324)	$ (153,109)	$ (168,871)
Net loss attributable to Intrexon per share, basic and diluted	$ (0.35)	$ (0.44)	$ (1.00)	$ (1.31)
Weighted average shares outstanding, basic and diluted	154,596,257	129,518,989	153,770,785	128,843,991

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Consolidated Statements of Comprehensive Loss
(Unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
(Amounts in thousands)	**2019**	**2018**	**2019**	**2018**
Net loss	$ (53,634)	$ (58,746)	$ (154,701)	$ (172,984)
Other comprehensive income (loss):				
Unrealized gain (loss) on investments	(25)	(96)	81	(94)
Loss on foreign currency translation adjustments	(4,871)	(914)	(4,560)	(7,207)
Comprehensive loss	(58,530)	(59,756)	(159,180)	(180,285)
Comprehensive loss attributable to the noncontrolling interests	—	1,380	1,581	4,172
Comprehensive loss attributable to Intrexon	$ (58,530)	$ (58,376)	$ (157,599)	$ (176,113)

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Consolidated Statements of Shareholders' and Total Equity
(Unaudited)

(Amounts in thousands, except share data)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Intrexon Shareholders' Equity	Noncontrolling Interests	Total Equity
Balances at June 30, 2019	161,917,424	$ —	$1,737,449	$ (28,206)	$(1,430,020)	$ 279,223	$ —	$ 279,223
Stock-based compensation expense	—	—	5,423	—	—	5,423	—	5,423
Shares issued upon vesting of restricted stock units and for exercises of stock options	164,844	—	6	—	—	6	—	6
Shares issued as payment for services	429,672	—	2,299	—	—	2,299	—	2,299
Net loss	—	—	—	—	(53,634)	(53,634)	—	(53,634)
Other comprehensive loss	—	—	—	(4,896)	—	(4,896)	—	(4,896)
Balances at September 30, 2019	162,511,940	$ —	$1,745,177	$ (33,102)	$(1,483,654)	$ 228,421	$ —	$ 228,421

(Amounts in thousands, except share data)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Intrexon Shareholders' Equity	Noncontrolling Interests	Total Equity
Balances at June 30, 2018	129,421,788	$ —	$1,504,356	$ (21,848)	$ (932,756)	$ 549,752	$ 17,389	$ 567,141
Stock-based compensation expense	—	—	8,097	—	—	8,097	35	8,132
Shares issued upon vesting of restricted stock units and for exercises of stock options	39,281	—	141	—	—	141	—	141
Shares issued as payment for services	204,402	—	2,917	—	—	2,917	—	2,917
Equity component of convertible debt, net of issuance costs and deferred taxes	—	—	36,868	—	—	36,868	—	36,868
Shares issued pursuant to share lending agreement	7,479,431	—	—	—	—	—	—	—
Net loss	—	—	—	—	(57,324)	(57,324)	(1,422)	(58,746)
Other comprehensive income (loss)	—	—	—	(1,052)	—	(1,052)	42	(1,010)
Balances at September 30, 2018	137,144,902	$ —	$1,552,379	$ (22,900)	$ (990,080)	$ 539,399	$ 16,044	$ 555,443

The accompanying notes are an integral part of these consolidated financial statements

Intrexon Corporation and Subsidiaries
Consolidated Statements of Shareholders' and Total Equity
(Unaudited)

(Amounts in thousands, except share data)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Intrexon Shareholders' Equity	Noncontrolling Interests	Total Equity
Balances at December 31, 2018	160,020,466	$ —	$1,722,012	$ (28,612)	$(1,330,545)	$ 362,855	$ 15,867	$ 378,722
Stock-based compensation expense	—	—	14,469	—	—	14,469	69	14,538
Shares issued upon vesting of restricted stock units and for exercises of stock options and warrants	796,859	—	63	—	—	63	250	313
Shares issued for accrued compensation	150,908	—	1,102	—	—	1,102	—	1,102
Shares issued as payment for services	1,543,707	—	7,987	—	—	7,987	—	7,987
Shares issued in public offerings, net of issuance costs	—	—	—	—	—	—	6,611	6,611
Adjustments for noncontrolling interests	—	—	(456)	—	—	(456)	456	—
Deconsolidation of subsidiary	—	—	—	—	—	—	(21,672)	(21,672)
Net loss	—	—	—	—	(153,109)	(153,109)	(1,592)	(154,701)
Other comprehensive income (loss)	—	—	—	(4,490)	—	(4,490)	11	(4,479)
Balances at September 30, 2019	162,511,940	$ —	$1,745,177	$ (33,102)	$(1,483,654)	$ 228,421	$ —	$ 228,421

The accompanying notes are an integral part of these consolidated financial statements

Intrexon Corporation and Subsidiaries
Consolidated Statements of Shareholders' and Total Equity
(Unaudited)

(Amounts in thousands, except share data)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Intrexon Shareholders' Equity	Noncontrolling Interests	Total Equity
Balances at December 31, 2017	122,087,040	$ —	$1,397,005	$ (15,554)	$ (847,820)	$ 533,631	$ 12,914	$ 546,545
Cumulative effect of adoption of ASC 606	—	—	—	(104)	26,611	26,507	—	26,507
Stock-based compensation expense	—	—	28,251	—	—	28,251	89	28,340
Shares issued upon vesting of restricted stock units and for exercises of stock options and warrants	66,314	—	262	—	—	262	812	1,074
Shares issued as payment for services	612,117	—	8,404	—	—	8,404	—	8,404
Shares and warrants issued in public offerings, net of issuance costs	6,900,000	—	82,374	—	—	82,374	5,616	87,990
Equity component of convertible debt, net of issuance costs and deferred taxes	—	—	36,868	—	—	36,868	—	36,868
Shares issued pursuant to share lending agreement	7,479,431	—	—	—	—	—	—	—
Adjustments for noncontrolling interests	—	—	(785)	—	—	(785)	785	—
Net loss	—	—	—	—	(168,871)	(168,871)	(4,113)	(172,984)
Other comprehensive loss	—	—	—	(7,242)	—	(7,242)	(59)	(7,301)
Balances at September 30, 2018	137,144,902	$ —	$1,552,379	$ (22,900)	$ (990,080)	$ 539,399	$ 16,044	$ 555,443

The accompanying notes are an integral part of these consolidated financial statements

Intrexon Corporation and Subsidiaries
Consolidated Statements of Cash Flows
(Unaudited)

(Amounts in thousands)	Nine Months Ended September 30, 2019	2018
Cash flows from operating activities		
Net loss	$ (154,701)	$ (172,984)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	18,711	25,184
Loss on disposals of assets, net	1,875	4,110
Impairment loss	626	—
Write-off of in-process research and development acquired in asset acquisition	—	8,721
Unrealized and realized (appreciation) depreciation on equity securities and preferred stock, net	(2,634)	27,565
Noncash dividend income	(38)	(14,575)
Amortization of discounts on investments, net	(949)	(275)
Equity in net loss of affiliates	5,034	9,880
Stock-based compensation expense	14,538	28,340
Shares issued as payment for services	7,987	8,404
Provision for bad debts	787	1,597
Accretion of debt discount and amortization of deferred financing costs	6,962	2,116
Deferred income taxes	(1,448)	(19,335)
Other noncash items	3,284	635
Changes in operating assets and liabilities:		
Receivables:		
Trade	241	399
Related parties	1,190	6,085
Other	462	(909)
Inventory	4,775	2,577
Prepaid expenses and other	(4,320)	(511)
Right-of-use assets	2,593	—
Other assets	(41)	584
Accounts payable	(4,432)	(731)
Accrued compensation and benefits	535	17,561
Other accrued liabilities	(5,651)	1,591
Deferred revenue	5,056	(22,993)
Lease liabilities	(3,680)	—
Related party payables	38	(167)
Other long-term liabilities	(585)	253
Net cash used in operating activities	(103,785)	(86,878)

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Consolidated Statements of Cash Flows
(Unaudited)

(Amounts in thousands)	Nine Months Ended September 30, 2019	2018
Cash flows from investing activities		
Purchases of investments	(55,073)	(178,681)
Sales of investments	2,996	—
Maturities of investments	127,500	20,975
Proceeds from sales of equity securities	589	217
Investments in affiliates	(3,713)	(14,139)
Decrease in cash from deconsolidation of subsidiary	(7,244)	—
Return of investment in affiliate	125	2,598
Cash received in asset acquisition	—	15,500
Purchases of property, plant and equipment	(33,199)	(30,354)
Proceeds from sale of assets	361	1,930
Net cash provided by (used in) investing activities	32,342	(181,954)
Cash flows from financing activities		
Proceeds from issuance of shares and warrants in public offerings, net of issuance costs	6,611	87,990
Advances from lines of credit	4,623	3,231
Repayments of advances from lines of credit	(4,520)	(3,264)
Proceeds from long-term debt, net of issuance costs	376	194,000
Payments of long-term debt	(464)	(485)
Proceeds from stock option and warrant exercises	313	1,074
Net cash provided by financing activities	6,939	282,546
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	(843)	578
Net increase (decrease) in cash, cash equivalents, and restricted cash	(65,347)	14,292
Cash, cash equivalents, and restricted cash		
Beginning of period	110,182	75,545
End of period	$ 44,835	$ 89,837

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Consolidated Statements of Cash Flows
(Unaudited)

(Amounts in thousands)	Nine Months Ended September 30, 2019	2018
Supplemental disclosure of cash flow information		
Cash paid during the period for interest	$ 3,698	$ 360
Cash paid during the period for income taxes	50	193
Significant noncash financing and investing activities		
Stock received as consideration for collaboration agreements	$ 4,530	$ —
Long-term debt issued to a related party in an asset acquisition	—	30,000
Purchases of property and equipment included in accounts payable and other accrued liabilities	692	2,088
Purchases of equipment financed through debt	—	193

The following table provides a reconciliation of the cash, cash equivalents, and restricted cash balances as of September 30, 2019 and December 31, 2018 as shown above:

	September 30, 2019	December 31, 2018
Cash and cash equivalents	$ 44,428	$ 102,768
Restricted cash	—	6,987
Restricted cash included in other assets	407	427
Cash, cash equivalents, and restricted cash	$ 44,835	$ 110,182

The accompanying notes are an integral part of these consolidated financial statements.

Intrexon Corporation and Subsidiaries
Notes to the Consolidated Financial Statements
(Unaudited)
(Amounts in thousands, except share and per share data)

1. Organization

Intrexon Corporation ("Intrexon"), a Virginia corporation, uses synthetic biology to focus on programming biological systems to alleviate disease, remediate environmental challenges, and provide sustainable food and industrial chemicals, which may be accomplished directly or through collaborations and joint ventures. Intrexon's primary domestic operations are in Florida, Maryland, and Virginia, and its primary international operations are in Hungary. There have been no commercialized products derived either directly by Intrexon or through its collaborations or joint ventures to date.

Precigen, Inc. ("Precigen"), a dedicated discovery and clinical stage biopharmaceutical company advancing the next generation of gene and cellular therapies using precision technology to target urgent and intractable diseases in immuno-oncology, autoimmune disorders, and infectious diseases, is a wholly owned subsidiary of Intrexon with primary operations in Maryland.

Effective October 1, 2019, Intrexon transferred substantially all of its proprietary methane bioconversion platform assets to a new wholly owned subsidiary, MBP Titan LLC ("MBP"). MBP's proprietary methane bioconversion platform is designed to turn natural gas into more valuable and usable energy and chemical products via microbial fermentation. The operations of MBP are primarily in California. Prior to October 1, 2019, MBP was an operating division within Intrexon. There were no accounting implications resulting from the transfer of these assets.

ActoBio Therapeutics, Inc. ("ActoBio") is pioneering a new class of microbe-based biopharmaceuticals that enable expression and local delivery of disease-modifying therapeutics and is a wholly owned subsidiary of Intrexon with primary operations in Belgium.

Trans Ova Genetics, L.C. ("Trans Ova"), Progentus, L.C. ("Progentus"), and ViaGen, L.C. ("ViaGen"), providers of advanced reproductive technologies, including services and products sold to cattle breeders and other producers, are wholly owned subsidiaries with primary operations in California, Iowa, Maryland, Missouri, New York, Oklahoma, Texas, and Washington.

Oxitec Limited ("Oxitec"), a pioneering company in biological insect control solutions, is a wholly owned subsidiary of Intrexon with primary operations in Brazil and the United Kingdom.

Intrexon Produce Holdings, Inc. ("IPHI") is a wholly owned subsidiary of Intrexon. Okanagan Specialty Fruits, Inc. ("Okanagan Specialty Fruits"), a company that developed and received regulatory approval for the world's first non-browning apple without the use of any artificial additives, is a wholly owned subsidiary of IPHI with primary operations in Canada. Fruit Orchard Holdings, Inc. ("FOHI") is a wholly owned subsidiary of IPHI with primary operations in Washington. IPHI and its subsidiaries are hereinafter referred to as "Okanagan."

Exemplar Genetics, LLC ("Exemplar"), a provider of genetically engineered swine for medical and genetic research, is a wholly owned subsidiary with primary operations in Iowa.

Through April 8, 2019, Intrexon consolidated AquaBounty Technologies, Inc. ("AquaBounty"), a company focused on improving productivity in commercial aquaculture and whose common stock is listed on the Nasdaq Stock Market. On April 9, 2019, AquaBounty completed an underwritten public offering that resulted in Intrexon no longer having the contractual right to control AquaBounty's board of directors, and accordingly, Intrexon deconsolidated AquaBounty. After remeasuring its retained interest in AquaBounty, Intrexon recorded a loss on deconsolidation of $2,648, which is included in other income, net, on the accompanying consolidated statement of operations for the nine months ended September 30, 2019. The deconsolidation resulted in the derecognition of the carrying amount of $38,682 in net assets that are no longer reported in the accompanying consolidated balance sheet as of September 30, 2019. See Notes 9, 10, and 11 for additional discussion of material impacts to the accompanying consolidated balance sheet as of September 30, 2019. As of September 30, 2019, Intrexon owned approximately 38% of AquaBounty and, after deconsolidating the entity, accounts for these equity securities using the fair value option. See Notes 2 and 20 for additional discussion of Intrexon's investment in AquaBounty.

Intrexon Corporation and its consolidated subsidiaries are hereinafter referred to as the "Company."

2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying interim consolidated financial statements are unaudited and have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). Certain information and footnote disclosures normally included in the Company's annual financial statements have been condensed or omitted. These interim consolidated financial statements, in the opinion of management, reflect all normal recurring adjustments necessary for fair statement of the Company's financial position as of September 30, 2019 and results of operations and cash flows for the interim periods ended September 30, 2019 and 2018. The year-end consolidated balance sheet data was derived from the Company's audited financial statements but does not include all disclosures required by U.S. GAAP. These interim financial results are not necessarily indicative of the results to be expected for the year ending December 31, 2019, or for any other future annual or interim period. The accompanying interim unaudited consolidated financial statements should be read in conjunction with the audited consolidated financial statements and related notes thereto included in the Company's Annual Report on Form 10-K for the year ended December 31, 2018.

The accompanying consolidated financial statements reflect the operations of the Company and its subsidiaries. All intercompany accounts and transactions have been eliminated.

Liquidity and Going Concern

The Company has incurred operating losses since its inception and management expects operating losses and negative cash flows to continue for the foreseeable future and, as a result, the Company will require additional capital to fund its operations and execute its business plan. As of September 30, 2019, the Company had $89,713 in cash, cash equivalents and short-term investments which is not sufficient to fund the Company's planned operations through one year after the date the interim unaudited consolidated financial statements are issued, and accordingly, there is substantial doubt about the Company's ability to continue as a going concern. The analysis used to determine the Company's ability to continue as a going concern does not include cash sources outside of the Company's direct control that could be available within the next twelve months.

Management plans to obtain sufficient additional funding through monetizing certain of its existing assets, entering into new license and collaboration agreements, issuing additional equity or debt instruments or any other means, and if it is able to do so, they may not be on satisfactory terms. The Company's ability to raise additional capital in the equity and debt markets, should the Company choose to do so, is dependent on a number of factors, including, but not limited to, the market demand for the Company's common stock, which itself is subject to a number of business risks and uncertainties, as well as the uncertainty that the Company would be able to raise such additional capital at a price or on terms that are favorable to the Company. Should the Company not be able to secure additional funding through these means, the Company may have to engage in any or all of the following activities: (i) shift the Company's internal investments from subsidiaries and platforms whose potential for value creation is longer-term to near-term opportunities; (ii) sell certain of our operating subsidiaries, or portions thereof, to third parties; (iii) reduce operating expenditures for third-party contractors, including consultants, professional advisors, and other vendors; and (iv) reduce or delay capital expenditures, including facility expansions, lab equipment, and information technology projects. These actions may have a material adverse impact on the Company's ability to achieve certain of its planned objectives. Even if the Company is able to source additional funding, it may be forced to significantly reduce its operations if its business prospects do not improve. If the Company is unable to source additional funding, it may be forced to shut down operations altogether. These interim unaudited consolidated financial statements have been prepared on a going concern basis and do not include any adjustments to the amounts and classification of assets and liabilities that may be necessary in the event the Company can no longer continue as a going concern.

Equity Securities

The Company holds equity securities of private and publicly traded companies, including investments received and/or purchased from certain collaborators. The Company evaluates whether to elect the fair value option on an individual investment basis. The Company elected the fair value option to account for its equity securities held in publicly traded companies. These equity securities are recorded at fair value at each reporting date and are subject to market price volatility. Unrealized gains and losses resulting from fair value adjustments are reported in the consolidated statements of operations. The fair value of these equity securities is subject to fluctuation in the future due to the volatility of the stock market, changes in general economic conditions and changes in the financial conditions of these collaborators. The Company accounts for its investments in private companies using either the equity method, as discussed below, or the measurement alternative method for equity securities without readily determinable fair values, which represents cost and any adjustments for impairment or observable price changes in certain transactions. As of September 30, 2019, there have been no adjustments for impairment or observable price changes

for the Company's investments in private companies accounted for under the measurement alternative method. Equity securities that the Company does not intend to sell within one year are classified as noncurrent in the consolidated balance sheets.

For equity securities received pursuant to a collaboration agreement, the Company records the fair value of securities received on the date the collaboration is consummated or the milestone is achieved using the fair value of the collaborator's security on that date, assuming the transfer of consideration is considered perfunctory. If the transfer of the consideration is not considered perfunctory, the Company considers the specific facts and circumstances to determine the appropriate date on which to evaluate fair value. The Company also evaluates whether any discounts for trading restrictions or other basis for lack of marketability should be applied to the fair value of the securities at inception of the collaboration. In the event the Company concludes that a discount should be applied to securities accounted for under the fair value option, the fair value of the securities is adjusted at inception of the collaboration and re-evaluated at each reporting period thereafter.

Equity Method Investments

The Company accounts for its investments in each of its joint ventures and for its investments in start-up entities backed by the Harvest Intrexon Enterprise Fund I, LP ("Harvest"), all of which are related parties, using the equity method of accounting based upon relative ownership interest. The Company's investments in these entities are included in investments in affiliates in the accompanying consolidated balance sheets. See additional discussion related to certain of the Harvest start-up entities in Note 3 and to certain of the Company's joint ventures in Note 4.

Effective in April 2019, the Company accounts for its investment in AquaBounty, a related party, using the fair value option. The fair value of the Company's investment in AquaBounty was $16,320 as of September 30, 2019 and is included in equity securities in the accompanying consolidated balance sheet. The Company's ownership of AquaBounty was approximately 38% as of September 30, 2019. Unrealized appreciation (depreciation) in the fair value of the Company's investment in AquaBounty common stock was $(3,721) and $2,081 for the three and nine months ended September 30, 2019, respectively. See Notes 1 and 20 for additional discussion regarding AquaBounty.

The Company accounts for its investment in Oragenics, Inc. ("Oragenics"), one of its collaborators and a related party, using the fair value option. Oragenics was considered an equity method investment through September 30, 2018. See Note 17 for additional discussion regarding Oragenics. Unrealized depreciation in the fair value of the Company's investment in Oragenics common stock was $(387) and $(1,547) for the three and nine months ended September 30, 2018, respectively.

Summarized financial data as of September 30, 2019 and December 31, 2018 and for the three and nine months ended September 30, 2019 and 2018, for the Company's equity method investments are shown in the following tables.

	September 30, 2019	December 31, 2018
Current assets	$ 16,983	$ 17,485
Noncurrent assets	59,231	31,274
Total assets	76,214	48,759
Current liabilities	6,788	4,226
Noncurrent liabilities	4,766	—
Total liabilities	11,554	4,226
Net assets	$ 64,660	$ 44,533

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenues	$ 206	$ 113	$ 601	$ 353
Operating expenses	6,843	11,621	21,604	30,762
Operating loss	(6,637)	(11,508)	(21,003)	(30,409)
Other, net	1	12	9	33
Net loss	$ (6,636)	$ (11,496)	$ (20,994)	$ (30,376)

Variable Interest Entities

As of September 30, 2019 and December 31, 2018, the Company determined that certain of its collaborators and joint ventures, as well as Harvest, were variable interest entities ("VIE" or "VIEs"). The Company was not the primary beneficiary for these entities since it did not have the power to direct the activities that most significantly impact the economic performance of the VIEs. The Company's aggregate investment balances of these VIEs as of September 30, 2019 and December 31, 2018 were $20,453 and $21,219, respectively, which represents the Company's maximum risk of loss related to the identified VIEs.

Operating Leases

The Company adopted Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") Topic 842, *Leases* ("ASC 842"), effective January 1, 2019. Under ASC 842, the Company determines if an arrangement is a lease at inception. Operating leases are included as right-of-use assets ("ROU Assets") and lease liabilities on the consolidated balance sheets. The Company has elected not to recognize ROU Assets or lease liabilities for leases with lease terms of one year or less.

Lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term at commencement date, with an ROU Asset of the same amount. For leases that contain fixed non-lease payments, the Company accounts for the lease and non-lease components as a single lease component. Variable lease payments, which primarily include payments for non-lease components such as maintenance costs, are excluded from the ROU Assets and lease liabilities and are recognized in the period in which the obligation for those payments is incurred. As the Company's operating leases do not provide an implicit interest rate, the Company uses its incremental borrowing rate at the lease commencement date, which is the estimated rate the Company would be required to pay for a collateralized borrowing equal to the total lease payments over the term of the lease, in determining the present value of future payments. The initial measurement of the ROU Asset also includes any lease payments made, adjusted for lease incentives. The lease term for all of the Company's leases includes the noncancelable period of the lease plus any additional periods covered by options that the Company is reasonably certain to exercise, either to extend or to not terminate the lease. Lease expense is recognized on a straight-line basis over the lease term.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates.

Segment Information

The Company realigned its business in April 2019, and as a result, its chief operating decision maker ("CODM") now regularly reviews disaggregated financial information for various operating segments. The Company's reportable segments now include (i) Precigen; (ii) MBP; (iii) the Fine Chemicals division, which is an operating division of Intrexon; (iv) Okanagan; and (v) Trans Ova. All of Intrexon's consolidated subsidiaries and operating divisions that did not meet the quantitative thresholds to report separately are combined and reported in a single category, All Other. See Note 1 for a description of Precigen, MBP, Okanagan, and Trans Ova. Corporate expenses, which are not allocated to the segments and are managed at a consolidated level, include costs associated with general and administrative functions, including the Company's finance, accounting, legal, human resources, information technology, corporate communication, and investor relations functions. Corporate expenses exclude interest expense, depreciation and amortization, stock-based compensation expense, and equity in net loss of affiliates and include unrealized and realized gains and losses on the Company's securities portfolio as well as dividend income. The Company's segment presentation has been recast to retrospectively reflect the change from one reportable segment to multiple reportable segments. See Note 19 for further discussion of the Company's segments.

Recently Adopted Accounting Pronouncements

The Company adopted ASC 842 on January 1, 2019 using the modified retrospective method as of the adoption date without restating prior periods. In addition, the Company elected to use the package of practical expedients which allowed the Company to not have to reassess whether expired or existing contracts contain leases under the new definition of a lease or the lease classification for expired or existing leases under ASC Topic 840. As a result of the adoption of ASC 842, the Company recorded ROU Assets and lease liabilities of approximately $43,500 and $45,500, respectively, as of January 1, 2019. The difference between the ROU Assets and lease liabilities primarily represents the balance of deferred rent as of December 31, 2018 that resulted from historical straight-lining of operating leases expense, which was reclassified upon adoption to reduce the measurement of the ROU Assets. There was no impact to accumulated deficit.

In June 2018, the FASB issued Accounting Standards Update ("ASU") 2018-07, *Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting* ("ASU 2018-07"). The provisions of ASU 2018-07 expand the scope of ASC Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. The Company adopted this standard effective January 1, 2019, and there was no material impact to the accompanying consolidated financial statements.

Recently Issued Accounting Pronouncements

In October 2018, the FASB issued ASU 2018-18, *Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606* ("ASU 2018-18"). The provisions of ASU 2018-18 clarify when certain transactions between collaborative arrangement participants should be accounted for under ASC Topic 606, *Revenue from Contracts with Customers* ("ASC 606"), and incorporates unit-of-account guidance consistent with ASC 606 to aid in this determination. The guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2019, with early adoption permitted, and is effective for the Company for the year ending December 31, 2020. The Company is currently evaluating the impact that the implementation of this standard will have on the Company's consolidated financial statements.

In October 2018, the FASB issued ASU 2018-17, *Consolidation (Topic 810): Targeted Improvements to Related Party Guidance for Variable Interest Entities* ("ASU 2018-17"). The provisions of ASU 2018-17 modify the guidance under ASC Topic 810 related to the evaluation of indirect interests held through related parties under common control when determining whether fees paid to decision makers and service providers are variable interests. Indirect interests held through related parties that are under common control are no longer considered to be the equivalent of direct interests in their entirety and instead should be considered on a proportional basis. This guidance more closely aligns with accounting of how indirect interests held through related parties under common control are considered for determining whether a reporting entity must consolidate a VIE. The guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2019, with early adoption permitted, and is effective for the Company for the year ending December 31, 2020. The Company is currently evaluating the impact that the implementation of this standard will have on the Company's consolidated financial statements.

In August 2018, the FASB issued ASU 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* ("ASU 2018-15"). The provisions of ASU 2018-15 clarify the accounting for implementation costs of a hosting arrangement that is a service contract. The new standard requires an entity (customer) in a hosting arrangement that is a service contract to follow existing internal-use software guidance to determine which implementation costs to capitalize as an asset related to the service contract and which costs to expense. Capitalized implementation costs of a hosting arrangement that is a service contract should be amortized over the term of the hosting arrangement, which might extend beyond the noncancelable period if there are options to extend or terminate. ASU 2018-15 also specifies the financial statement presentation of capitalized implementation costs and related amortization, in addition to required disclosures for material capitalized implementation costs related to hosting arrangements that are service contracts. The guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2019, with early adoption permitted, and is effective for the Company for the year ending December 31, 2020. The Company is currently evaluating the impact that the implementation of this standard will have on the Company's consolidated financial statements.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurements (Topic 820): Disclosure Framework-Changes to the Disclosure Requirements for Fair Value Measurements* ("ASU 2018-13"). The provisions of ASU 2018-13 modify the disclosures related to recurring and nonrecurring fair value measurements. Disclosures related to the transfer of assets between Level 1 and Level 2 hierarchies have been eliminated and various additional disclosures related to Level 3 fair value measurements have been added, modified or removed. The guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2019, but entities are permitted to early adopt either the entire standard or only the provisions that eliminate or modify the requirements. This standard is effective for the Company for the year ending December 31, 2020. The Company is currently evaluating the impact that the implementation of this standard will have on the Company's consolidated financial statements.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("ASU 2016-13"). The provisions of ASU 2016-13 modify the impairment model to utilize an expected loss methodology in place of the currently used incurred loss methodology, and requires a consideration of a broader range of reasonable and supportable information to inform credit loss estimates. The guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2019, with early adoption permitted, and is effective for the Company for the year ending December 31, 2020. The Company is currently evaluating the impact that the implementation of this standard will have on the Company's consolidated financial statements.

In April 2019, the FASB issued ASU 2019-04, *Codification Improvements to Topic 326, Financial Instruments-Credit Losses, Topic 815, Derivatives and Hedging, and Topic 825, Financial Instruments* ("ASU 2019-04"). The provisions of ASU 2019-04 clarify and improve areas of guidance related to ASU 2016-13 and ASC Topic 825, *Financial Instruments* ("ASC 825"). The amendments to ASU 2016-13 have the same effective date as the original ASU and are effective for the Company for the year ending December 31, 2020. The amendments to ASC 825 are effective for fiscal years beginning after December 15, 2019, with early adoption permitted, and are effective for the Company for the year ending December 31, 2020. The Company is currently evaluating the impact that the implementation of this standard will have on the Company's consolidated financial statements.

3. Mergers and Acquisitions

Asset Acquisition of Certain Harvest Entities

In September 2018, the Company, through its wholly owned subsidiary ActoBio, issued $30,000 of convertible promissory notes to Harvest, a related party, to acquire Harvest's ownership in CRS Bio, Inc., Genten Therapeutics, Inc., and Relieve Genetics, Inc. (collectively the "Harvest entities"). The Company also received $15,500 cash in the transaction from the acquisition of the Harvest entities. Prior to the transaction, the Company held a noncontrolling interest in the Harvest entities, with a combined carrying value for all entities of $4,303, and accounted for its ownership using the equity method of accounting. Following the transaction, the Company owns 100% of the equity interests of the Harvest entities including the rights that had been previously licensed to the Harvest entities by the Company. The Harvest entities did not meet the definition of a business and accordingly, the transaction was accounted for as an asset acquisition.

By reacquiring the rights previously licensed to the Harvest entities, the Company was relieved from its obligations under the original exclusive channel collaborations ("ECCs") and therefore wrote off deferred revenue of $10,078 in September 2018 as part of the transaction. The remaining value acquired of $8,721 was considered in-process research and development related to the reacquired rights under the ECCs and expensed immediately.

See Note 11 for additional discussion of the convertible promissory notes.

4. Investments in Joint Ventures

Intrexon Energy Partners

In March 2014, the Company and certain investors (the "IEP Investors"), including an affiliate of Third Security, LLC ("Third Security"), a related party, entered into a Limited Liability Company Agreement that governs the affairs and conduct of business of Intrexon Energy Partners, LLC ("Intrexon Energy Partners"), a joint venture formed to optimize and scale-up the Company's methane bioconversion platform technology for the production of certain fuels and lubricants. The Company also entered into an ECC with Intrexon Energy Partners providing exclusive rights to the Company's technology for the use in bioconversion, as a result of which the Company received a technology access fee of $25,000 while retaining a 50% membership interest in Intrexon Energy Partners. The IEP Investors made initial capital contributions, totaling $25,000 in the aggregate, in exchange for pro rata membership interests in Intrexon Energy Partners totaling 50%. In addition, Intrexon has committed to make capital contributions of up to $25,000, and the IEP Investors, as a group and pro rata in accordance with their respective membership interests in Intrexon Energy Partners, have committed to make additional capital contributions of up to $25,000, at the request of Intrexon Energy Partners' board of managers (the "Intrexon Energy Partners Board") and subject to certain limitations. As of September 30, 2019, the Company's remaining commitment was $4,225. Intrexon Energy Partners is governed by the Intrexon Energy Partners Board, which has five members. Two members of the Intrexon Energy Partners Board are designated by the Company and three members are designated by a majority of the IEP Investors. The Company and the IEP Investors have the right, but not the obligation, to make additional capital contributions above the initial limits when and if solicited by the Intrexon Energy Partners Board.

The Company's investment in Intrexon Energy Partners was $(355) and $(656) as of September 30, 2019 and December 31, 2018, respectively, and is included in other accrued liabilities in the accompanying consolidated balance sheets.

Intrexon Energy Partners II

In December 2015, the Company and certain investors (the "IEPII Investors"), including Harvest, entered into a Limited Liability Company Agreement that governs the affairs and conduct of business of Intrexon Energy Partners II, LLC ("Intrexon Energy Partners II"), a joint venture formed to utilize the Company's methane bioconversion platform technology for the production of 1,4-butanediol, an industrial chemical used to manufacture spandex, polyurethane, plastics, and polyester. The Company also entered into an ECC with Intrexon Energy Partners II that provides exclusive rights to the Company's technology for use in the field, as a result of which the Company received a technology access fee of $18,000 while retaining a

50% membership interest in Intrexon Energy Partners II. The IEPII Investors made initial capital contributions, totaling $18,000 in the aggregate, in exchange for pro rata membership interests in Intrexon Energy Partners II totaling 50%. In December 2015, the owners of Intrexon Energy Partners II made a capital contribution of $4,000, half of which was paid by the Company. Intrexon has committed to make additional capital contributions of up to $10,000, and the IEPII Investors, as a group and pro rata in accordance with their respective membership interests in Intrexon Energy Partners II, have committed to make additional capital contributions of up to $10,000, at the request of Intrexon Energy Partners II's board of managers (the "Intrexon Energy Partners II Board") and subject to certain limitations. Intrexon Energy Partners II is governed by the Intrexon Energy Partners II Board, which has five members. One member of the Intrexon Energy Partners II Board is designated by the Company and four members are designated by a majority of the IEPII Investors. The Company and the IEPII Investors have the right, but not the obligation, to make additional capital contributions above the initial limits when and if solicited by the Intrexon Energy Partners II Board.

The Company's investment in Intrexon Energy Partners II was $(425) and $(50) as of September 30, 2019 and December 31, 2018, respectively, and is included in other accrued liabilities in the accompanying consolidated balance sheets.

EnviroFlight

In February 2016, the Company entered into a series of transactions involving EnviroFlight, LLC ("Old EnviroFlight"), Darling Ingredients Inc. ("Darling") and a newly formed venture between the Company and Darling ("New EnviroFlight"). New EnviroFlight was formed to generate high-nutrition, low environmental impact animal and fish feed, as well as fertilizer products, from black soldier fly larvae. Through September 30, 2019, the Company and Darling have made subsequent capital contributions of $19,000 each.

The Company's investment in New EnviroFlight was $15,629 and $16,720 as of September 30, 2019 and December 31, 2018, respectively, and is included in investments in affiliates in the accompanying consolidated balance sheets.

Intrexon T1D Partners

In March 2016, the Company and certain investors (the "T1D Investors"), including affiliates of Third Security, entered into a Limited Liability Company Agreement that governs the affairs and conduct of business of Intrexon T1D Partners, LLC ("Intrexon T1D Partners"), a joint venture formed to utilize the Company's proprietary ActoBiotics platform to develop and commercialize products to treat type 1 diabetes. The Company also entered into an ECC with Intrexon T1D Partners that provided the exclusive rights to the Company's technology for use in the field, as a result of which the Company received a technology access fee of $10,000 while retaining a 50% membership interest in Intrexon T1D Partners. The T1D Investors made initial capital contributions, totaling $10,000 in the aggregate, in exchange for pro rata membership interests in Intrexon T1D Partners totaling 50%. Intrexon committed to make capital contributions of up to $5,000, and the T1D Investors, as a group and pro rata in accordance with their respective membership interests in Intrexon T1D Partners, committed to make additional capital contributions of up to $5,000, at the request of Intrexon T1D Partners' board of managers, which consisted of two members appointed by the Company and three members appointed by a majority of the T1D Investors. The Company satisfied its commitment in 2018.

In November 2018, the Company, together with its wholly owned subsidiary ActoBio, issued 1,933,737 shares of Intrexon common stock valued at $18,970 to the T1D Investors to acquire their ownership interest in Intrexon T1D Partners. Following the transaction, the Company owns 100% of the membership interests in Intrexon T1D Partners, including the rights that had been previously licensed to Intrexon T1D Partners by the Company in the ECC. Intrexon T1D Partners did not meet the definition of a business, and accordingly, the transaction was accounted for as an asset acquisition. By reacquiring the rights previously licensed to Intrexon T1D Partners, the Company was relieved from its obligations under the original ECC and therefore wrote off $8,517 of deferred revenue in November 2018 as part of the transaction. The remaining value of $10,453 was considered in-process research and development related to the reacquired rights under the ECC and expensed immediately.

5. Collaboration and Licensing Revenue

The Company's collaborations and licensing agreements provide for multiple promises to be satisfied by the Company and typically include a license to the Company's technology platforms, participation in collaboration committees, and performance of certain research and development services. Based on the nature of the promises in the Company's collaboration and licensing agreements, the Company typically combines most of its promises into a single performance obligation because the promises are highly interrelated and not individually distinct. At contract inception, the transaction price is typically the upfront payment received and is allocated to the single performance obligation. The Company has determined the transaction price should be

recognized as revenue based on its measure of progress under the agreement primarily based on inputs necessary to fulfill the performance obligation.

The Company recognizes the reimbursement payments received for research and development services in the period when the services are performed. At the inception of each collaboration, the Company determines whether any milestone payments are probable and can be included in the transaction price. The milestone payments are typically not considered probable at inception and are therefore constrained. Royalties related to product sales will be recognized when sales have occurred since the royalties relate directly to the technology license granted in the agreement.

The Company determines whether collaborations and licensing agreements are individually significant for disclosure based on a number of factors, including total revenue recorded by the Company pursuant to collaboration and licensing agreements, collaborators or licensees with either majority-owned subsidiaries or equity method investments, or other qualitative factors. Collaboration and licensing revenues generated from consolidated subsidiaries are eliminated in consolidation.

The following table summarizes the amounts recorded as revenue in the consolidated statements of operations for each significant counterparty to a collaboration or licensing agreement for the three and nine months ended September 30, 2019 and 2018.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
ZIOPHARM Oncology, Inc.	$ 431	$ 4,826	$ 2,130	$ 13,626
Ares Trading S.A.	—	1,576	—	7,525
Oragenics, Inc.	231	705	615	867
Intrexon T1D Partners, LLC	—	368	—	2,399
Intrexon Energy Partners, LLC	823	1,329	2,596	3,345
Intrexon Energy Partners II, LLC	293	754	1,217	1,685
Surterra Holdings, Inc.	1,022	—	1,182	—
Genopaver, LLC	494	689	1,186	3,076
Fibrocell Science, Inc.	402	391	3,247	1,015
Persea Bio, LLC	1,083	199	621	714
Harvest start-up entities (1)	100	2,691	4,862	11,792
Other	1,306	796	3,596	5,578
Total	$ 6,185	$ 14,324	$ 21,252	$ 51,622

(1) For the three and nine months ended September 30, 2019 and 2018, revenues recognized from collaborations with Harvest start-up entities include: Thrive Agrobiotics, Inc.; Exotech Bio, Inc.; and AD Skincare, Inc. For the nine months ended September 30, 2018, revenues recognized from collaborations with Harvest start-up entities also include Genten Therapeutics, Inc. and CRS Bio, Inc.

Except for the agreements discussed below, there have been no significant changes to the agreements with our collaborators and licensees in the nine months ended September 30, 2019.

Surterra Collaboration

In June 2019, the Company entered into an Exclusive Product Collaboration agreement ("Surterra EPC") with Surterra Holdings, Inc. ("Surterra") to advance Surterra's cannabinoid production at a reliable, efficient, cost-effective, and industrial scale utilizing the Company's yeast fermentation platform. Under the Surterra EPC, Surterra is responsible for the commercialization of products, including securing any regulatory approvals. Upon execution of the Surterra EPC, the Company received a technology access fee in the form of a $10,000 cash payment and common stock of Surterra valued at $4,530 as upfront consideration. The Company is entitled to developmental milestones for each target selected by Surterra up to a maximum of $68,000 for the achievement of all milestones for all targets as defined in the agreement. The Company is entitled to payments for research and development services provided pursuant to the agreement as well as single-digit royalties on quarterly gross sales of products developed. The Company's performance obligations terminate upon the acceptance of all deliverables for each target selected under the agreement, and the agreement may be terminated by either party in the event of a

material breach as defined in the agreement or may be terminated voluntarily by Surterra upon 90 days written notice to the Company.

Fibrocell Science Collaboration

In April 2019, Fibrocell Science, Inc. ("Fibrocell"), a publicly traded cell and gene therapy company focused on disease affecting the skin and connective tissue and a related party, entered into a collaboration agreement with a third party to develop and commercialize a product in the field of the Company's ECC with Fibrocell ("Fibrocell ECC"). Pursuant to the terms of the Fibrocell ECC, the Company is entitled to 50% of sublicensing fees and received $3,750 during the nine months ended September 30, 2019.

Deferred Revenue

Deferred revenue primarily consists of consideration received for the Company's collaboration and licensing agreements. Deferred revenue consists of the following:

	September 30, 2019	December 31, 2018
Collaboration and licensing agreements	$ 74,431	$ 63,284
Prepaid product and service revenues	3,054	2,933
Other	1,639	3,547
Total	$ 79,124	$ 69,764
Current portion of deferred revenue	$ 12,764	$ 15,554
Long-term portion of deferred revenue	66,360	54,210
Total	$ 79,124	$ 69,764

The following table summarizes the remaining balance of deferred revenue associated with upfront and milestone payments for each significant counterparty to a collaboration or licensing agreement as of September 30, 2019 and December 31, 2018, including the estimated remaining performance period as of September 30, 2019.

	Average Remaining Performance Period (Years)	September 30, 2019	December 31, 2018
ZIOPHARM Oncology, Inc.	0.0	$ —	$ 1,214
Oragenics, Inc.	4.7	5,463	5,810
Intrexon Energy Partners, LLC	4.5	8,362	10,267
Intrexon Energy Partners II, LLC	5.2	12,843	14,060
Surterra Holdings, Inc.	8.7	13,987	—
Genopaver, LLC	4.5	789	1,175
Fibrocell Science, Inc.	5.1	18,102	17,519
Persea Bio, LLC	5.3	3,553	2,697
Harvest start-up entities (1)	5.4	6,993	7,644
Other	1.7	4,297	2,898
Total		$ 74,389	$ 63,284

(1) As of September 30, 2019 and December 31, 2018, the balance of deferred revenue for collaborations with Harvest start-up entities includes: Thrive Agrobiotics, Inc.; Exotech Bio, Inc.; and AD Skincare, Inc.

6. Short-term Investments

The Company's investments are classified as available-for-sale. The following table summarizes the amortized cost, gross unrealized gains and losses, and fair value of available-for-sale investments as of September 30, 2019:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Aggregate Fair Value
U.S. government debt securities	$ 44,925	$ 20	$ —	$ 44,945
Certificates of deposit	340	—	—	340
Total	$ 45,265	$ 20	$ —	$ 45,285

The following table summarizes the amortized cost, gross unrealized gains and losses, and fair value of available-for-sale investments as of December 31, 2018:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Aggregate Fair Value
U.S. government debt securities	$ 119,401	$ —	$ (61)	$ 119,340
Certificates of deposit	348	—	—	348
Total	$ 119,749	$ —	$ (61)	$ 119,688

As of September 30, 2019, all of the available-for-sale investments were due within one year based on their contractual maturities.

Changes in market interest rates and bond yields cause certain investments to fall below their cost basis, resulting in unrealized losses on investments. The unrealized losses of the Company's investments were primarily a result of unfavorable changes in interest rates subsequent to the initial purchase of these investments, and there were no unrealized losses as of September 30, 2019.

As of September 30, 2019 and December 31, 2018, the Company did not consider any of its debt security investments to be other-than-temporarily impaired. When evaluating its debt security investments for other-than-temporary impairment, the Company reviews factors such as the length of time and extent to which fair value has been below its cost basis, the financial condition of the issuer, the Company's ability and intent to hold the security and whether it is more likely than not that it will be required to sell the investment before recovery of its cost basis.

7. Fair Value Measurements

The carrying amount of cash and cash equivalents, restricted cash, receivables, accounts payable, accrued compensation and benefits, other accrued liabilities, and related party payables approximate fair value due to the short maturity of these instruments.

Assets

The following table presents the placement in the fair value hierarchy of financial assets that are measured at fair value on a recurring basis, including the items for which the fair value option has been elected, at September 30, 2019:

	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	September 30, 2019
Assets				
U.S. government debt securities	$ —	$ 44,945	$ —	$ 44,945
Equity securities	1,687	298	16,320	18,305
Other	—	593	390	983
Total	$ 1,687	$ 45,836	$ 16,710	$ 64,233

The following table presents the placement in the fair value hierarchy of financial assets that are measured at fair value on a recurring basis, including the items for which the fair value option has been elected, at December 31, 2018:

	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	December 31, 2018
Assets				
U.S. government debt securities	$ —	$ 119,340	$ —	$ 119,340
Equity securities	1,626	556	—	2,182
Other	—	468	191	659
Total	$ 1,626	$ 120,364	$ 191	$ 122,181

The method used to estimate the fair value of the Level 1 assets in the tables above is based on observable market data as these equity securities are publicly-traded. The method used to estimate the fair value of the Level 2 short-term investments in the tables above is based on professional pricing sources for identical or comparable instruments, rather than direct observations of quoted prices in active markets. The methods used to estimate the fair value of the Level 2 and Level 3 equity securities in the tables above are based on the quoted market price of the publicly-traded security, adjusted for any trading restrictions, including discounts for lack of marketability based on historical volatilities and the restriction period. Market price volatility of these Level 3 securities and a significant change in the assumptions used in the discount for lack of marketability could result in a significant impact to the fair value. The Company owns preferred stock in certain of its collaborators, and these investments are classified as Level 3 within the fair value hierarchy. The methods used to estimate the fair value of these Level 3 assets are discussed in Note 17.

The following table summarizes the changes in the Level 3 investments in equity securities and preferred stock during the nine months ended September 30, 2019.

	Nine Months Ended September 30, 2019
Beginning balance	$ 191
Retained interest in deconsolidated subsidiary	14,239
Dividend income from investments in preferred stock	38
Net unrealized appreciation in the fair value of the investments in equity securities and preferred stock	2,242
Ending balance	$ 16,710

There were no transfers of assets between levels of the fair value hierarchy during the nine months ended September 30, 2019.

Liabilities

The carrying values of the Company's long-term debt, excluding the 3.50% convertible senior notes due 2023 (the "Convertible Notes"), approximates fair value due to the length of time to maturity and/or the existence of interest rates that approximate prevailing market rates.

The calculated fair value of the Convertible Notes (Note 11) was approximately $122,000 and $141,000 as of September 30, 2019 and December 31, 2018, respectively, and is based on the recent third-party trades of the instrument as of the balance sheet date. The fair value of the Convertible Notes is classified as Level 2 within the fair value hierarchy as there is not an active market for the Convertible Notes, however, third-party trades of the instrument are considered observable inputs. The Convertible Notes are reflected on the accompanying consolidated balance sheets at amortized cost, which was $155,063 and $148,101 as of September 30, 2019 and December 31, 2018, respectively.

The Company's contingent consideration liabilities are measured on a recurring basis and were $585 at September 30, 2019 and December 31, 2018. These fair value measurements were based on significant inputs not observable in the market and thus represented a Level 3 measurement. A significant change in unobservable inputs could result in a significant impact on the fair

value of the Company's contingent consideration liabilities. The contingent consideration liabilities are remeasured to fair value at each reporting date until the contingencies are resolved, and those changes in fair value are recognized in earnings. There were no changes in the fair value of the Level 3 liabilities during the nine months ended September 30, 2019.

8. Inventory

Inventory consists of the following:

	September 30, 2019	December 31, 2018
Supplies, embryos and other production materials	$ 3,461	$ 4,729
Work in process	4,656	4,391
Livestock	6,505	10,167
Feed	2,673	2,160
Total inventory	$ 17,295	$ 21,447

9. Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	September 30, 2019	December 31, 2018
Land and land improvements	$ 11,011	$ 12,490
Buildings and building improvements	11,607	20,371
Furniture and fixtures	1,388	1,891
Equipment	67,020	74,555
Leasehold improvements	30,722	28,289
Breeding stock	4,867	4,582
Computer hardware and software	11,385	11,697
Trees	16,728	11,910
Construction and other assets in progress	26,319	18,880
	181,047	184,665
Less: Accumulated depreciation and amortization	(58,341)	(55,791)
Property, plant and equipment, net	$ 122,706	$ 128,874

The deconsolidation of AquaBounty (Note 1) in April 2019 resulted in the reduction of $24,186 of property, plant and equipment, net on the accompanying consolidated balance sheet as of September 30, 2019.

During the three and nine months ended September 30, 2019, the Company recorded $448 of property, plant and equipment impairment losses in conjunction with the closing of two of its reporting units during the third quarter of 2019.

During the three and nine months ended September 30, 2018, the Company recorded losses of $85 and $5,057, respectively, on disposal of certain leasehold improvements, equipment, and other fixed assets, in conjunction with the closing of one of its research and development facilities in Brazil.

Depreciation expense was $3,293 and $3,614 for the three months ended September 30, 2019 and 2018, respectively, and $10,213 and $10,712 for the nine months ended September 30, 2019 and 2018, respectively.

10. Goodwill and Intangible Assets, Net

The changes in the carrying amount of goodwill for the nine months ended September 30, 2019 are as follows:

Balance at December 31, 2018	$	149,585
Impairment		(178)
Foreign currency translation adjustments		(1,458)
Balance at September 30, 2019	$	147,949

The Company had $14,001 and $13,823 of accumulated impairment losses as of September 30, 2019 and December 31, 2018, respectively.

In April 2019, as a result of the Company's change in segments (Notes 2 and 19), the Company concluded that certain operating segments are now separate reporting units. Accordingly, the Company performed a relative fair value allocation of certain of its goodwill.

During the three and nine months ended September 30, 2019, the Company recorded $178 of goodwill impairment losses in conjunction with the closing of two of its reporting units during the third quarter of 2019.

Intangible assets consist of the following as of September 30, 2019:

	Gross Carrying Amount	Accumulated Amortization	Net
Patents, developed technologies and know-how	$ 136,114	$ (38,804)	$ 97,310
Customer relationships	10,700	(8,221)	2,479
Trademarks	5,900	(3,685)	2,215
In-process research and development	5,137	—	5,137
Total	$ 157,851	$ (50,710)	$ 107,141

Intangible assets consist of the following as of December 31, 2018:

	Gross Carrying Amount	Accumulated Amortization	Net
Patents, developed technologies and know-how	$ 152,482	$ (35,133)	$ 117,349
Customer relationships	10,700	(7,565)	3,135
Trademarks	6,800	(3,341)	3,459
In-process research and development	5,348	—	5,348
Total	$ 175,330	$ (46,039)	$ 129,291

The balance of in-process research and development includes certain in-process research and development technology acquired in the Company's acquisition of Oxitec in September 2015, and amortization will begin once certain regulatory approvals have been obtained for the in-process programs.

The deconsolidation of AquaBounty (Note 1) in April 2019 resulted in the reduction of $11,567 of net intangible assets, primarily related to patents, developed technologies, and know-how, on the accompanying consolidated balance sheet as of September 30, 2019.

Amortization expense was $2,728 and $4,689 for the three months ended September 30, 2019 and 2018, respectively, and $8,498 and $14,472 for the nine months ended September 30, 2019 and 2018, respectively.

11. Lines of Credit and Long-Term Debt

Lines of Credit

Trans Ova has an $8,000 revolving line of credit with First National Bank of Omaha that matures on December 31, 2019. The line of credit bears interest at the greater of 2.95% above the London Interbank Offered Rate or 3.00%, and the actual rate was 5.06% as of September 30, 2019. As of September 30, 2019, there was no outstanding balance. The amount available under the line of credit is based on eligible accounts receivable and inventory up to the maximum principal amount and was $7,930 as of September 30, 2019. The line of credit is collateralized by certain of Trans Ova's assets and contains certain restricted covenants that include maintaining minimum tangible net worth and working capital and maximum allowable annual capital expenditures. Trans Ova was in compliance with these covenants as of September 30, 2019.

Exemplar has a $700 revolving line of credit with American State Bank that matures on October 31, 2020. As of September 30, 2019, the line of credit bore interest at 5.75% per annum, and there was an outstanding balance of $569.

Long-Term Debt

Long-term debt consists of the following:

	September 30, 2019	December 31, 2018
Convertible debt	$ 211,037	$ 203,391
Notes payable	4,204	4,551
Other	226	3,852
Long-term debt	215,467	211,794
Less current portion	31,433	559
Long-term debt, less current portion	$ 184,034	$ 211,235

The deconsolidation of AquaBounty (Note 1) in April 2019 resulted in the reduction of $4,030 of long-term debt on the accompanying consolidated balance sheet as of September 30, 2019.

Convertible Debt

Intrexon Convertible Notes

In July 2018, Intrexon completed a registered underwritten public offering of $200,000 aggregate principal amount of Convertible Notes and issued the Convertible Notes under an indenture (the "Base Indenture") between Intrexon and The Bank of New York Mellon Trust Company, N.A., as trustee, as supplemented by the First Supplemental Indenture (together with the Base Indenture, the "Indenture"). Intrexon received net proceeds of $193,958 after deducting underwriting discounts and offering expenses of $6,042.

The Convertible Notes are senior unsecured obligations of Intrexon and bear interest at a rate of 3.50% per year, payable semiannually in arrears on January 1 and July 1 of each year beginning on January 1, 2019. The Convertible Notes mature on July 1, 2023, unless earlier repurchased or converted. The Convertible Notes are convertible into cash, shares of Intrexon's common stock or a combination of cash and shares, at Intrexon's election. The initial conversion rate of the Convertible Notes is 58.6622 shares of Intrexon common stock per $1,000 principal amount of Convertible Notes (equivalent to an initial conversion price of approximately $17.05 per share of common stock). The conversion rate is subject to adjustment upon the occurrence of certain events, but will not be adjusted for any accrued and unpaid interest. In addition, following certain corporate events that occur prior to the maturity date as defined in the Indenture, Intrexon will increase the conversion rate for a holder who elects to convert its Convertible Notes in connection with such a corporate event in certain circumstances. Prior to April 1, 2023, the holders may convert the Convertible Notes at their option only upon the satisfaction of the following circumstances:

- During any calendar quarter commencing after the calendar quarter ended on September 30, 2018, if the last reported sales price of Intrexon's common stock for at least 20 trading days (whether or not consecutive) during the last 30 consecutive trading days of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;

- During the five business day period after any five consecutive trading day period in which the trading price, as defined in the Indenture, for the Convertible Notes is less than 98% of the product of the last reported sales price of Intrexon's common stock and the conversion rate for the Convertible Notes on each such trading day; or

- Upon the occurrence of specified corporate events as defined in the Indenture.

None of the above events allowing for conversion prior to April 1, 2023 occurred during the three months ended September 30, 2019. On or after April 1, 2023 until June 30, 2023, holders may convert their Convertible Notes at any time. Intrexon may not redeem the Convertible Notes prior to the maturity date.

If Intrexon undergoes a fundamental change, as defined in the Indenture, holders of the Convertible Notes may require Intrexon to repurchase for cash all or any portion of their Convertible Notes at a fundamental change repurchase price equal to 100% of the principal amount of the Convertible Notes to be repurchased, plus accrued and unpaid interest to, but excluding, the fundamental change repurchase date. The Indenture contains customary events of default, as defined in the agreement, and, if any of the events occur, could require repayment of a portion or all of the Convertible Notes, including accrued and unpaid interest. Additionally, the Indenture provides that Intrexon shall not consolidate with or merge with or into, or sell, convey, transfer or lease all or substantially all of its properties and assets to, another entity, unless (i) the surviving entity is organized under the laws of the United States and such entity expressly assumes all of Intrexon's obligations under the Convertible Notes and the Indenture; and (ii) immediately after such transaction, no default or event of default has occurred and is continuing under the Indenture.

The net proceeds received from the issuance of the Convertible Notes were initially allocated between long-term debt, the liability component, in the amount of $143,723, and additional paid-in capital, the equity component, in the amount of $50,235. Additional paid-in capital was further reduced by $13,367 of deferred taxes resulting from the difference between the carrying amount and the tax basis of the Convertible Notes that is created by the equity component, which resulted in deferred tax benefit recognized from the reversal of valuation allowances on the then current year domestic operating losses in the same amount. As of September 30, 2019, the outstanding principal balance on the Convertible Notes was $200,000 and the carrying value of long-term debt was $155,063. The effective interest rate on the Convertible Notes, including amortization of the long-term debt discount and debt issuance costs, is 11.02%. As of September 30, 2019, the unamortized long-term debt discount and debt issuance costs totaled $44,937.

The components of interest expense related to the Convertible Notes were as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Cash interest expense	$ 1,750	$ 1,731	$ 5,250	$ 1,731
Non-cash interest expense	2,430	2,116	6,962	2,116
Total interest expense	$ 4,180	$ 3,847	$ 12,212	$ 3,847

Accrued interest of $1,750 is included in other accrued liabilities on the accompanying consolidated balance sheet as of September 30, 2019.

ActoBio Convertible Notes

In September 2018, ActoBio issued $30,000 of convertible promissory notes (the "ActoBio Notes") to a related party in conjunction with an asset acquisition with Harvest (Note 3). The ActoBio Notes have a maturity date of September 6, 2020, accrue interest at 3.0% compounded annually, are convertible into shares of ActoBio common stock at any time by the holder, and are automatically convertible in shares of ActoBio common stock upon the closing of certain financing events as defined in the ActoBio Notes. If the ActoBio Notes have not been converted to ActoBio common stock by the maturity date, ActoBio can pay the principal and accrued interest in cash or with shares of Intrexon common stock at its election. There are no embedded features that are required to be separated from the debt host and accounted for separately, so the ActoBio Notes were recorded at $30,000. Interest expense was $232 and $60 for the three months ended September 30, 2019 and 2018, respectively, and $684 and $60 for the nine months ended September 30, 2019 and 2018, respectively. As of September 30, 2019, the carrying value of the ActoBio Notes, including accrued interest, was $30,974.

Intrexon and Precigen Convertible Note

In December 2018, in conjunction with the Securities Purchase, Assignment and Assumption Agreement with Ares Trading S.A. ("Ares Trading"), Intrexon and Precigen jointly and severally issued a $25,000 convertible note (the "Merck Note") to Ares Trading in exchange for cash. The Merck Note has a maturity date of June 28, 2021 and will be converted to Intrexon common stock on the first trading day following maturity if not otherwise converted prior to that date. Prior to maturity, Ares Trading may convert the Merck Note, at their election, into (i) Intrexon common stock at any time, (ii) Intrexon common stock upon the Company's closing of qualified financing as defined in the agreement, (iii) Precigen equity upon Precigen closing a qualified financing as defined in the agreement, and (iv) Precigen common stock upon the closing of a qualified initial public offering ("IPO") of Precigen common stock. In the event of a conversion upon a qualified IPO, the conversion price will be 90% of the IPO price. In the event Ares Trading elects to convert the Merck Note into Precigen equity, the Merck Note accrues interest at a rate of 5% per year ("PIK interest") and will be converted with the outstanding principal. The Company determined that the potential PIK interest and IPO conversion discount represented embedded derivatives requiring bifurcation from the debt host but had no significant value as of September 30, 2019 and December 31, 2018.

Notes Payable

Trans Ova has a note payable to American State Bank that matures in April 2033 and had an outstanding principal balance of $4,180 as of September 30, 2019. Trans Ova pays monthly installments of $39, which includes interest at 3.95%. The note payable is collateralized by certain of Trans Ova's real estate and non-real estate assets.

Future Maturities

Future maturities of long-term debt are as follows:

2019	$	127
2020		31,487
2021		25,330
2022		340
2023		200,354
2024		367
Thereafter		2,399
Total	$	260,404

12. Income Taxes

Tax provisions for interim periods are calculated using an estimate of actual taxable income or loss for the respective period, rather than estimating the Company's annual effective income tax rate, as the Company is currently unable to reliably estimate its income for the full year. For the three and nine months ended September 30, 2019, the Company had U.S. taxable loss of approximately $47,100 and $194,400, respectively. For the three and nine months ended September 30, 2019, the Company recognized $45 and $167, respectively, of current foreign income tax benefit. For the three and nine months ended September 30, 2018, the Company had U.S. taxable loss of approximately $39,100 and $104,400, respectively, and recorded $31 of current domestic income tax benefit and $82 of current domestic income tax expense, respectively. For the three and nine months ended September 30, 2018, the Company recognized $45 and $282, respectively, of current foreign income tax benefit. For the three and nine months ended September 30, 2019, the Company recorded deferred tax benefit of $467 and $1,448, respectively. For the three and nine months ended September 30, 2018, the Company recorded deferred tax benefit of $14,246 and $19,335, respectively. Of these amounts, $13,367 relates to deferred tax benefits recognized from the reversal of valuation allowances on current year domestic operating losses in the same amount as the deferred taxes recorded as a direct reduction of additional paid-in capital related to the issuance of the Convertible Notes (Note 11). The Company considered amounts recorded directly to shareholders' equity in evaluating the need for a valuation allowance on deferred tax assets related to continuing operations. The Company's net deferred tax assets, excluding certain deferred tax liabilities totaling $5,732, are offset by a valuation allowance due to the Company's history of net losses combined with an inability to confirm recovery of the tax benefits of the Company's losses and other net deferred tax assets. In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in

which those temporary differences become deductible. Management considers the scheduled reversal of deferred tax liabilities, projected future taxable income and tax planning strategies in making this assessment.

As of September 30, 2019, the Company has operating and capital loss carryforwards for U.S. federal income tax purposes of approximately $564,100 available to offset future taxable income, including approximately $311,400 generated after 2017, and federal and state research and development tax credits of approximately $9,200, prior to consideration of annual limitations that may be imposed under Section 382 of the Internal Revenue Code of 1986, as amended. Carryforwards generated prior to 2018 begin to expire in 2022. As of September 30, 2019, the Company's foreign subsidiaries have foreign loss carryforwards of approximately $159,200, most of which do not expire.

13. Shareholders' Equity

Issuances of Intrexon Common Stock

In January 2018, Intrexon closed a public offering of 6,900,000 shares of its common stock, including 1,000,000 shares of common stock purchased by affiliates of Third Security. The net proceeds of the offering were $82,374, after deducting underwriting discounts of $3,688 and offering expenses of $188, all of which were capitalized.

Share Lending Agreement

Concurrently with the offering of the Convertible Notes (Note 11), Intrexon entered into a share lending agreement (the "Share Lending Agreement") with J.P. Morgan Securities LLC (the "Share Borrower") pursuant to which Intrexon loaned and delivered 7,479,431 shares of its common stock (the "Borrowed Shares") to the Share Borrower. The Share Lending Agreement will terminate, and the Borrowed Shares will be returned to Intrexon within five business days of such termination, upon (i) termination by the Share Borrower or (ii) the earliest to occur of (a) October 1, 2023 and (b) the date, if any, on which the Share Lending Agreement is either mutually terminated or terminated by one party upon a default by the other party. The Borrowed Shares were offered and sold to the public at a price of $13.37 per share under a registered offering (the "Borrowed Shares Offering"). Intrexon did not receive any proceeds from the sale of the Borrowed Shares to the public. The Share Borrower or its affiliates received all the proceeds from the sale of the Borrowed Shares to the public. Affiliates of Third Security purchased all of the shares of common stock in the Borrowed Shares Offering.

The Share Lending Agreement was entered into at fair value and met the requirements for equity classification. Therefore, the value is netted against the issuance of the Borrowed Shares in additional paid-in capital. Additionally, the Borrowed Shares are not included in the denominator for loss per share attributable to Intrexon shareholders unless the Share Borrower defaults on the Share Lending Agreement.

Issuances of AquaBounty Common Stock

In March 2019, AquaBounty completed an underwritten public offering that resulted in net proceeds of $6,611 after deducting discounts, fees, and expenses. See Note 1 for additional discussion of issuances of AquaBounty common stock in April 2019, which resulted in the deconsolidation of AquaBounty.

In January 2018, AquaBounty completed an underwritten public offering that resulted in net proceeds of $10,616 after deducting discounts, fees and expenses. As part of this offering, Intrexon purchased $5,000 of additional AquaBounty common stock. In October 2018, certain investors exercised warrants acquired from the January 2018 offering, resulting in additional net proceeds of $4,316, including $3,077 from Intrexon.

Components of Accumulated Other Comprehensive Loss

The components of accumulated other comprehensive loss are as follows:

	September 30, 2019	December 31, 2018
Unrealized gain (loss) on investments	$ 20	$ (61)
Loss on foreign currency translation adjustments	(33,122)	(28,551)
Total accumulated other comprehensive loss	$ (33,102)	$ (28,612)

14. Share-Based Payments

The Company measures the fair value of stock options and restricted stock units ("RSUs") issued to employees and nonemployees as of the grant date for the recognition of stock-based compensation expense. Stock-based compensation expense for employees and nonemployees is recognized over the requisite service period, which is typically the vesting period. Stock-based compensation costs included in the consolidated statements of operations are presented below:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Cost of products	$ 4	$ 14	$ 16	$ 64
Cost of services	52	51	169	207
Research and development	1,838	1,681	5,565	7,315
Selling, general and administrative	3,529	6,386	8,788	20,754
Total	$ 5,423	$ 8,132	$ 14,538	$ 28,340

Intrexon Stock Option Plans

In April 2008, Intrexon adopted the 2008 Equity Incentive Plan (the "2008 Plan") for employees and nonemployees pursuant to which Intrexon's board of directors granted share-based awards, including stock options, to officers, key employees and nonemployees. Upon the effectiveness of the 2013 Omnibus Incentive Plan (the "2013 Plan"), no new awards may be granted under the 2008 Plan. As of September 30, 2019, there were 380,930 stock options outstanding under the 2008 Plan.

Intrexon adopted the 2013 Plan for employees and nonemployees pursuant to which Intrexon's board of directors may grant share-based awards, including stock options and shares of common stock, to employees, officers, consultants, advisors, and nonemployee directors. The 2013 Plan became effective in August 2013, and as of September 30, 2019, there were 25,000,000 shares authorized for issuance under the 2013 Plan, of which 9,149,553 stock options and 2,108,509 RSUs were outstanding and 8,496,486 shares were available for grant.

In April 2019, Intrexon adopted the Intrexon Corporation 2019 Incentive Plan for Non-Employee Service Providers (the "2019 Plan"), which became effective upon shareholder approval in June 2019. The 2019 Plan permits the grant of share-based awards, including stock options, restricted stock awards, and RSUs, to non-employee service providers, including board members. As of September 30, 2019, there were 5,000,000 shares authorized for issuance under the 2019 Plan, of which 4,513,060 were available for grant.

Stock option activity was as follows:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)
Balances at December 31, 2018	11,093,063	$ 27.95	6.81
Granted	1,536,075	6.53	
Exercised	(19,887)	(3.17)	
Forfeited	(824,192)	(29.81)	
Expired	(2,254,576)	(39.05)	
Balances at September 30, 2019	9,530,483	21.77	6.68
Exercisable at September 30, 2019	6,306,218	24.97	5.81

RSU activity was as follows:

	Number of Restricted Stock Units	Weighted Average Grant Date Fair Value	Weighted Average Remaining Contractual Term (Years)
Balances at December 31, 2018	970,341	$ 13.82	1.43
Granted	2,278,460	6.59	
Vested	(927,880)	(9.25)	
Forfeited	(212,412)	(9.20)	
Balances at September 30, 2019	2,108,509	8.48	1.33

Intrexon currently uses authorized and unissued shares to satisfy share award exercises.

The Company's Chief Executive Officer ("CEO") receives a base salary of $200 per month payable in fully-vested shares of Intrexon common stock with such shares subject to a three-year lock-up on resale. The monthly number of shares of common stock was calculated based on the closing price on the last trading day of each month and the shares were issued pursuant to the terms of a Restricted Stock Unit Agreement ("RSU Agreement") between Intrexon and the CEO pursuant to the terms of the 2013 Plan. The RSU Agreement, which is subject to renewal annually by the compensation committee of the board of directors of the Company, expired March 31, 2019. In April 2019, the Company entered into a new RSU agreement with its CEO through March 31, 2020. Under the new RSU agreement, the base salary and lock-up terms remained unchanged from the original RSU Agreement. However, the number of fully-vested shares of Intrexon common stock paid monthly will be calculated based on the volume weighted average of the price of Intrexon common stock over the 30 day period ending on the last calendar day of each month. The fair value of the shares issued as compensation for services is included in selling, general and administrative expenses in the Company's consolidated statements of operations and totaled $444 and $499 for the three months ended September 30, 2019 and 2018, respectively, and $1,425 and $1,468 for the nine months ended September 30, 2019 and 2018, respectively.

15. Operating Leases

The Company leases certain facilities and equipment under operating leases. Leases with a lease term of twelve months or less are considered short term leases and are not recorded on the balance sheet, and expense for these leases is recognized over the term of the lease. The Company's leases have remaining terms of one to twenty years, some of which may include options to extend the lease and some of which may include options to terminate the lease within one year. The leases are renewable at the option of the Company and do not contain residual value guarantees, covenants, or other restrictions. The Company's finance leases are not material.

The components of lease costs were as follows:

	Three Months Ended September 30, 2019	Nine Months Ended September 30, 2019
Operating lease costs	$ 2,665	$ 7,713
Short-term and variable lease costs	1,196	3,364
Lease costs	$ 3,861	$ 11,077

As of September 30, 2019, maturities of lease liabilities, excluding short-term leases, were as follows:

2019	$	2,213
2020		11,456
2021		9,864
2022		8,920
2023		7,232
2024		7,102
Thereafter		26,691
Total		73,478
Present value adjustment		(29,072)
Total	$	44,406
Current portion of operating lease liabilities	$	6,224
Long-term portion of operating lease liabilities		38,182
Total	$	44,406

Other information related to operating leases was as follows:

		Nine Months Ended September 30, 2019
Supplemental Cash Flows Information		
Cash paid for operating lease liabilities	$	8,489
Operating lease right-of-use assets added in exchange for new lease liabilities		3,249

	September 30, 2019
Weighted average remaining lease term (years)	8.63
Weighted average discount rate	11.59%

At December 31, 2018, future minimum lease payments under operating leases having initial or remaining noncancelable lease terms in excess of one year were as follows:

2019	$	9,182
2020		9,910
2021		9,127
2022		8,305
2023		7,229
Thereafter		34,157
Total	$	77,910

16. Commitments and Contingencies

Purchase Commitments

As of September 30, 2019, the Company had outstanding contractual purchase commitments of $12,068, which primarily relate to amounts to be paid in 2019, 2020, and 2021 upon delivery of commercial non-browning apple trees.

Contingencies

In March 2012, Trans Ova was named as a defendant in a licensing and patent infringement suit brought by XY, LLC ("XY") alleging that certain of Trans Ova's sale of semen-sorting products and services breached a 2004 licensing agreement and infringed on patents related to semen sorting that XY allegedly owned. Trans Ova filed a number of counterclaims in the case. The matter proceeded to a jury trial in the United States District Court for the District of Colorado in January 2016. The jury determined that XY and Trans Ova had each breached the licensing agreement and that Trans Ova had infringed XY's patents. In April 2016, the court issued its post-trial order, awarding $528 in damages to Trans Ova and $6,066 in damages to XY. The order also provided Trans Ova with the ability to continue to practice XY's technology, subject to an ongoing royalty obligation of 12.5% of gross proceeds on Trans Ova's standard sorted semen products, plus a 2% enhancement on those products utilizing "reverse-sorted semen", or semen that is frozen before being sorted. In addition, the court assigned a $5.00 minimum royalty for a straw of sexed semen. Both parties appealed the district court's order. In May 2018, the Court of Appeals for the Federal Circuit denied Trans Ova's appeal of its claims for antitrust, breach of contract, and patent invalidity (except as to one patent, for which the Federal Circuit affirmed invalidity in a separate, same-day ruling in a third-party case). The Federal Circuit remanded the district court's calculation of the ongoing royalty and instructed the district court to re-calculate the ongoing royalty in light of post-verdict economic factors. In March 2019, the district court clarified the royalty base and reset the royalty rates consistent with the Federal Circuit's opinion. The district court increased the royalty rate on Trans Ova's standard sorted semen products to 18.75%. For the reverse-sort enhancement, however, it applied a weighted, blended royalty of 12.63% to Trans Ova's entire in vitro fertilization service cycle that utilizes reverse-sorted semen. The district court also changed the minimum royalty for a straw of sexed semen to $6.25 for a 2-million cell straw (prorated appropriately for straws of higher cell counts), and assigned a minimum royalty for a sexed embryo at $6.25 per embryo. The new royalty rates were made retroactive to February 2016 (the end date of the trial).

Since the inception of the 2004 licensing agreement, Trans Ova has remitted payments to XY pursuant to the terms of that agreement, or pursuant to the terms of the district court's April 2016 post-trial order and its March 2019 post-remand order, and has recorded these payments in cost of services in the consolidated statements of operations for the respective periods. For the period from inception of the 2004 agreement through the district court's April 2016 order, aggregate royalty and license payments were $3,170, of which $2,759 had not yet been deposited by XY. In 2016, the Company recorded the expense of $4,228, representing the excess of the net damages awarded to XY, including prejudgment interest, over the liability previously recorded by Trans Ova for uncashed checks previously remitted to XY. In August 2016, Trans Ova deposited the net damages amount, including prejudgment interest, into the district court's registry, to be held until the appeals process was complete and final judgment amounts were determined. These amounts were included in restricted cash and other accrued liabilities on the consolidated balance sheet as of December 31, 2018. After the appeal, the district court subsequently released the funds held in its registry to XY in January 2019. As for post-trial damages, Trans Ova continued to remit payment to XY every quarter based on the original ongoing royalty rates set by the district court, though XY refused to cash those checks.

Under the district court's March 2019 post-remand order clarifying the royalty base and resetting the royalty rates, Trans Ova recalculated royalties owed from February 2016 through the first quarter of 2019, plus any applicable pre- and post-judgment interest, and remitted that payment, totaling $5,801, to XY in May 2019. In June 2019, XY deposited the $5,801 into the district court's registry while the parties resolve a dispute over the appropriate calculation of royalties. In that dispute, which is pending before the district court, XY filed a motion claiming over $1,000 in additional back royalties. Trans Ova contends that no additional back royalties are due and is seeking an oral hearing on the matter.

During the nine months ended September 30, 2019, the Company recorded additional royalty expense of $383 based on the recalculation of royalties owed XY from February 2016 through December 2018. This amount is included in selling, general and administrative expenses on the accompanying consolidated statement of operations.

In December 2016, XY filed a complaint for patent infringement, trade secret misappropriation, and various state law claims against Trans Ova in the United States District Court for the Western District of Texas in Waco, Texas. Since the claims in the 2016 complaint directly relate to the parties' other litigation, Trans Ova filed and was granted a motion to transfer the case to Colorado district court. That court subsequently dismissed nine of the complaint's twelve counts, including all five non-patent counts. The court subsequently dismissed another patent count after ruling that the patent was invalid, leaving only two patent counts left in the case. In February 2019, a Wisconsin district court invalidated one of the remaining patents, which XY had asserted against another competitor. That ruling prompted the Colorado district court to stay the two remaining patent counts and enter final judgment against XY's ten other dismissed counts. The 2016 litigation is administratively closed, pending XY's appeal of the district court's rulings dismissing its various patent and non-patent causes of action.

Trans Ova shall continue to utilize the technology consistent with the determinations of the court proceedings. Nonetheless, these disputes remain subject to a number of uncertainties, including the outcome of appellate proceedings, the possibility of

further claims by XY, and the impact of these matters on Trans Ova's ability to utilize the technology. Trans Ova and the Company could elect to enter into a settlement agreement in order to avoid the further costs and uncertainties of litigation.

The Company may become subject to other claims, assessments, and governmental investigations from time to time in the ordinary course of business. Such matters are subject to many uncertainties and outcomes are not predictable with assurance. The Company accrues liabilities for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated. As of September 30, 2019, the Company does not believe that any such matters, individually or in the aggregate, will have a material adverse effect on the Company's business, financial condition, results of operations, or cash flows.

17. Related Party Transactions

Third Security and Affiliates

The Company's CEO and Chairman of the board of directors is also the Senior Managing Director and CEO of Third Security and owns 100% of the equity interests of Third Security. In November 2015, the independent members of Intrexon's board of directors, with the recommendation of the audit committee of the board of directors, approved the execution of a Services Agreement ("Services Agreement") with Third Security pursuant to which Third Security provides the Company with certain professional, legal, financial, administrative, and other support services necessary to support the Company and its CEO. The Services Agreement provides for a term of one year, can be terminated by the Company at any time, and may be extended only by agreement of the parties, including approval of a majority of the independent members of Intrexon's board of directors. The independent members of Intrexon's board of directors, with the recommendation of the audit committee of the board of directors, subsequently approved extensions of the Services Agreement through January 1, 2020. Under the Services Agreement, as consideration for providing these services, Third Security is entitled to a fee paid in the form of fully-vested shares of Intrexon common stock that approximates $800 per month. Through 2018, the number of shares of common stock was calculated based on the closing price of the Company's common stock on the 15th day of each month and issued to Third Security at the end of the month. Beginning in 2019, the number of shares of common stock is calculated based on the volume weighted average of the closing price of the Company's common stock over the 30-day period ending on the 15th day of the calendar month when the applicable services are provided. Through May 2019, the payments made by the Company under the Services Agreement constitute, in the aggregate, an award under the 2013 Plan and are subject to the terms of the 2013 Plan. Following the effectiveness of the 2019 Plan in June 2019, subsequent payments made by the Company under the Services Agreement constitute, in the aggregate, an award under the 2019 Plan and are subject to the terms of the 2019 Plan (Note 14). For the three months ended September 30, 2019 and 2018, the Company issued 340,453 shares and 166,143 shares, respectively, with values of $1,855 and $2,417, respectively, to Third Security as payment for services pursuant to the Services Agreement. For the nine months ended September 30, 2019 and 2018, the Company issued 1,180,446 shares and 466,460 shares, respectively, with values of $6,217 and $6,522, respectively, to Third Security as payment for services pursuant to the Services Agreement. In addition to the foregoing Services Agreement, the Company reimburses Third Security for certain out-of-pocket expenses incurred on the Company's behalf, and the total expenses incurred by the Company under this arrangement were $8 and $16 for the three months ended September 30, 2019 and 2018, respectively, and $26 and $33 for the nine months ended September 30, 2019 and 2018, respectively.

See also Note 14 regarding compensation arrangements between the Company and its CEO.

The Company also subleases certain administrative offices to Third Security. The significant terms of the lease mirror the terms of the Company's lease with the landlord, and the Company recorded sublease income of $22 for the three months ended September 30, 2019 and 2018, and $66 for the nine months ended September 30, 2019 and 2018.

Transactions with ECC Parties

In addition to entities controlled by Third Security, entities in which the Company holds more than a de minimis equity interest, including equity securities received as upfront or milestone consideration, and that also are party to a collaboration with the Company, are considered to be related parties.

In June 2016, the Company received 100,000 shares of Series 1 Preferred Stock (the "Preferred Shares") of ZIOPHARM Oncology, Inc. ("ZIOPHARM"), with a per share stated value of $1,200, as consideration for amending their two previously existing ECC agreements. The Company received a monthly dividend, paid in additional Preferred Shares, equal to $12.00 per Preferred Share held per month divided by the stated value of the Preferred Shares. In conjunction with the reacquisition of certain rights previously licensed to ZIOPHARM in October 2018, the Company returned to ZIOPHARM all of the Preferred Shares owned or accrued by the Company as of the effective date of the agreement. During the three and nine months ended

September 30, 2018, the Company received an additional 3,847 and 11,205 Preferred Shares, respectively, and recognized $4,649 and $14,539 of dividend income in the accompanying consolidated statement of operations, respectively. Following the transaction in October 2018, ZIOPHARM is no longer considered a related party.

In March 2017, Fibrocell sold Series A Convertible Preferred Stock (the "Convertible Preferred Shares"), convertible into shares of Fibrocell common stock, and warrants to purchase shares of Fibrocell common stock to certain institutional and accredited investors, including the Company and affiliates of Third Security. The Company paid $1,161 in exchange for 1,161 Convertible Preferred Shares and warrants to acquire 99,769 shares of Fibrocell common stock. The Convertible Preferred Shares are convertible at any time at the election of the Company and accrue dividends at 4% per annum, compounded quarterly, increasing the stated value of the shares. The investment in Fibrocell preferred stock is categorized as Level 3 as there are significant unobservable inputs and the Convertible Preferred Shares are not traded on a public exchange. The fair value of the investment in Fibrocell preferred stock is estimated using a conversion plus dividend approach utilizing the trading value of the underlying common stock and an estimated premium for the preferred stock dividend and other preferences. Market price volatility of Fibrocell's common stock and a significant change in the estimated preferred stock premium could result in a significant impact to the fair value of the investment in Fibrocell preferred stock. As of September 30, 2019 and December 31, 2018, the fair value of the Company's investment in Fibrocell preferred stock totaled $390 and $191, respectively, and is included in other assets on the accompanying consolidated balance sheets.

The Company also holds a promissory note convertible into shares of Fibrocell common stock ("convertible note") and additional warrants to purchase shares of Fibrocell common stock. As of September 30, 2019 and December 31, 2018, the value of the convertible note and warrants totaled $253 and $120, respectively, and is included in other assets on the accompanying consolidated balance sheets.

In November 2017, concurrent with Oragenics closing a preferred stock private placement, the Company exchanged a promissory note, including accrued interest, purchased from Oragenics in May 2017 and receivables due from Oragenics totaling $3,385 for Oragenics Series C preferred stock ("Series C Preferred Stock"). The Series C Preferred Stock is non-voting and non-convertible and is redeemable in whole or part at any time by Oragenics in cash. The Series C Preferred Stock accrued an annual 12% dividend payable in additional Series C Preferred Stock through May 10, 2019, and after such date, the annual dividend increased to 20%. As of September 30, 2019 and December 31, 2018, based on the most recent financial information available on Oragenics, the Company concluded that there was no value to its investment in Oragenics preferred stock.

During 2018, the Company mutually terminated each of its ECC agreements with Histogenics Corporation, OvaScience, Inc., and Synthetic Biologics, Inc. Upon termination of these ECCs, the Company recognized the remaining deferred revenue totaling $11,877, including $3,183 during the nine months ended September 30, 2018.

18. Net Loss per Share

The following table presents the computation of basic and diluted net loss per share:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	**2018**	**2019**	**2018**
Historical net loss per share:				
Numerator:				
Net loss attributable to Intrexon	$ (53,634)	$ (57,324)	$ (153,109)	$ (168,871)
Denominator:				
Weighted average shares outstanding, basic and diluted	154,596,257	129,518,989	153,770,785	128,843,991
Net loss attributable to Intrexon per share, basic and diluted	$ (0.35)	$ (0.44)	$ (1.00)	$ (1.31)

The following potentially dilutive securities as of September 30, 2019 and 2018, have been excluded from the above computations of diluted weighted average shares outstanding for the three and nine months then ended as they would have been anti-dilutive:

	September 30,	
	2019	2018
Convertible debt	21,055,805	13,507,746
Options	9,530,483	11,160,524
Restricted stock units	2,108,509	980,758
Warrants	133,264	133,264
Total	32,828,061	25,782,292

19. Segments

Through March 31, 2019, the Company was a single operating segment. In April 2019, the Company initiated efforts to better deploy resources, realize inherent synergies, and position the Company for growth with a core focus on healthcare and initiated plans to achieve this through various corporate activities, including partnering, potential asset sales, and operating cost reductions. Thereafter, the Company's CODM assessed the operating performance of and allocated resources for several operating segments using Segment Adjusted EBITDA. Management believes this financial metric is a key indicator of operating results since it excludes noncash revenues and expenses that are not reflective of the underlying business performance of an individual enterprise. The Company defines Segment Adjusted EBITDA as net loss before (i) interest expense, (ii) income tax expense or benefit, (iii) depreciation and amortization, (iv) stock-based compensation expense, (v) loss on impairment of goodwill and other long-lived assets, (vi) equity in net loss of affiliates, and (vii) recognition of previously deferred revenue associated with upfront and milestone payments as well as cash outflows from capital expenditures and investments in affiliates.

Because the Company uses Segment Adjusted EBITDA as its primary measure of segment performance, it has included this measure in its discussion of segment operating results. The Company has also disclosed revenues from external customers and intersegment revenues for each reportable segment. Corporate expenses are not allocated to the segments and are managed at a consolidated level. The CODM does not use total assets by segment to evaluate segment performance or allocate resources, and accordingly, these amounts are not required to be disclosed. The Company's CODM now regularly reviews disaggregated financial information for each of the Company's operating segments. The Company's segment presentation has been recast to retrospectively reflect the change from one reportable segment to the newly identified reportable segments.

For the three and nine months ended September 30, 2019, the Company's reportable segments are (i) Precigen, (ii) MBP, (iii) the Fine Chemicals division, (iv) Okanagan, and (v) Trans Ova. These identified reportable segments met the quantitative thresholds for the nine months ended September 30, 2019, to be reported separately. See Note 1 for a description of Precigen, MBP, Okanagan, and Trans Ova. The Company's Fine Chemicals division is an operating division within Intrexon which is focused primarily on microbial production of therapeutic compounds. The All Other category as reported below reflects Intrexon's other operating segments that do not meet the quantitative thresholds to report separately.

Information by reportable segment was as follows:

	Three Months Ended September 30, 2019						
	Precigen	MBP	Fine Chemicals	Okanagan	Trans Ova	All Other	Total
Revenues from external customers	$ 444	$ 1,117	$ 2,177	$ 6	$ 13,981	$ 5,318	$ 23,043
Intersegment revenues	2,313	—	1,225	—	257	78	3,873
Total revenues	$ 2,757	$ 1,117	$ 3,402	$ 6	$ 14,238	$ 5,396	$ 26,916
Segment Adjusted EBITDA	$ (5,953)	$ (9,024)	$ 144	$ (4,323)	$ (5,560)	$ (8,526)	$ (33,242)

	Three Months Ended September 30, 2018						
	Precigen	MBP	Fine Chemicals	Okanagan	Trans Ova	All Other	Total
Revenues from external customers	$ 6,822	$ 2,083	$ 1,103	$ 10	$ 15,634	$ 6,771	$ 32,423
Intersegment revenues	200	2	1,160	—	136	120	1,618
Total revenues	$ 7,022	$ 2,085	$ 2,263	$ 10	$ 15,770	$ 6,891	$ 34,041
Segment Adjusted EBITDA	$ (7,965)	$ (8,192)	$ (343)	$ (5,158)	$ (1,844)	$ (9,054)	$ (32,556)

	Nine Months Ended September 30, 2019						
	Precigen	MBP	Fine Chemicals	Okanagan	Trans Ova	All Other	Total
Revenues from external customers	$ 2,174	$ 3,813	$ 4,167	$ 45	$ 53,307	$ 18,711	$ 82,217
Intersegment revenues	7,090	2	4,090	—	1,204	646	13,032
Total revenues	$ 9,264	$ 3,815	$ 8,257	$ 45	$ 54,511	$ 19,357	$ 95,249
Segment Adjusted EBITDA	$ (20,789)	$ (26,238)	$ (979)	$ (25,367)	$ (2,854)	$ (26,020)	$ (102,247)

	Nine Months Ended September 30, 2018						
	Precigen	MBP	Fine Chemicals	Okanagan	Trans Ova	All Other	Total
Revenues from external customers	$ 22,285	$ 5,030	$ 4,211	$ 37	$ 59,467	$ 26,228	$ 117,258
Intersegment revenues	431	8	3,954	—	382	847	5,622
Total revenues	$ 22,716	$ 5,038	$ 8,165	$ 37	$ 59,849	$ 27,075	$ 122,880
Segment Adjusted EBITDA	$ (20,797)	$ (22,059)	$ (1,244)	$ (16,609)	$ (1,901)	$ (31,088)	$ (93,698)

The table below reconciles total revenues from reportable segments to total consolidated revenues:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Total revenues from reportable segments	$ 21,520	$ 27,150	$ 75,892	$ 95,805
Other revenues, including from other operating segments	5,396	6,916	19,504	27,497
Elimination of intersegment revenues	(3,873)	(1,618)	(13,032)	(5,913)
Total consolidated revenues	$ 23,043	$ 32,448	$ 82,364	$ 117,389

The table below reconciles Segment Adjusted EBITDA for reportable segments to consolidated net loss before income taxes:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Segment Adjusted EBITDA for reportable segments	$ (24,716)	$ (23,502)	$ (76,227)	$ (62,610)
All Other Segment Adjusted EBITDA	(8,526)	(9,054)	(26,020)	(31,088)
Remove cash paid for capital expenditures and investments in affiliates	8,115	10,373	34,021	30,422
Add recognition of previously deferred revenue associated with upfront and milestone payments	5,770	7,201	16,685	24,100
Other expenses:				
Interest expense	(4,471)	(3,999)	(13,140)	(4,240)
Depreciation and amortization	(6,021)	(8,303)	(18,711)	(25,184)
Impairment loss	(626)	—	(626)	—
Reacquisition of in-process research and development	—	(8,721)	—	(8,721)
Stock-based compensation expense	(5,423)	(8,132)	(14,538)	(28,340)
Equity in net loss of affiliates	(1,647)	(2,870)	(5,034)	(9,880)
Other	35	—	35	—
Unallocated corporate costs	(13,544)	(25,440)	(43,657)	(75,319)
Eliminations	(3,092)	(621)	(9,104)	(1,659)
Consolidated net loss before income taxes	$ (54,146)	$ (73,068)	$ (156,316)	$ (192,519)

As of September 30, 2019 and December 31, 2018, the Company had $14,373 and $16,839, respectively, of long-lived assets in foreign countries. The Company recognized revenues derived in foreign countries totaling $3,325 and $2,235 for the three months ended September 30, 2019 and 2018, respectively, and $7,785 and $10,389 for the nine months ended September 30, 2019 and 2018, respectively.

20. Subsequent Events

In October 2019, the independent members of the Company's board of directors, with the recommendation of the audit committee and an independent special committee of the Board, unanimously approved the sale of the Company's common shares held in AquaBounty to an affiliate of Third Security for $21,587, resulting in a gain of $5,267 in the fourth quarter. As a result of this transaction, the Company classified its investment in AquaBounty as a current asset on the accompanying consolidated balance sheet as of September 30, 2019.

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

The following "Management's Discussion and Analysis of Financial Condition and Results of Operations" should be read in conjunction with the unaudited financial information and the notes thereto included in this Quarterly Report on Form 10-Q, or Quarterly Report, and our Annual Report on Form 10-K for the year ended December 31, 2018, or Annual Report.

The following discussion contains forward-looking statements that reflect our plans, estimates, and beliefs. Our actual results could differ materially from those discussed in the forward-looking statements and you are cautioned not to place undue reliance on forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Quarterly Report, particularly in "Special Note Regarding Forward-Looking Statements" and "Risk Factors." The forward-looking statements included in this Quarterly Report are made only as of the date hereof.

Overview

We believe we are a leader in the field of synthetic biology, focusing on programming biological systems to alleviate disease, remediate environmental challenges, and provide sustainable food and industrial chemicals. At present rates of global industrialization and population growth, food and energy supplies and environmental and healthcare resources are becoming more scarce and/or costly. We believe it is not a viable option for mankind to continue on this path — new solutions will be necessary to preserve and globally expand a high quality of life. We believe that synthetic biology is a solution.

Synthetic biology is a rapidly evolving discipline that applies engineering principles to biological systems to enable rational, design-based control of cellular function for a specific purpose. Using our suite of proprietary and complementary technologies, we design, build, and regulate gene programs, which are DNA sequences that consist of key genetic components. A single gene program or a complex, multi-genic program is fabricated and stored within a DNA vector. Vectors are segments of DNA used as a vehicle to transmit genetic information. DNA vectors can, in turn, be introduced into cells in order to generate a simple or complex cellular system, which are the basic and complex cellular activities that take place within a cell and the interaction of those systems in the greater cellular environment. It is these genetically modified cell systems that can be used to produce biological effector molecules, or be employed directly to enable the development of new and improved products and manufacturing processes across a variety of end markets, including health, food, energy, and environment. Our synthetic biology capabilities include the ability to precisely control the amount, location and modification of biological molecules to control the function and output of living cells and optimize for desired results at an industrial scale.

In working with our subsidiaries, joint ventures, or JVs, and collaborators, we seek to create more effective, less costly, and more sustainable solutions than can be provided through current industry practices. Our technologies combine the principles of precision engineering, statistical modeling, automation, and production at an industrial scale. We efficiently engineer precise and complex gene programs across many cell types. We apply the engineering principle of a design-build-test-learn continuum, through which we accumulate knowledge about the characteristics and performance of gene programs and cell lines. This process of continuous learning allows us to enhance our ability to design and build improved and more complex gene programs and cellular systems.

We believe our technologies are broadly applicable across many diverse end markets, including some end markets that have failed to recognize the applicability of synthetic biology or failed to efficiently utilize biologically-based processes to produce products. To enable us to maximize the number of these markets we could address, we devised a strategy that allowed us to focus on our core expertise in synthetic biology while developing many different commercial product candidates via collaborations in a broad range of industries or end markets. Historically, we built our business primarily around the formation of exclusive channel collaborations, or ECCs. An ECC is an agreement with a collaborator to develop products based on technologies in a specifically defined field. Through our ECCs, we provide expertise in the engineering of gene programs and cellular systems, and our collaborators are responsible for providing market and product development expertise, as well as sales and marketing capabilities. In addition, we have sometimes executed a research collaboration to develop an early-stage program pursuant to which we received reimbursement for our development costs but the exclusive commercial rights, and related access fees, were deferred until completion of an initial research program.

Over time, our strategy has evolved away from ECC-type collaborations to relationships and structures that provide us with more control and ownership over the development process and commercialization path. In these new relationships and structures, we bear more of the responsibility to fund the projects and execute on product candidate development. For example, in October 2018, through our wholly owned subsidiary, Precigen, Inc., or Precigen, we entered into a license agreement, or the ZIOPHARM License Agreement, with ZIOPHARM Oncology, Inc., or ZIOPHARM, which terminated and replaced the terms of an ECC with ZIOPHARM. The ZIOPHARM License Agreement gives us development and commercialization control over certain products previously licensed to ZIOPHARM. Additionally, in December 2018, we reacquired the rights to use Chimeric

Antigen Receptor T-cell (CAR-T) technologies that were previously licensed to Ares Trading S.A., or Ares Trading, a wholly owned subsidiary of Merck KGaA, collectively Merck KGaA.

In certain strategic circumstances, we may enter into a JV with a third-party collaborator whereby we may contribute access to our technology, cash or both into the JV, which we will jointly control with our collaborator. Pursuant to a JV agreement, we may be required to contribute additional capital to the JV, and we may be able to receive a higher financial return than we would normally receive from an ECC to the extent that we and our collaborator are successful in developing one or more products. For a discussion of our JVs, see the "Notes to the Consolidated Financial Statements (Unaudited) - Note 4" appearing elsewhere in this Quarterly Report. Additionally, we are increasing the resources that we are expending internally on early-stage proof-of-concept programs where we believe we can leverage our competitive edge in gene program creation and host cell and genome expertise. We are also seeking to partner our more mature programs and capabilities or later-stage assets. In this way, we endeavor to leverage our capital resources and ultimately hope to realize significant value from our mature assets.

As we consider the broad potential applications of our synthetic biology technologies, and consistent with the evolution of our business strategy, we have acquired a number of ventures that are already enabling products that benefit from the application of synthetic biology. Our strategy contemplates the continued acquisition of product-focused companies that we believe may leverage our technologies and expertise in order to expand their respective product applications. We believe that the acquisition of these types of companies allows us to develop and commercialize innovative products and create significant value.

Consistent with the ongoing evolution of our strategy, we routinely consider ways to organize our business and the grouping of our assets to facilitate strategic opportunities. For example, effective October 1, 2019, we transferred substantially all of our proprietary methane bioconversion platform assets to a newly formed wholly owned subsidiary, MBP Titan LLC, or MBP.

Our operating subsidiaries

To derive value from the broad potential applications of our synthetic biology technologies, and consistent with the evolution of our business strategy, we routinely consider ways to organize our business to facilitate strategic opportunities. For example, we have acquired a number of ventures that are already enabling products that benefit from the application of synthetic biology and that we now operate as subsidiaries. Our strategy contemplates the continued formation and acquisition of such operating subsidiaries. As these enterprises develop, we will determine whether to maintain full ownership, introduce investors via either private or public financing, or seek strategic options to partner or divest the businesses.

Primary wholly owned operating subsidiaries

Precigen, Inc.

Precigen is a dedicated discovery and clinical stage biopharmaceutical company advancing the next generation of gene and cellular therapies using precision technology to target urgent and intractable diseases in immuno-oncology, autoimmune disorders, and infectious diseases. Precigen's technologies and technologies licensed from Intrexon enable Precigen to find innovative solutions for affordable biotherapeutics in a controlled manner. Precigen operates as an innovation engine, progressing a preclinical and clinical pipeline of well-differentiated unique therapies toward clinical proof-of-concept and commercialization.

MBP Titan LLC

MBP utilizes its proprietary methane bioconversion platform, which is designed to turn natural gas into more valuable and usable energy and chemical products via microbial fermentation. Traditional methods of feedstock conversion for fuel production and other materials are costly, wasteful, and often come with significant environmental impact. MBP's production method has the potential to transform the generation of drop-in fuels, synthetic rubber, and plastic materials through less resource-intensive and more sustainable approaches than conventional methods.

In August 2019, we entered into an Investment and Contribution Agreement with a third party related to our methane bioconversion platform technology. During the third quarter, we and the third party mutually agreed to defer the closing of the initial investment under the Investment and Contribution Agreement to permit us to pursue additional independent investors. The parties expect to reassess the form of the investment structure depending on the participation of such additional investors and consider alternative approaches or transaction structures, and there is no assurance that any transaction will ultimately be consummated.

ActoBio Therapeutics, Inc.

ActoBio Therapeutics, Inc., or ActoBio, is pioneering a new class of microbe-based biopharmaceuticals that enable expression and local delivery of disease-modifying therapeutics. The ActoBiotics platform produces biologics through oral or topical administration with treatment applications across many diseases including oral, gastrointestinal, and autoimmune/allergic disorders. This approach is being developed to provide safer and more efficacious treatments than injectable biologicals. ActoBio, both independently and through an ECC, has a strong research and development pipeline with the latest stage candidate in Phase 2b clinical trials and an extensive portfolio of candidates ready for clinical development across a number of potential indications.

Trans Ova Genetics, L.C.

Trans Ova Genetics, L.C., or Trans Ova, is internationally recognized as a provider of industry-leading bovine reproductive technologies. Intrexon and Trans Ova are building upon Trans Ova's original platform with a goal of achieving higher levels of delivered value to dairy and beef cattle producers. Progentus, L.C., or Progentus, a wholly owned subsidiary of Trans Ova, is a provider of bovine genetics. ViaGen, L.C., or ViaGen, a wholly owned subsidiary of Trans Ova, is a provider of cloning technology for livestock species.

Okanagan Specialty Fruits, Inc.

Okanagan Specialty Fruits, Inc. and its affiliates, or Okanagan, is the pioneering agricultural company behind the world's first non-browning apple without the use of any artificial additives. Okanagan is scaling up its commercial supplies of non-browning apples and developing new commercial tree fruit varieties intended to provide benefits to the entire supply chain, from growers to consumers.

Oxitec Limited

Oxitec Limited, or Oxitec, is a pioneering company in biological insect control solutions. Oxitec is developing products that use genetic engineering to control insect pests that spread disease and damage crops. Among the applications of its platform, which uses advanced genetics and molecular biology, Oxitec has developed innovative solutions for controlling *Aedes aegypti*, a mosquito that is a known vector for the transmission of infectious disease including dengue fever, chikungunya, and Zika and, in conjunction with its collaborators, is pursuing solutions that target certain agricultural crop pests. Oxitec is pursuing regulatory and commercial approvals for its insect solutions in a number of countries, including the United States.

Exemplar Genetics, LLC

Exemplar Genetics, LLC, or Exemplar, is committed to enabling the study of life-threatening human diseases through the development of miniswine research models and services, as well as enabling the production of cells and organs in its genetically engineered swine for regenerative medicine applications.

Segments

In April 2019, we initiated efforts to better deploy resources, realize inherent synergies, and position us for growth with a core focus on healthcare and initiated plans to achieve this through various corporate activities, including partnering, potential asset sales, and operating cost reductions. Our chief operating decision maker now regularly reviews disaggregated financial information for various operating segments. Our reportable segments now include (i) Precigen, (ii) MBP, (iii) our Fine Chemicals division, (iv) Okanagan, and (v) Trans Ova. All of our consolidated subsidiaries and operating divisions that did not meet the quantitative thresholds to report separately are combined and reported in single category, All Other. Corporate expenses, which are not allocated to the segments and are managed at a consolidated level, include costs associated with general and administrative functions, including our finance, accounting, legal, human resources, information technology, corporate communication, and investor relations functions. Corporate expenses exclude interest expense, depreciation and amortization, stock-based compensation expense, and equity in net loss of affiliates and include unrealized and realized gains and losses on our securities portfolio as well as dividend income. Our segment presentation has been recast to retrospectively reflect the change from one reportable segment to multiple reportable segments. For a description of Precigen, MBP, Okanagan, and Trans Ova, see above under the caption "Our operating subsidiaries." Our Fine Chemicals division is an operating division within Intrexon which is focused primarily on microbial production of therapeutic compounds.

Mergers, acquisitions, and technology in-licensing

We may augment our suite of proprietary technologies through mergers or acquisitions of technologies, which would then become available to new or existing ventures, including operating subsidiaries, JVs, and collaborations. Among other things, we may pursue technologies that we believe will be generally complementary to our existing technologies and also meet our desired return on investment and other economic criteria. In certain cases, such technologies may already be applied in the production of products or services and in these cases we may seek to expand the breadth or efficacy of such products or services through the use of our technologies. See "Notes to the Consolidated Financial Statements (Unaudited) - Note 3" appearing elsewhere in this Quarterly Report for further discussion of mergers, acquisitions or significant technology in-licensing activities.

Financial overview

We have incurred significant losses since our inception. We anticipate that we may continue to incur significant losses for the foreseeable future, and we may never achieve or maintain profitability. Outside of collaboration and license fee payments and sales of products and services, which vary over time, we have not generated significant revenues, including revenues or royalties from product sales by us or our collaborators. Certain of our consolidated subsidiaries require regulatory approval and/or commercial scale-up before they may commence significant product sales and operating profits.

In April 2019, we initiated efforts to better deploy resources, realize inherent synergies, and position us for growth with a core focus on healthcare and initiated plans to achieve this through various corporate activities, including partnering, potential asset sales, and operating cost reductions. As we continue our efforts to focus our business and generate additional capital, we may be willing to enter into transactions involving one or more of our operating segments and reporting units for which we have goodwill and intangible assets. These efforts could result in our identifying impairment indicators or recording impairment charges in future periods. In addition, market changes and changes in judgments, assumptions and estimates that we have made in assessing the fair value of goodwill could cause us to consider some portion or all of certain assets to become impaired.

Sources of revenue

Historically, we have derived our collaboration and licensing revenues through agreements with counterparties for the development and commercialization of products enabled by our technologies. Generally, the terms of these collaborations provide that we receive some or all of the following: (i) technology access fees upon signing; (ii) reimbursements of costs incurred by us for our research and development and/or manufacturing efforts related to specific applications provided for in the collaboration; (iii) milestone payments upon the achievement of specified development, regulatory and commercial activities; and (iv) royalties on sales of products arising from the collaboration.

Our technology access fees and milestone payments may be in the form of cash or securities of the collaborator. Our collaborations contain multiple arrangements, and we typically defer revenues from the technology access fees and milestone payments received and recognize such revenues in the future over the anticipated performance period. We are also entitled to sublicensing revenues in those situations where our collaborators choose to license our technologies to other parties.

From time to time, we and certain collaborators may cancel the agreements or we may repurchase rights to the exclusive fields from collaborators, relieving us of any further performance obligations under the agreement. Upon such circumstances or when we determine no further performance obligations are required of us under an agreement, we may recognize any remaining deferred revenue as either collaboration revenue or as a reduction of in-process research and development expense, depending on the circumstances.

We generate product and service revenues primarily through sales of products or services that are created from technologies developed or owned by us. Our primary current offerings include sales of advanced reproductive technologies, including our bovine embryo transfer and in vitro fertilization, or IVF, processes and from genetic preservation and sexed semen processes and applications of such processes to other livestock, as well as sales of livestock and embryos produced using these processes and used in production. We recognize revenue when control of the promised product is transferred to the customer or when the promised service is completed.

In future periods, our revenues will depend in part on our ability to partner our more mature programs and capabilities, the number of collaborations to which we are party, the advancement and creation of our programs and programs within our collaborations, and the extent to which we or our collaborators bring products enabled by our technologies to market. We expect our collaboration revenues will decrease considerably as a result of a number of transactions in 2018 to reacquire rights to fields previously licensed to collaborators, after which we no longer expect to receive reimbursement of costs incurred by us

for research and development services and will no longer recognize previously deferred revenues associated with the terminated collaboration. Our revenues will also depend upon our ability to maintain or improve the volume and pricing of our current product and service offerings and to develop and scale up production of new offerings from the various technologies of our subsidiaries. Our future revenues may also include additional revenue streams we may acquire through mergers and acquisitions. In light of our limited operating history and experience, there can be no assurance as to the timing, magnitude, and predictability of revenues to which we might be entitled.

Cost of products and services

Cost of products and services includes primarily labor and related costs, drugs and supplies used primarily in the embryo transfer and IVF processes, livestock and feed used in production, and facility charges, including rent and depreciation. Fluctuations in the price of livestock and feed have not had a significant impact on our operating margins and no derivative financial instruments are used to mitigate the price risk.

Research and development expenses

We recognize research and development expenses as they are incurred. Our research and development expenses consist primarily of:

- salaries and benefits, including stock-based compensation expense, for personnel in research and development functions;
- fees paid to consultants and contract research organizations who perform research on our behalf and under our direction;
- costs related to laboratory supplies used in our research and development efforts;
- costs related to certain in-licensed technology rights or reacquired in-process research and development;
- depreciation of leasehold improvements and laboratory equipment;
- amortization of patents and related technologies acquired in mergers and acquisitions; and
- rent and utility costs for our research and development facilities.

We have no individually significant research and development projects, and our research and development expenses primarily relate to either the costs incurred to expand or otherwise improve our multiple platform technologies, the costs incurred to develop a specific application of our technologies in support of current or prospective partners, or costs incurred to expand or otherwise improve our products and services. Research and development expenses, including costs for preclinical and clinical development incurred for programs we support pursuant to an ECC agreement, are typically reimbursed by the partner at cost, and all other research and development programs may be terminated or otherwise deferred at our discretion. The amount of our research and development expenses may be impacted by, among other things, the number of ECCs and the number and size of programs we may support on behalf of an ECC.

The table below summarizes our research and development expenses incurred to expand or otherwise improve our multiple platform technologies, the costs incurred to develop a specific application of our technologies in support of current or prospective partners, or costs incurred to develop our products and services, including clinical development costs, for the three and nine months ended September 30, 2019 and 2018. Other research and development expenses for these periods include indirect salaries and overhead expenses that are not allocated to either expanding or improving our multiple platform technologies, specific applications of our technologies in support of current or prospective partners, or developing our product and services offerings. Additionally, other research and development expenses for the three and nine months ended September 30, 2018, include an $8.7 million expense related to in-process research and development reacquired as part of an asset acquisition in September 2018, which was immediately expensed. Other research and development expenses for the nine months ended September 30, 2018 also include approximately $5.3 million of one-time costs associated with closing one of Oxitec's Brazilian subsidiary's leased research and development facilities as we decentralized operations previously conducted in this facility.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
	(In thousands)			
Expansion or improvement of our platform technologies	$ 5,288	$ 5,056	$ 18,176	$ 13,565
Specific applications of our technologies in support of current and prospective partners	9,222	18,676	28,136	55,440
Development of our product and service offerings	10,917	6,027	33,206	21,729
Other	6,053	15,126	19,542	33,338
Total research and development expenses	$ 31,480	$ 44,885	$ 99,060	$ 124,072

We expect that our research and development expenses will increase as we develop our own proprietary programs and expand our offerings. We believe these increases will likely include increased costs related to the hiring of additional personnel in research and development functions, increased costs paid to consultants and contract research organizations, and increased costs related to laboratory supplies. Research and development expenses may also increase as a result of ongoing research and development operations that we might assume through mergers and acquisitions or in-licensing of technologies.

Selling, general and administrative expenses

Selling, general and administrative, or SG&A, expenses consist primarily of salaries and related costs, including stock-based compensation expense, for employees in executive, operational, finance, sales and marketing, information technology, legal and corporate communications functions. Other significant SG&A expenses include rent and utilities, insurance, accounting and legal services, and expenses associated with obtaining and maintaining our intellectual property.

SG&A expenses may fluctuate in the future depending on the number and nature of transactions we may undertake with certain of our operations and subsidiaries. These fluctuations could be related to personnel, legal fees, outside consultants, and other professional services. SG&A expenses may increase as a result of ongoing operations that we might assume through mergers and acquisitions.

Other income (expense), net

We hold equity securities and preferred stock of private and publicly traded companies, including investments received and/or purchased from certain collaborators. We evaluate whether to elect the fair value option on an individual investment basis. We elected the fair value option to account for our equity securities and preferred stock held in publicly traded companies. These equity securities and preferred stock are recorded at fair value at each reporting date. Unrealized appreciation (depreciation) resulting from fair value adjustments are reported as other income (expense) in the consolidated statements of operations. As such, we bear the risk that fluctuations in the securities' share prices may significantly impact our results of operations. We account for our investments in private companies using either the equity method or the measurement alternative method for equity securities without readily determinable fair values, which represents cost and any adjustments for impairment or observable price changes in certain transactions. See "Notes to the Consolidated Financial Statements (Unaudited) - Note 2" appearing elsewhere in this Quarterly Report.

Interest expense is expected to increase in future periods due to the noncash amortization of the long-term debt discount and debt issuance costs related to the 3.50% convertible senior notes due 2023, or the Convertible Notes, issued in July 2018.

Interest income consists of interest earned on our cash and cash equivalents and short-term and long-term investments. Dividend income consists of the monthly preferred stock dividends received from our investments in preferred stock. Dividend income has decreased in the current period because we returned our ZIOPHARM preferred shares to ZIOPHARM in October 2018 in conjunction with the reacquisition of certain rights previously licensed to ZIOPHARM.

Equity in net income (loss) of affiliates

Equity in net income or loss of affiliates is our pro-rata share of our equity method investments' operating results, adjusted for accretion of basis difference. We account for investments in our JVs and start-up entities backed by Harvest Intrexon Enterprise Fund I, LP, or Harvest, using the equity method of accounting since we have the ability to exercise significant influence, but not control, over the operating activities of these entities.

Segment performance

We use Segment Adjusted EBITDA as our primary measure of segment performance. We define Segment Adjusted EBITDA as net loss before (i) interest expense, (ii) income tax expense or benefit, (iii) depreciation and amortization, (iv) stock-based compensation expense, (v) loss on impairment of goodwill and other long-lived assets, (vi) equity in net loss of affiliates, and (vii) recognition of previously deferred revenue associated with upfront and milestone payments as well as cash outflows from capital expenditures and investments in affiliates. Corporate expenses are not allocated to the segments and are managed at a consolidated level.

Results of operations

Comparison of the three months ended September 30, 2019 and the three months ended September 30, 2018

The following table summarizes our results of operations for the three months ended September 30, 2019 and 2018, together with the changes in those items in dollars and as a percentage:

	Three Months Ended September 30,		Dollar Change	Percent Change
	2019	2018		
	(In thousands)			
Revenues				
Collaboration and licensing revenues (1)	$ 6,185	$ 14,324	$ (8,139)	(56.8)%
Product revenues	5,852	6,829	(977)	(14.3)%
Service revenues	9,924	10,414	(490)	(4.7)%
Other revenues	1,082	881	201	22.8 %
Total revenues	23,043	32,448	(9,405)	(29.0)%
Operating expenses				
Cost of products	8,263	8,877	(614)	(6.9)%
Cost of services	6,550	6,449	101	1.6 %
Research and development	31,480	44,885	(13,405)	(29.9)%
Selling, general and administrative	24,741	38,708	(13,967)	(36.1)%
Impairment loss	626	—	626	N/A
Total operating expenses	71,660	98,919	(27,259)	(27.6)%
Operating loss	(48,617)	(66,471)	17,854	(26.9)%
Total other expense, net	(3,882)	(3,727)	(155)	4.2 %
Equity in loss of affiliates	(1,647)	(2,870)	1,223	(42.6)%
Loss before income taxes	(54,146)	(73,068)	18,922	(25.9)%
Income tax benefit	512	14,322	(13,810)	(96.4)%
Net loss	(53,634)	(58,746)	5,112	(8.7)%
Net loss attributable to noncontrolling interests	—	1,422	(1,422)	(100.0)%
Net loss attributable to Intrexon	$ (53,634)	$ (57,324)	$ 3,690	(6.4)%

(1) Includes $3,428 and $11,952 from related parties for the three months ended September 30, 2019 and 2018, respectively.

Collaboration and licensing revenues

The following table shows the collaboration and licensing revenues recognized for the three months ended September 30, 2019 and 2018, together with the changes in those items.

	Three Months Ended September 30,		Dollar Change
	2019	2018	
	(In thousands)		
ZIOPHARM Oncology, Inc.	$ 431	$ 4,826	$ (4,395)
Ares Trading S.A.	—	1,576	(1,576)
Oragenics, Inc.	231	705	(474)
Intrexon T1D Partners, LLC	—	368	(368)
Intrexon Energy Partners, LLC	823	1,329	(506)
Intrexon Energy Partners II, LLC	293	754	(461)
Surterra Holdings, Inc.	1,022	—	1,022
Genopaver, LLC	494	689	(195)
Fibrocell Science, Inc.	402	391	11
Persea Bio, LLC	1,083	199	884
Harvest start-up entities (1)	100	2,691	(2,591)
Other	1,306	796	510
Total	$ 6,185	$ 14,324	$ (8,139)

(1) For the three months ended September 30, 2019 and 2018, revenues recognized from collaborations with Harvest start-up entities include: Thrive Agrobiotics, Inc.; Exotech Bio, Inc.; and AD Skincare, Inc.

Collaboration and licensing revenues decreased $8.1 million, or 57%, from the three months ended September 30, 2018 primarily due to the reacquisition of rights previously licensed to certain significant collaborators, including ZIOPHARM and Ares Trading, the result of which eliminated or substantially reduced revenues generated from those collaborations. Additionally, collaboration and licensing revenues from collaborations with Harvest start-up entities decreased due to fewer research and development services provided in the current year period.

Product revenues and gross margin

Product revenues decreased $1.0 million, or 14%, from the three months ended September 30, 2018. The decrease in product revenues was primarily due to lower customer demand for pregnant cows. Gross margin on products declined in the current period as a result of fewer products sold.

Service revenues and gross margin

Service revenues and gross margin thereon were consistent period over period as expected.

Research and development expenses

Research and development expenses decreased $13.4 million, or 30%, from the three months ended September 30, 2018. The 2018 amounts include an $8.7 million expense related to in-process research and development reacquired from certain Harvest start-up entities as part of an asset acquisition in September 2018. Additionally, depreciation and amortization decreased $2.2 million primarily due to intangible assets that were impaired or abandoned in 2018.

Selling, general and administrative expenses

SG&A expenses decreased $14.0 million, or 36%, from the three months ended September 30, 2018. Salaries, benefits and other personnel costs decreased $11.2 million primarily due to decreased compensation expenses related to performance and retention incentives for SG&A employees as well as decreased share-based compensation expenses following the departure of employees during the first half of 2019.

Total other expense, net

Total other expense, net, was comparable period over period as the change in unrealized appreciation (depreciation) on our equity securities based on the changes in the securities' share prices was offset by the lack of dividend income from our investment in ZIOPHARM preferred stock since we returned this investment in October 2018.

Segment performance

The following table summarizes Segment Adjusted EBITDA, which is our primary measure of segment performance, for the three months ended September 30, 2019 and 2018, for each of our reportable segments and for All Other segments combined, as well as unallocated corporate costs.

	Three Months Ended September 30,		Dollar Change	Percent Change
	2019	2018		
	(In thousands)			
Segment Adjusted EBITDA:				
Precigen	$ (5,953)	$ (7,965)	$ 2,012	25.3 %
MBP	(9,024)	(8,192)	(832)	(10.2)%
Fine Chemicals	144	(343)	487	142.0 %
Okanagan	(4,323)	(5,158)	835	16.2 %
Trans Ova	(5,560)	(1,844)	(3,716)	<(200)%
All Other	(8,526)	(9,054)	528	5.8 %
Unallocated corporate costs	13,544	25,440	(11,896)	(46.8)%

For a reconciliation of Segment Adjusted EBITDA to net loss before income taxes, see "Notes to the Consolidated Financial Statements (Unaudited) - Note 19" appearing elsewhere in this Quarterly Report.

The following table summarizes revenues from external customers for the three months ended September 30, 2019 and 2018, for each of our reportable segments and for All Other segments combined.

	Three Months Ended September 30,		Dollar Change	Percent Change
	2019	2018		
	(In thousands)			
Precigen	$ 444	$ 6,822	$ (6,378)	(93.5)%
MBP	1,117	2,083	(966)	(46.4)%
Fine Chemicals	2,177	1,103	1,074	97.4 %
Okanagan	6	10	(4)	(40.0)%
Trans Ova	13,981	15,634	(1,653)	(10.6)%
All Other	5,318	6,771	(1,453)	(21.5)%

Precigen

Precigen's Segment Adjusted EBITDA improved period over period due to higher costs for contract research organizations incurred in 2018 for preclinical activities on programs that entered the clinic in 2019.

The decline in Precigen's revenues reflects the effects of the termination in the fourth quarter of 2018 of our collaboration with ZIOPHARM.

MBP

Research and development services performed on our partnered programs have declined in the current period as we focus more resources on our unpartnered platform, resulting in a decline in both Segment Adjusted EBITDA and revenues for this segment.

Fine Chemicals

While Fine Chemicals' Segment Adjusted EBITDA is comparable period over period, expenses have increased due to the collaboration with Surterra that we entered into in the second quarter of 2019, which expenses are offset by related revenues.

The increase on revenues for this segment is primarily driven by the collaboration with Surterra.

Okanagan

Okanagan's Segment Adjusted EBITDA and revenues are comparable period over period as expected as there were no substantive changes in its business operations period over period.

Trans Ova

The decrease in Trans Ova's Segment Adjusted EBITDA was primarily attributable to lower product revenues and margins thereon due to lower customer demand, as well as the cost of capital expenditure investments in Progentus' breeding herd and facility improvements in the current period.

All Other

The Segment Adjusted EBITDA and revenues of All Other were comparable period over period as there were no substantive changes in the businesses included period over period.

Unallocated Corporate Costs

Unallocated corporate costs decreased primarily due to decreased compensation expenses related to performance and retention incentives for SG&A employees of $6.5 million. The unallocated corporate costs in the current period also include $2.5 million of other income related to a breakup fee for an abandoned transaction.

Comparison of the nine months ended September 30, 2019 and the nine months ended September 30, 2018

The following table summarizes our results of operations for the nine months ended September 30, 2019 and 2018, together with the changes in those items in dollars and as a percentage:

	Nine Months Ended September 30,		Dollar Change	Percent Change
	2019	2018		
	(In thousands)			
Revenues				
Collaboration and licensing revenues (1)	$ 21,252	$ 51,622	$ (30,370)	(58.8)%
Product revenues	18,528	23,549	(5,021)	(21.3)%
Service revenues	39,707	40,379	(672)	(1.7)%
Other revenues	2,877	1,839	1,038	56.4 %
Total revenues	82,364	117,389	(35,025)	(29.8)%
Operating expenses				
Cost of products	25,729	28,046	(2,317)	(8.3)%
Cost of services	21,860	21,127	733	3.5 %
Research and development	99,060	124,072	(25,012)	(20.2)%
Selling, general and administrative	79,818	112,872	(33,054)	(29.3)%
Impairment loss	626	—	626	N/A
Total operating expenses	227,093	286,117	(59,024)	(20.6)%
Operating loss	(144,729)	(168,728)	23,999	(14.2)%
Total other expense, net	(6,553)	(13,911)	7,358	(52.9)%
Equity in loss of affiliates	(5,034)	(9,880)	4,846	(49.0)%
Loss before income taxes	(156,316)	(192,519)	36,203	(18.8)%
Income tax benefit	1,615	19,535	(17,920)	(91.7)%
Net loss	(154,701)	(172,984)	18,283	(10.6)%
Net loss attributable to noncontrolling interests	1,592	4,113	(2,521)	(61.3)%
Net loss attributable to Intrexon	$ (153,109)	$ (168,871)	$ 15,762	(9.3)%

(1) Includes $14,350 and $41,740 from related parties for the nine months ended September 30, 2019 and 2018, respectively.

Collaboration and licensing revenues

The following table shows the collaboration and licensing revenues recognized for the nine months ended September 30, 2019 and 2018, together with the changes in those items.

	Nine Months Ended September 30,		Dollar Change
	2019	2018	
	(In thousands)		
ZIOPHARM Oncology, Inc.	$ 2,130	$ 13,626	$ (11,496)
Ares Trading S.A.	—	7,525	(7,525)
Oragenics, Inc.	615	867	(252)
Intrexon T1D Partners, LLC	—	2,399	(2,399)
Intrexon Energy Partners, LLC	2,596	3,345	(749)
Intrexon Energy Partners II, LLC	1,217	1,685	(468)
Surterra Holdings, Inc.	1,182	—	1,182
Genopaver, LLC	1,186	3,076	(1,890)
Fibrocell Science, Inc.	3,247	1,015	2,232
Persea Bio, LLC	621	714	(93)
Harvest start-up entities (1)	4,862	11,792	(6,930)
Other	3,596	5,578	(1,982)
Total	$ 21,252	$ 51,622	$ (30,370)

(1) For the nine months ended September 30, 2019 and 2018, revenues recognized from collaborations with Harvest start-up entities include: Thrive Agrobiotics, Inc.; Exotech Bio, Inc.; and AD Skincare, Inc. For the nine months ended September 30, 2018, revenues recognized from collaborations with Harvest start-up entities also include Genten Therapeutics, Inc. and CRS Bio, Inc.

Collaboration and licensing revenues decreased $30.4 million, or 59%, from the nine months ended September 30, 2018 primarily due to the reacquisition of rights previously licensed to certain significant collaborators, including ZIOPHARM, Ares Trading and certain of the Harvest start-up entities, the result of which eliminated or substantially reduced revenues generated from those collaborations. The decline was also attributable to the mutual termination of our ECC with OvaScience, Inc. in March 2018. This was partially offset by increased sublicensing revenue from Fibrocell Science, Inc., or Fibrocell, in the current period.

Product revenues and gross margin

Product revenues decreased $5.0 million, or 21%, from the nine months ended September 30, 2018. The decrease in product revenues was primarily due to lower customer demand for pregnant cows, calf products, and cloned products. Gross margin on products declined in the current period as a result of fewer products sold.

Service revenues and gross margin

Service revenues and gross margin thereon were consistent period over period as expected.

Research and development expenses

Research and development expenses decreased $25.0 million, or 20%, from the nine months ended September 30, 2018. The 2018 amounts include (i) an $8.7 million expense related to in-process research and development reacquired from certain Harvest start-up entities as part of an asset acquisition in September 2018 as well as (ii) $5.3 million of one-time costs associated with closing one of Oxitec's research and development facilities as we decentralized operations previously conducted in this facility. Additionally, depreciation and amortization decreased $6.5 million primarily due to intangible assets that were impaired or abandoned in 2018.

Selling, general and administrative expenses

SG&A expenses decreased $33.1 million, or 29%, from the nine months ended September 30, 2018. Salaries, benefits and other personnel costs decreased $26.7 million primarily due to (i) decreased share-based compensation expense due to the reversal of previously recognized expense for unvested options granted to former employees as well as a result of certain stock option grants becoming fully vested in 2018 and (ii) decreased compensation expenses related to performance and retention incentives for SG&A employees.

Total other expense, net

Total other expense, net, decreased $7.4 million, or 53%, from the nine months ended September 30, 2018. This decrease was primarily attributable to a decrease in unrealized losses on preferred stock, net of dividend income, following the return of our investment in ZIOPHARM preferred stock to ZIOPHARM in October 2018. These decreases were partially offset by an increase in interest expense associated with our Convertible Notes issued in July 2018.

Segment performance

The following table summarizes Segment Adjusted EBITDA, which is our primary measure of segment performance, for the nine months ended September 30, 2019 and 2018, for each of our reportable segments and for All Other segments combined, as well as unallocated corporate costs.

	Nine Months Ended September 30,		Dollar Change	Percent Change
	2019	2018		
	(In thousands)			
Segment Adjusted EBITDA:				
Precigen	$ (20,789)	$ (20,797)	$ 8	— %
MBP	(26,238)	(22,059)	(4,179)	(18.9)%
Fine Chemicals	(979)	(1,244)	265	21.3 %
Okanagan	(25,367)	(16,609)	(8,758)	(52.7)%
Trans Ova	(2,854)	(1,901)	(953)	(50.1)%
All Other	(26,020)	(31,088)	5,068	16.3 %
Unallocated corporate costs	43,657	75,319	(31,662)	(42.0)%

For a reconciliation of Segment Adjusted EBITDA to net loss before income taxes, see "Notes to the Consolidated Financial Statements (Unaudited) - Note 19" appearing elsewhere in this Quarterly Report.

The following table summarizes revenue from external customers for the nine months ended September 30, 2019 and 2018, for each of our reportable segments and for All Other segments combined.

	Nine Months Ended September 30,		Dollar Change	Percent Change
	2019	2018		
	(In thousands)			
Precigen	$ 2,174	$ 22,285	$ (20,111)	(90.2)%
MBP	3,813	5,030	(1,217)	(24.2)%
Fine Chemicals	4,167	4,211	(44)	(1.0)%
Okanagan	45	37	8	21.6 %
Trans Ova	53,307	59,467	(6,160)	(10.4)%
All Other	18,711	26,228	(7,517)	(28.7)%

Precigen

Precigen's 2019 Segment Adjusted EBITDA is primarily attributable to utilizing its resources on its proprietary cell and gene therapy programs, including initial clinical trial programs. In 2018, Segment Adjusted EBITDA includes the effects of Precigen's prior collaboration with ZIOPHARM.

The decline in Precigen's revenue reflects the effects of the termination in the fourth quarter of 2018 of our collaboration with ZIOPHARM.

MBP

Research and development services performed on our partnered programs have declined in the current period as we focus more resources on our unpartnered platform which has resulted in a decline in both Segment Adjusted EBITDA and revenues for this segment.

Fine Chemicals

While Fine Chemicals' Segment Adjusted EBITDA is comparable period over period, expenses have increased due to the collaboration with Surterra Holdings, Inc., or Surterra, that we entered into in the second quarter of 2019 which are offset by related revenues.

Fine Chemicals' revenues are comparable period over period due to increased revenues under the collaboration with Surterra, offset by fewer research and development services provided to previously existing collaborators as a result of program progression.

Okanagan

In the first and second quarters of 2019, we invested significantly in the expansion of Okanagan's orchards in an effort to scale the operation for increased production in future years, causing a decrease in Segment Adjusted EBITDA as compared to the prior year period. Segment Adjusted EBITDA was also impacted as Okanagan scaled up its sales and marketing efforts in anticipation of future growth.

Trans Ova

The decrease in Trans Ova's Segment Adjusted EBITDA and revenues was primarily attributable to a decrease in product revenues, which was attributable to lower customer demand, and a decrease in product gross margin.

All Other

The Segment Adjusted EBITDA of All Other improved as a result of the loss on disposal of leasehold improvements and equipment in the second quarter of 2018 related to the closing of one of Oxitec's research and development facilities in Brazil. These improvements were partially offset by increased costs associated with our internal development of programs for which our expenses were previously reimbursed by collaborators. Revenues for the All Other segment also declined for this same reason.

Unallocated Corporate Costs

Unallocated corporate costs decreased primarily due to an improvement in the unrealized gains and losses in our securities portfolio of $30.2 million, partially offset by a reduction in dividend income of $14.5 million, which was primarily the result of the return of our investment in ZIOPHARM preferred stock in the fourth quarter of 2018. There was also decreased compensation expenses related to performance and retention incentives for SG&A employees of $10.5 million.

Liquidity and capital resources

Sources of liquidity

We have incurred losses from operations since our inception, and as of September 30, 2019, we had an accumulated deficit of $1.5 billion. From our inception through September 30, 2019, we have funded our operations principally with proceeds received from private and public equity and debt offerings, cash received from our collaborators, and through product and service sales made directly to customers. As of September 30, 2019, we had cash and cash equivalents of $44.4 million and short-term investments of $45.3 million. Cash in excess of immediate requirements is typically invested primarily in money market funds and U.S. government debt securities in order to maintain liquidity and preserve capital.

We currently generate cash receipts primarily from sales of products and services, reimbursement of research and development services performed by us, and from strategic transactions involving our subsidiaries.

Cash flows

The following table sets forth the significant sources and uses of cash for the periods set forth below:

	Nine Months Ended September 30,	
	2019	2018
	(In thousands)	
Net cash provided by (used in):		
Operating activities	$ (103,785)	$ (86,878)
Investing activities	32,342	(181,954)
Financing activities	6,939	282,546
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	(843)	578
Net increase (decrease) in cash, cash equivalents, and restricted cash	$ (65,347)	$ 14,292

Cash flows from operating activities:

During the nine months ended September 30, 2019, our net loss was $154.7 million, which includes the following significant noncash expenses totaling $53.2 million: (i) $18.7 million of depreciation and amortization expense, (ii) $14.5 million of stock-based compensation expense, (iii) $8.0 million of shares issued as payment for services, (iv) $7.0 million of accretion of debt discount and amortization of deferred financing costs, and (v) $5.0 million of equity in net loss of affiliates. Additionally, we had a $3.8 million net increase in our operating assets and liabilities, including the receipt of a $10.0 million upfront payment for our new product collaboration with Surterra and a $3.8 million sublicensing fee from Fibrocell.

During the nine months ended September 30, 2018, our net loss was $173.0 million, which includes the following significant noncash expenses totaling $112.2 million: (i) $28.3 million of stock-based compensation expense, (ii) $27.6 million of noncash net unrealized and realized losses on our equity securities and preferred stock, (iii) $25.2 million of depreciation and amortization expense, (iv) $9.9 million of equity in net loss of affiliates, (v) $8.7 million of expense related to the reacquired in-process research and development in an asset acquisition, (vi) $8.4 million of shares issued as payment for services, and (vii) $4.1 million of losses on disposals of long-lived assets. These expenses were partially offset by $14.6 million of noncash dividend income and $19.3 million of noncash deferred tax benefits. Additionally, we had a $3.7 million net decrease in our operating assets and liabilities.

Cash outflows from operations increased $16.9 million over the nine months ended September 30, 2018 due to increased expenses primarily for our clinical programs combined with the lack of reimbursement for research and development services we previously received under certain key collaborations which we reacquired in 2018.

Cash flows from investing activities:

During the nine months ended September 30, 2019, we received $75.4 million from maturities and sales of short-term investments, net of purchases, and used $33.2 million for purchases of property, plant and equipment. Additionally, our cash balance decreased $7.2 million following the deconsolidation of AquaBounty Technologies, Inc., or AquaBounty.

During the nine months ended September 30, 2018, we used $157.7 million for purchases of short-term investments, net of maturities; $30.4 million for the purchase of property, plant and equipment; and $14.1 million for investments in our JVs, and we received $15.5 million in an asset acquisition and $2.6 million from the return of the balance from an investment in an affiliate that was dissolved.

Cash flows from financing activities:

During the nine months ended September 30, 2019, we received $6.6 million in net proceeds from a public financing in March.

During the nine months ended September 30, 2018, we received $194.0 million net proceeds from the issuance of long-term debt in July and $88.0 million in net proceeds from public financings in January.

Future capital requirements

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

- progress in our research and development programs, as well as the magnitude of these programs;
- the timing, receipt and amount of any payments received in connection with strategic transactions;
- the value we receive, or the expenses we are able to reduce, in connection with asset dispositions, if any;
- the timing, receipt and amount of upfront, milestone and other payments, if any, from present and future collaborators, if any;
- the timing, receipt and amount of sales and royalties, if any, from our potential products;
- our ability to maintain or improve the volume and pricing of our current product and service offerings and to develop new offerings, including those that may incorporate new technologies;
- our ability to implement cost reductions;
- costs we might incur to reacquire previously licensed rights for our own development;
- the timing and capital requirements to scale up our various product and service offerings and customer acceptance thereof;
- our ability to maintain and establish additional collaborative arrangements and/or new strategic initiatives;
- the timing of regulatory approval of products of our collaborations and operations;
- the resources, time, and cost required for the preparation, filing, prosecution, maintenance, and enforcement of patent claims;
- investments we may make in current and future collaborators, including JVs;
- strategic mergers and acquisitions, including upfront acquisition costs as well as the cost to integrate, maintain, and expand the strategic target; and
- the costs associated with legal activities, including litigation, arising in the course of our business activities and our ability to prevail in any such legal disputes.

Until such time, if ever, as we can regularly generate positive operating cash flows, we plan to finance our cash needs through a combination of equity offerings, debt financings, government or other third-party funding, strategic alliances, sales of assets, and licensing arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interests of our common shareholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common shareholders. Our current stock price may make it more difficult to pursue equity financings and lead to substantial dilution if the price of our common stock does not increase. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, or declaring dividends. If we raise additional funds through strategic transactions, collaborations, or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs, or product candidates, or to grant licenses on terms that may not be favorable to us.

Our interim unaudited consolidated financial statements as of and for the three and nine months ended September 30, 2019 have been prepared on the basis that we will continue as a going concern, which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. Based on our balance of cash, cash equivalents and short-term investments of $89.7 million at September 30, 2019 and our recurring losses since inception, there is substantial doubt about our ability to continue as a going concern within one year after the date that our interim unaudited consolidated financial statements were issued. Our ability to continue as a going concern will depend on whether we are able to generate positive cash flows through equity or debt financings, partnering, and strategic collaborations, sales of assets, or equity investments in our

subsidiaries or platforms, and the continuation of cash revenues from collaborators and customers of our products and services. The interim unaudited consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty, which could have a material adverse effect on our financial condition. In addition, if we are unable to continue as a going concern, we may be unable to meet our obligations under our existing debt facilities, which could result in an acceleration of our obligation to repay all amounts outstanding under those facilities, and we may be forced to liquidate our assets. In such a scenario, the values we receive for our assets in liquidation or dissolution could be significantly lower than the values reflected in our interim unaudited consolidated financial statements.

If we do not achieve our planned operating results, including our expectations with respect to partnering, potential asset sales, and cost reductions, our ability to continue as a going concern would be jeopardized and we may need to take the following actions to support our liquidity needs in 2019:

- shift our internal investments from subsidiaries and platforms whose potential for value creation is longer-term to near-term opportunities;
- sell certain of our assets or operating subsidiaries (or portions thereof) to third parties;
- reduce operating expenditures; and
- reduce or delay capital expenditures, including facility expansions, lab equipment, and information technology projects.

Implementing this plan could have a negative impact on our ability to continue our business as currently contemplated, including, without limitation, delays or failures in our ability to:

- maintain the diversity of our various portfolio offerings;
- develop and commercialize products within planned timelines or at planned scales; and
- invest in new research and development efforts.

Contractual obligations and commitments

The following table summarizes our significant contractual obligations and commitments as of September 30, 2019 and the effects such obligations are expected to have on our liquidity and cash flows in future periods:

	Total	Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
			(In thousands)		
Operating leases	$ 73,785	$ 11,069	$ 19,439	$ 14,631	$ 28,646
Purchase commitments	12,068	6,466	5,602	—	—
Convertible debt (1)	255,974	30,974	25,000	200,000	—
Cash interest payable on convertible debt	28,000	7,000	14,000	7,000	—
Long-term debt, excluding convertible debt	4,430	457	765	715	2,493
Contingent consideration	585	585	—	—	—
Total	$ 374,842	$ 56,551	$ 64,806	$ 222,346	$ 31,139

(1) The convertible debt may be converted to Intrexon common stock or to the common stock of one of our subsidiaries. See "Notes to the Consolidated Financial Statements (Unaudited) - Note 11" appearing elsewhere in this Quarterly Report for further discussion of these instruments.

In addition to the obligations in the table above, as of September 30, 2019 we also have the following significant contractual obligations described below.

In conjunction with the formation of our JVs, we committed to making future capital contributions subject to certain conditions and limitations. As of September 30, 2019, our remaining capital contribution commitments to our JVs were $14.2 million. These future capital contributions are not included in the table above due to the uncertainty of the timing and amounts of such contributions.

We are party to in-licensed research and development agreements with various academic and commercial institutions where we could be required to make future payments for annual maintenance fees as well as for milestones and royalties we might receive upon commercial sales of products that incorporate their technologies. These agreements are generally subject to termination by us and therefore no amounts are included in the tables above. At September 30, 2019, we also had research and development commitments with third parties totaling $15.9 million that had not yet been incurred.

Net operating losses

As of September 30, 2019, we had net operating and capital loss carryforwards of approximately $564.1 million for U.S. federal income tax purposes available to offset future taxable income, including $311.4 million generated after 2017, and U.S. federal and state research and development tax credits of approximately $9.2 million, prior to consideration of annual limitations that may be imposed under Section 382 of the Internal Revenue Code of 1986, as amended, or Section 382. Carryforwards generated prior to 2018 begin to expire in 2022. Our foreign subsidiaries have foreign loss carryforwards of approximately $159.2 million, most of which do not expire. Excluding certain deferred tax liabilities totaling $5.7 million, our remaining net deferred tax assets, which primarily relate to these loss carryforwards, are offset by a valuation allowance due to our history of net losses.

As a result of our past issuances of stock, as well as due to prior mergers and acquisitions, certain of our net operating losses have been subject to limitations pursuant to Section 382. As of September 30, 2019, Intrexon has utilized all net operating losses subject to Section 382 limitations, other than those losses inherited via acquisitions. As of September 30, 2019, approximately $42.1 million of domestic net operating losses were inherited via acquisitions and are limited based on the value of the target at the time of the transaction. Future changes in stock ownership may also trigger an ownership change and, consequently, a Section 382 limitation.

Off-balance sheet arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, other than purchase commitments as mentioned above, as defined under Securities and Exchange Commission, or SEC, rules.

Critical accounting policies and estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which we have prepared in accordance with generally accepted accounting principles in the United States, or U.S. GAAP. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenues and expenses during the reporting periods. We evaluate these estimates and judgments on an ongoing basis. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Our actual results may differ from these estimates under different assumptions or conditions.

There have been no material changes to our critical accounting policies from those described in "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in our Annual Report.

Recent accounting pronouncements

For information with respect to recent accounting pronouncements and the impact of these pronouncements on our consolidated financial statements, see "Notes to the Consolidated Financial Statements (Unaudited) - Note 2" appearing elsewhere in this Quarterly Report.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

The following sections provide quantitative information on our exposure to interest rate risk, stock price risk, and foreign currency exchange risk. We make use of sensitivity analyses that are inherently limited in estimating actual losses in fair value that can occur from changes in market conditions.

Interest rate risk

We had cash, cash equivalents and short-term investments of $89.7 million and $222.5 million as of September 30, 2019 and December 31, 2018, respectively. Our cash and cash equivalents and short-term investments consist of cash, money market funds, U.S. government debt securities, and certificates of deposit. The primary objectives of our investment activities are to preserve principal, maintain liquidity and maximize income without significantly increasing risk. Our investments consist of U.S. government debt securities and certificates of deposit, which may be subject to market risk due to changes in prevailing interest rates that may cause the fair values of our investments to fluctuate. We believe that a hypothetical 100 basis point increase in interest rates would not materially affect the fair value of our interest-sensitive financial instruments and any such losses would only be realized if we sold the investments prior to maturity.

Investment in a publicly traded company's common stock

We own shares of common stock in AquaBounty, which is traded on the Nasdaq Stock Market and is subject to market price volatility. Effective in April 2019, we account for our investment in AquaBounty using the fair value option. As such, we record this investment at fair value at the end of each reporting period with the unrealized gain or loss recorded as a separate component of other income (expense), net for the period. The fair value of our investment in AquaBounty as of September 30, 2019 and December 31, 2018, was $16.3 million and $16.9 million, respectively. The fair value of this investment in subject to fluctuation in the future due to the volatility of the stock market, changes in general economic conditions and changes in the financial condition of this company. The fair value of our investment in AquaBounty as of September 30, 2019 would be approximately $17.9 million and $13.0 million based on a hypothetical 10% increase or 20% decrease, respectively, in the value of this investment. The fair value of our investment in AquaBounty as of December 31, 2018 would be approximately $18.6 million and $13.5 million based on a hypothetical 10% increase or 20% decrease, respectively, in the value of this investment. See "Notes to the Consolidated Financial Statements (Unaudited) - Note 20" appearing elsewhere in this Quarterly Report for further discussion of our investment in AquaBounty.

Foreign currency exchange risk

We have international subsidiaries in a number of countries, including Belgium, Brazil, Canada, Hungary, and the United Kingdom. These subsidiaries' assets, liabilities, and current revenues and expenses are denominated in their respective foreign currency. We do not hedge our foreign currency exchange rate risk. The effect of a hypothetical 10% change in foreign currency exchange rates applicable to our business would not have a material impact on our consolidated financial statements.

Item 4. Controls and Procedures

Pursuant to Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), we carried out an evaluation, under supervision and with the participation of our management, including our Chief Executive Officer ("CEO"), who is our principal executive officer, and our Chief Financial Officer ("CFO"), who is our principal financial officer, of the effectiveness of the design and operation of our disclosure controls and procedures (as defined under Rule 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based upon that evaluation, as of the end of the period covered by this report, our CEO and CFO concluded that our disclosure controls and procedures are effective to ensure 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 that such information is accumulated and communicated to our management, including our CEO and CFO, as appropriate, to allow timely decisions regarding required disclosure.

There has been no change in our internal control over financial reporting during the three months ended September 30, 2019, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

In March 2012, Trans Ova was named as a defendant in a licensing and patent infringement suit brought by XY, LLC, or XY, alleging that certain of Trans Ova's sale of semen-sorting products and services breached a 2004 licensing agreement and infringed on patents related to semen sorting that XY allegedly owned. Trans Ova filed a number of counterclaims in the case. The matter proceeded to a jury trial in the United States District Court for the District of Colorado in January 2016. The jury determined that XY and Trans Ova had each breached the licensing agreement and that Trans Ova had infringed XY's patents. In April 2016, the court issued its post-trial order, awarding $0.5 million in damages to Trans Ova and $6.1 million in damages to XY. The order also provided Trans Ova with the ability to continue to practice XY's technology, subject to an ongoing royalty obligation of 12.5% of gross proceeds on Trans Ova's standard sorted semen products, plus a 2% enhancement on those products utilizing "reverse-sorted semen", or semen that is frozen before being sorted. In addition, the court assigned a $5.00 minimum royalty for a straw of sexed semen. Both parties appealed the district court's order. In May 2018, the Court of Appeals for the Federal Circuit denied Trans Ova's appeal of its claims for antitrust, breach of contract, and patent invalidity (except as to one patent, for which the Federal Circuit affirmed invalidity in a separate, same-day ruling in a third-party case). The Federal Circuit remanded the district court's calculation of the ongoing royalty and instructed the district court to re-calculate the ongoing royalty in light of post-verdict economic factors. In March 2019, the district court clarified the royalty base and reset the royalty rates consistent with the Federal Circuit's opinion. The district court increased the royalty rate on Trans Ova's standard sorted semen products to 18.75%. For the reverse-sort enhancement, however, it applied a weighted, blended royalty of 12.63% to Trans Ova's entire IVF service cycle that utilizes reverse-sorted semen. The district court also changed the minimum royalty for a straw of sexed semen to $6.25 for a 2-million cell straw (prorated appropriately for straws of higher cell counts), and assigned a minimum royalty for a sexed embryo at $6.25 per embryo. The new royalty rates were made retroactive to February 2016 (the end date of the trial).

Since the inception of the 2004 licensing agreement, Trans Ova has remitted payments to XY pursuant to the terms of that agreement, or pursuant to the terms of the district court's April 2016 post-trial order and its March 2019 post-remand order, and has recorded these payments in cost of services in the consolidated statements of operations for the respective periods. For the period from inception of the 2004 agreement through the district court's April 2016 order, aggregate royalty and license payments were $3.2 million, of which $2.8 million had not yet been deposited by XY. In 2016, we recorded the expense of $4.2 million, representing the excess of the net damages awarded to XY, including prejudgment interest, over the liability previously recorded by Trans Ova for uncashed checks previously remitted to XY. In August 2016, Trans Ova deposited the net damages amount, including prejudgment interest, into the district court's registry, to be held until the appeals process was complete and final judgment amounts were determined. These amounts were included in restricted cash and other accrued liabilities on the accompanying consolidated balance sheet as of December 31, 2018, appearing elsewhere in this Quarterly Report. After the appeal, the district court subsequently released the funds held in its registry to XY in January 2019. As for post-trial damages, Trans Ova continued to remit payment to XY every quarter based on the original ongoing royalty rates set by the district court, though XY refused to cash those checks.

Under the district court's March 2019 post-remand order clarifying the royalty base and resetting the royalty rates, Trans Ova recalculated royalties owed from February 2016 through the first quarter of 2019, plus any applicable pre- and post-judgment interest, and remitted that payment, totaling $5.8 million, to XY in May 2019. In June 2019, XY deposited the $5.8 million into the district court's registry while the parties resolve a dispute over the appropriate calculation of royalties. In that dispute, which is pending before the district court, XY filed a motion claiming over $1.0 million in additional back royalties. Trans Ova contends that no additional back royalties are due and is seeking an oral hearing on the matter.

During the nine months ended September 30, 2019, $0.4 million of additional royalty expense was recorded based on the recalculation of royalties owed XY from February 2016 through December 2018 and is included in SG&A expenses on the accompanying consolidated statement of operations appearing elsewhere in this Quarterly Report.

In December 2016, XY filed a complaint for patent infringement, trade secret misappropriation, and various state law claims against Trans Ova in the United States District Court for the Western District of Texas in Waco, Texas. Since the claims in the 2016 complaint directly relate to the parties' other litigation, Trans Ova filed and was granted a motion to transfer the case to Colorado district court. That court subsequently dismissed nine of the complaint's twelve counts, including all five non-patent counts. The court subsequently dismissed another patent count after ruling that the patent was invalid, leaving only two patent counts left in the case. In February 2019, a Wisconsin district court invalidated one of the remaining patents, which XY had asserted against another competitor. That ruling prompted the Colorado district court to stay the two remaining patent counts

and enter final judgment against XY's ten other dismissed counts. The 2016 litigation is administratively closed, pending XY's appeal of the district court's rulings dismissing its various patent and non-patent causes of action.

Trans Ova shall continue to utilize the technology consistent with the determinations of the court proceedings. Nonetheless, these disputes remain subject to a number of uncertainties, including the outcome of appellate proceedings, the possibility of further claims by XY, and the impact of these matters on Trans Ova's ability to utilize the technology. Trans Ova and we could elect to enter into a settlement agreement in order to avoid the further costs and uncertainties of litigation.

We may become subject to other claims, assessments, and governmental investigations from time to time in the ordinary course of business. Such matters are subject to many uncertainties and outcomes are not predictable with assurance. We accrue liabilities for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated. As of September 30, 2019, we do not believe that any such matters, individually or in the aggregate, will have a material adverse effect on our business, financial condition, results of operations, or cash flows.

Item 1A. Risk Factors

As disclosed in "Item 1A. Risk Factors" in our Annual Report, there are a number of risks and uncertainties that may have a material effect on the operating results of our business and our financial condition. There are no additional material updates or changes to our risk factors since the filing of our Annual Report, except as follows:

Our efforts to realign our business may not be successful and could increase our capital requirements, increase our costs, or otherwise harm our operating results and financial condition.

Consistent with the ongoing evolution of our strategy, we routinely consider ways to organize our business and the grouping of our assets to facilitate strategic opportunities. In April 2019, we initiated efforts to better deploy resources, realize inherent synergies, and position us for growth with a core focus on healthcare and initiated plans to achieve this through various corporate activities, including partnering, potential asset sales, and operating cost reductions. We believe this financial discipline will allow us to continue to hold significant operating capital. However, there is no assurance that the new alignment of our business will be successful or achieve these benefits, that our capital requirements and costs will not increase in connection with or as a result of the new alignment, or that we will not otherwise harm our operating results and financial condition. Furthermore, the implementation of this strategy and the evaluation and implementation of any leadership changes, including the recent departure of two of our executive officers, could lead to strategic and operational challenges, distractions of management from other key initiatives, impaired employee relations, inefficiencies or increased costs, any of which could adversely affect our business, financial condition, results of operations and cash flows. Finally, as we continue our efforts to focus our business and generate additional capital, we may be willing to enter into transactions involving one or more of our operating segments and reporting units for which we have goodwill and intangible assets. These efforts could result in our identifying impairment indicators or recording impairment charges in future periods. In addition, market changes and changes in judgments, assumptions and estimates that we have made in assessing the fair value of goodwill could cause us to consider some portion or all of certain assets to become impaired.

In evaluating our risks, readers also should carefully consider the risk factors discussed in our Annual Report, which could materially affect our business, financial condition or operating results, in addition to the other information set forth in this report and in our other filings with the SEC.

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

From July 1, 2019 through September 30, 2019, we issued 340,453 unregistered shares of our common stock as payment under the Services Agreement entered into and effective as of November 1, 2015, as amended, by and between us and Third Security, LLC as previously disclosed in our Current Report on Form 8-K filed on April 22, 2019. We issued these shares of common stock in reliance on exemptions from registration under Section 4(a)(2) of the Securities Act.

Item 3. Defaults on Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None.

Item 6. Exhibits

Exhibit No.	Description
10.1*	Stock Purchase Agreement, dated October 29, 2019 by and between Intrexon Corporation and TS AquaCulture LLC (incorporated by reference to Exhibit 10.1 of Intrexon Corporation's Current Report on Form 8-K, filed with the Securities and Exchange Commission on October 31, 2019).
31.1	Certification of Randal J. Kirk, Chairman and Chief Executive Officer (Principal Executive Officer) of Intrexon Corporation, pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Rick L. Sterling, Chief Financial Officer (Principal Financial Officer) of Intrexon Corporation, pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1**	Certification of Randal J. Kirk, Chairman and Chief Executive Officer (Principal Executive Officer) of Intrexon Corporation, 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 Rick L. Sterling, Chief Financial Officer (Principal Financial Officer) of Intrexon Corporation, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.0	Interactive Data File (Quarterly Report on Form 10-Q, for the quarterly period ended September 30, 2019, formatted in Inline XBRL (eXtensible Business Reporting Language)). Attached as Exhibit 101.0 to this Quarterly Report on Form 10-Q are the following documents formatted in XBRL: (i) the Consolidated Balance Sheets as of September 30, 2019 and December 31, 2018, (ii) the Consolidated Statements of Operations for the three and nine months ended September 30, 2019 and 2018, (iii) the Consolidated Statements of Comprehensive Loss for the three and nine months ended September 30, 2019 and 2018, (iv) the Consolidated Statements of Shareholders' and Total Equity for the three and nine months ended September 30, 2019 and 2018, (v) the Consolidated Statements of Cash Flows for the nine months ended September 30, 2019 and 2018, and (vi) the Notes to the Consolidated Financial Statements.

* Previously filed.

** Furnished herewith.

SIGNATURES

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

Intrexon Corporation
(Registrant)

Date: November 12, 2019

By: /s/ Rick L. Sterling
Rick L. Sterling
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Randal J. Kirk, certify that:

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

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

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

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

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

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

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

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

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

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

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

Date: November 12, 2019

/s/ RANDAL J. KIRK

Randal J. Kirk

Chairman and Chief Executive Officer

(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Rick L. Sterling, certify that:

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

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

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

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

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

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

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

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

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

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

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

Date: November 12, 2019

/s/ RICK L. STERLING

Rick L. Sterling

Chief Financial Officer

(Principal Financial Officer)

Exhibit 32.1

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

I, Randal J. Kirk, Chairman and Chief Executive Officer of Intrexon Corporation (the "Company"), do hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

- the Quarterly Report on Form 10-Q of the Company for the quarter ended September 30, 2019 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

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

Date: November 12, 2019

/s/ RANDAL J. KIRK
Randal J. Kirk
Chairman and Chief Executive Officer
(Principal Executive Officer)

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Registrant under the Securities Act of 1933 or the Securities Exchange Act of 1934 (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.

Exhibit 32.2

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

I, Rick L. Sterling, Chief Financial Officer of Intrexon Corporation (the "Company"), do hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

- the Quarterly Report on Form 10-Q of the Company for the quarter ended September 30, 2019 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

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

Date: November 12, 2019

/s/ RICK L. STERLING
Rick L. Sterling
Chief Financial Officer
(Principal Financial Officer)

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Registrant under the Securities Act of 1933 or the Securities Exchange Act of 1934 (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.