

INTERMOLECULAR INC
Form 10-K
March 08, 2019

Of

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018

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: 001-35348

Intermolecular, Inc.

(Exact Name of Registrant as Specified in its Charter)

Delaware
(State or Other Jurisdiction of Incorporation or Organization) 20-1616267
(I.R.S. Employer Identification No.)

3011 N. First Street

San Jose, California
(Address of Principal Executive Offices) 95134
(Zip Code)

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(408) 582-5700

(Registrant's Telephone Number, Including Area Code)

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

| Title of Each Class | Name of Each Exchange on Which Registered |
|---------------------------------|---|
| Common Stock, \$0.001 par value | The Nasdaq Global Select Market |

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

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 if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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 12(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 June 29, 2018 (the last business day of the registrant's most recently completed second quarter), the aggregate market value of the registrant's common stock, par value \$0.001, held by non-affiliates of the registrant was \$28.9 million based upon the closing price reported for such date by The Nasdaq Global Select Market. Shares of the registrant's common stock held by executive officers and directors of the registrant and by each person who owned

10% or more of the outstanding common stock have been excluded because such persons may be deemed to be affiliates of the registrant. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of March 5, 2019, the number of outstanding shares of the registrant's common stock, par value \$0.001 per share, was 49,758,224.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Definitive Proxy Statement to be filed with the Commission pursuant to Regulation 14A in connection with the registrant's 2019 Annual Meeting of Stockholders, to be filed subsequent to the date hereof, are incorporated by reference into Part III of this Report. Such Definitive Proxy Statement will be filed with the Securities and Exchange Commission no later than 120 days after the conclusion of the registrant's fiscal year ended December 31, 2018. Except with respect to information specifically incorporated by reference in this Form 10-K, the Proxy Statement is not deemed to be filed as part of this Form 10-K.

INTERMOLECULAR, INC.

FORM 10-K FOR THE FISCAL YEAR ENDED DECEMBER 31, 2018

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

The following discussion and analysis should be read in conjunction with our audited consolidated financial statements and the related notes that appear elsewhere in this Annual Report on Form 10-K. This Annual Report on Form 10-K contains "forward-looking statements" within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, particularly in Part I, Item 1: "Business," Part I, Item 1A: "Risk Factors" and Part 2, Item 7: "Management's Discussion and Analysis of Financial Condition and Results of Operations." These statements are often identified by the use of words such as "may," "will," "expect," "believe," "anticipate," "intend," "could," "should," "estimate," or "continue," and similar expressions or variations. All statements other than statements of historical fact could be deemed forward-looking, including, but not limited to: any projections of financial information; any statements about historical results that may suggest trends for our business; any statements of the plans, strategies, and objectives of management for future operations; any statements of expectation or belief regarding future events, technology developments, our customers and programs, expenses, liquidity, cash flow, growth rates or enforceability of our intellectual property rights and related litigation expenses; and any statements of assumptions underlying any of the foregoing. Such forward-looking statements are subject to risks, uncertainties and other factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Accordingly, we caution you not to place undue reliance on these statements. For Intermolecular, particular uncertainties that could affect future results include: our limited operating history; our ability to implement our new business model, which is dependent on, among other things, our ability to continuously grow and refresh our sales opportunities; fluctuations in quarterly results; our ability to achieve profitability, which is dependent on, among other things, (i) customer acceptance of our high-productivity combinatorial (HPC) platform as an alternative to conventional research and development, (ii) our ability to provide customers with the technological innovations they seek, and (iii) our ability to evaluate engineered thin-film materials for next generation technology products, our dependence on a limited number of customers; rapid technological changes and market cyclicality in the semiconductor industry; the early stage of development of the new market sectors and the challenges each industry within the sector faces; our ability to scale our development services to accommodate new customer engagements; our ability to make the substantial research and development investments required to stay competitive in our business and to be able to address a wider range of markets and customers; our ability to adequately protect against potential conflicts of interest and breaches of confidentiality among our customers; our ability to work cooperatively with our customers' materials suppliers and equipment manufacturers; the ability of our suppliers to deliver sufficient quantities of materials in a timely manner; our ability to manage our future growth, including an increasing number of employees, customers and programs; our ability to scale our development efforts and secure new programs with new or existing customers and the timing of those programs; the degree to which existing programs are completed or expanded; our ability to realize any expected growth, synergies or benefits from acquisitions, strategic investments or joint ventures we may enter into; our potential need for additional capital to finance our business for purposes that could include potential acquisitions as well as repayment of debt; the potential loss of key personnel; our ability to realize the full value of our backlog and the timing of our receipt of revenue under contracts included in backlog; our general ability to compete successfully in challenging markets; product liability for our HPC tools and for our customers' products that incorporate technology developed through our programs; the costs and risks associated with environmental, health and safety laws and regulations; global or regional economic, political and social circumstances and foreign currency exchange rates that could adversely affect our business; business interruptions such as earthquakes and other natural disasters; our ability to use our tax credit carryforwards; our ability to effectively protect and monetize our intellectual property, including patents, trade secrets and other proprietary information; any potential involvement in intellectual property litigation; and any potential payments to our customers resulting from our intellectual property indemnification policies and obligations. For a discussion of some of the factors that could cause actual results to differ materially from our forward-looking statements, see the discussion on risk factors that appears in Part I, Item 1A: "Risk Factors" of this Form 10-K and other risks and uncertainties detailed in this and our other reports and filings with the Securities and Exchange Commission, or SEC. The forward-looking statements in this Form 10-K represent our views as of the date of this Form 10-K. We anticipate that subsequent

events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Form 10-K.

PART I

ITEM 1. BUSINESS

Overview

We are a trusted partner for the innovation of advanced materials using high throughput experimentation. Advanced materials are critical to sustaining and advancing many industries, including semiconductor and semiconductor related industries. Using traditional experimental techniques, it can take many years to discover new advanced materials and many more years to deploy them in the marketplace. By leveraging our proprietary High Productivity Combinatorial (HPC) equipment platform, advanced characterization ability and multi-disciplinary development team, we strive to enable our customers to more rapidly discover advanced materials and tailor them to suit their needs.

Our HPC platform, which consists of our Tempus™ processing tools, our unique, automated characterization methods, and our Informatics analysis software, is purpose-built for research and development (R&D) using combinatorial process systems in concert with established chemical vapor deposition (CVD), physical vapor deposition (PVD) and atomic layer deposition (ALD) deposition methods. Combinatorial processing is a methodology for experimentation, discovery and development that employs parallel and other high-throughput experimentation, which allows for R&D experimentation at speeds up to 100 times faster than conventional R&D platforms that are optimized for manufacturing rather than for R&D. Our development team included approximately 54 scientists and engineers (of whom approximately 56% have advanced degrees) or approximately 34% of our total headcount as of December 31, 2018.

We currently target large markets that rely on advanced materials for differentiation. Within these broad markets, we target customers that have track records of technological innovation, have significant materials-based R&D, and are pursuing technical advancements that are critical to their success and strategy. Samsung and SK hynix accounted for 10% or more of our revenue for the year ended December 31, 2018. Samsung and Micron Technology, Inc. (“Micron”) each accounted for more than 10% of our revenue for the year ended December 31, 2017, and Guardian, Micron, Samsung and SK hynix each accounted for more than 10% of our revenue for the year ended December 31, 2016. To date, we have received the substantial majority of our revenue from customers in the semiconductor, glass, advanced alloys, light-emitting diodes (LEDs) and flat-panel display markets.

Generally, our approach is most relevant to industries that rely heavily upon advanced thin film materials such as those achieved using PVD and ALD processing tools; however, our approach is also relevant to discovering and understanding advanced materials more broadly, including advanced bulk materials such as metal alloys. Historically, we have partnered most extensively in the semiconductor industry and particularly in the area of semiconductor memory such as dynamic RAM (DRAM), non-volatile memory (NVM) and phase-change memory (PCM) technologies. Going forward, we plan to continue growing our footprint with semiconductor device makers, while expanding our engagement with semiconductor materials and equipment makers.

We maintain a flexible engagement model that allows our customers to choose how best to leverage our HPC platform and whether and how to work with our development team. Prior to 2015, we offered only multi-year collaborative development programs (CDPs), which typically required the customer to pay a fixed annual fee during the engagement and an ongoing royalty stream upon our customer’s commercialization of technology we developed under the program. Such engagements typically took nine to twenty-four months to negotiate and often were conducted at or below cost to secure the royalty obligation, which was contingent upon our customer’s successful introduction of the developed technology under the CDP. Due to CDP contracts having a relatively long sales cycle and other reasons, since 2015, our preferred approach has been to engage with customers using a multi-year umbrella agreement that allows our customers to selectively engage in multiple projects, each typically having a duration of six to twelve

months. With these multi-year umbrella agreements, we typically generate program revenue through contracted service-based fees that are collected upon the completion of projects and/or upon the completion of certain milestones. For example, a service-based fee could include using our HPC platform to perform certain research services from scanning and screening new material combinations to achieving certain performance objectives using new material combinations. These multi-year umbrella agreements also can include success fees or royalties depending on how the project leverages our development team or incorporates our background technology. While the CDP model remains available to customers who prefer it, our baseline customer

engagement strategy no longer includes a patent licensing component but instead relies upon program revenue being generated through service-based fees. Our new flexible engagement model has substantially reduced our sales cycle and improved our operating results.

We believe there are opportunities for us to develop our own advanced materials while preserving the trusted relationship with our customers. By pursuing the discovery and development of novel materials required for new applications, we believe we can effectively complement our current customer's markets. We believe that the licensing of our proprietary materials and techniques has potential to produce additional future revenues.

Our Advantage

We have pioneered, developed and patented a proprietary platform and methodology for improving R&D in our target markets. Our strengths include:

• **Proprietary and patented HPC platform.** Our HPC platform employs proprietary and patented combinatorial methods to parallel and rapid-serial process up to 192 experiments on a single substrate as compared to conventional methods, which typically allow only a single experiment at a time.

• **Flexible technology platform configurable for and extendable to multiple markets.** Our HPC platform can be configured for many applications and extended to address a broad set of markets. Because of the similarities and synergies in materials deposition, manufacturing processes and device integration complexities across markets, our platform allows us to create unified workflows and support innovation across multiple markets.

• **Seasoned engineering team with multi-disciplinary expertise.** We have assembled a multi-disciplinary team of scientists and engineers with expertise across various disciplines, fields and technologies, including materials science, chemistry, physics, engineering, process equipment development, software and informatics, process development and integration, device technologies and device integration.

• **Deep expertise in advanced materials, processes, integration and device architectures.** We have accelerated innovation for a broad set of customers across multiple markets. Our team and our platform enable more rapid comprehension and learning about advanced materials, processes, integration and device architectures, some of which is applicable across markets. We generate our own IP such as materials characteristics, optimized processes and interoperability of systems and architectures that can be applicable in many fields of use and potentially could result in us being able to generate additional license-related fees.

• **Our revenue is built on customer programs and licensing fees.** Our customer programs are designed to generate predictable services revenue throughout the length of the engagement as our multi-year umbrella contracts include service-based fees that are collected upon the completion of projects or upon the completion of certain milestones. In some cases, we also receive success fees or licensing fees for our work and technology, but this is not typical of most of our customer engagements.

Embedded throughout our platform, which is a combination of hardware and software, our proprietary technology is based upon the parallel and/or rapid serial experimentation capabilities of combinatorial methods. HPC methods generally refer to techniques that vary materials, unit processes, process, and device integration sequences across multiple regions of one or more substrates, the output of which can then be evaluated in parallel or rapid serial fashion. Our informatics software and analytical methods characterize and analyze these combinations of materials, unit processes, process, and device integration sequences for the most promising solutions in a structured, automated and throughput-matched fashion. The relationship between materials, processes, integration and device output are established earlier in the development process, so that performance and manufacturability considerations are taken into account from the outset, instead of late in the R&D process.

We begin the development and discovery process by working with our customers to design experiments to synthesize, characterize and understand the material sets they want to explore. We then use our HPC platform to run those experiments. Once an experiment is processed, the data sets of each experiment are stored in a secure database and analyzed for desired properties. As with processing, our clean room labs include a broad array of characterization and metrology instruments and software to evaluate different properties under a wide variety of process conditions. These properties include physical, electrical, mechanical, thermal, chemical, and optical properties. In general, we are able to design, process and characterize tens to hundreds of experimental results in a single day.

Intellectual Property

Our success depends in part on our IP, including patents, trade secrets and know-how. We have patented and continue to seek patent protection for combinatorial methods and systems included in our HPC platform, and we will also seek patents for advanced materials and related technologies we develop outside of development services for our customers, such as technologies developed as internal research and development or part of a joint development effort with a partner. Our intellectual property rights have terms that expire between 2019 and 2035.

Our Customers

Our customers serve large and growing markets, including the markets for semiconductors, glass, advanced alloys, LEDs, flat-panel displays, and other applications. Success in these markets requires rapid and cost-effective product innovation, fast time-to-market, competitive pricing, production scalability and the ability to achieve specific product performance requirements. Our semiconductor customers' products are typically manufactured using thin-film deposition of advanced materials through customized processes that create a specific device architecture. These thin-film structures must then be scaled and integrated into cost-effective manufacturing processes to serve high-volume end markets. Conventional R&D approaches are increasingly challenged by the ever increasing device complexity and the market need to manage innovation in our target markets.

Empowered with our inter-disciplinary team and unique technology through our HPC platform, we believe we are well positioned to assist manufacturing industries that increasingly rely on the discovery and introduction of new materials, which traditionally have required intensive, time-consuming experimentation due to the fact that advanced materials are not well-understood and accurate, robust models do not exist. Ironically, the greater expertise and higher costs required to discover and introduce advanced materials have led to increased specialization among materials, capital equipment, semiconductor manufacturing and IC (integrated circuit) design companies. This specialization has left gaps in the industry knowledge base with respect to the complex interactions among materials science, process technology, device integration and the ability to scale to high-volume, high-performance IC production. Our HPC platform allows us to accelerate the rate of experimentation, and our inter-disciplinary team has been assembled to address such gaps.

The majority of our revenue during 2018 came from Samsung and SK hynix, which represented a combined 75% of our total revenue during the year ended December 31, 2018. The majority of our revenue during 2017 came from Micron and Samsung which represented a combined 70% of our total revenue during the year ended December 31, 2017. The majority of our revenue during 2016 came from Guardian, Micron, Samsung, and SK hynix, which represented a combined 75% of our total revenue during the year ended December 31, 2016.

Research and Development

We conduct R&D activities for customers and for internal research and development on both workflow platform development and application R&D. As of December 31, 2018, we employed a research and development team of 70 full-time employees. This R&D team includes many experienced engineers, scientists and managers with advanced

degrees from leading universities around the world and experience with leading chip manufacturers, solar PV companies and equipment and materials suppliers. We believe these R&D professionals on our team have enabled us to develop our HPC platform, support customer programs, implement our technology roadmap rapidly and provide us with the foundation for our technology advancement in the future.

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We devote a substantial portion of our resources to engineering of our next-generation platforms by integrating future generations of technology and developing standardized software and hardware modules. We work closely with multiple vendors during the development of new workflows or workflow modifications for use in our future platforms. The synergies among existing and new workflows often enable us to operate with adjacent vertical technologies. Our R&D expenses were \$17.2 million, \$21.6 million and \$28.1 million for the years ended December 31, 2018, 2017 and 2016, respectively; this represented approximately 51%, 58% and 59%, of our revenue in those years, respectively.

Competition

The principal capabilities required to be competitive in our market include technical expertise, processes and integration capabilities, diversity of platform offerings, development speed and performance, quality and reliability of engineers, depth of collaboration with customers and technical support. We believe we compete favorably with respect to these factors because of the breadth of capabilities of our HPC platform, the depth of multi-disciplinary expertise of our internal research team and external engineering teams who collaborate with customers and our use of combinatorial processing and throughput matched characterization and analysis. These differentiating factors allow us to explore more comprehensive materials sets and provide faster results to our customers. We are not aware of any companies that currently compete or have to date competed with us in the use of combinatorial methods for thin-film development; however, we do believe that we compete for the R&D resources of our customers with third-party IP licensors, equipment suppliers, industry consortia, alliance partnerships and university research teams. In addition, many of our customers design, develop, manufacture and market solutions based on their own unique device architectures and develop their own intellectual property in-house.

A portion of our revenue is generated from the sales of end products by our customers, and our competitive position therefore is dependent on their competitive positions. The markets for our customers' products that incorporate technology developed through our programs are intensely competitive and characterized by rapid technological change. These changes result in frequent product introductions, short product development cycles and increased product capabilities typically representing significant price and performance improvements.

Environmental Regulation

We are subject to various foreign, federal, state and local environmental laws and regulations governing, among other matters, emissions and discharges of hazardous materials into the air and water, the use, generation, storage, handling, transportation and disposal of, and exposure to, hazardous materials and wastes, remediation of contamination and employee health and safety. In addition, under certain of these environmental laws, liability can be joint and several and without regard to comparative fault. Our operations involve the use of hazardous materials and produce hazardous waste, and we could become liable for any injury or contamination that could arise due to such use or disposal of these materials. Failure to comply with environmental laws and regulations or to obtain or maintain required environmental permits could result in the imposition of substantial civil and criminal fines and sanctions, could require operational changes or limits or the installation of costly equipment or otherwise lead to third party claims. Future environmental laws and regulations, stricter enforcement of existing laws and regulations, or the discovery of previously unknown contamination or violations of such laws and regulations could require us to incur costs, or become the basis for new or increased liabilities or subject us to fines or other sanctions.

Employees

As of December 31, 2018, we had a total of 88 full-time employees. None of our employees is represented by a labor union or covered by a collective bargaining agreement, and we consider our employee relations to be good.

Financial Information about Segments and Geographic Areas; Backlog

We derive a significant portion of our revenue from customers based in foreign countries, particularly those based in Asia, including Japan. Revenue generated from customers in Asia, including Japan, accounted for 76%, 68% and 51% of total revenue for the years ended December 31, 2018, 2017 and 2016, respectively. We expect that a significant portion of our total future revenue will continue to be derived from companies based in Asia and Japan.

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For geographic information, see Note 11 to our consolidated financial statements included in this annual report on Form 10-K. We report all of our business activities as a single reporting segment.

Our backlog as of December 31, 2018 was approximately \$12.3 million. Our backlog as of December 31, 2017 was approximately \$19.9 million. As of December 31, 2016 we had backlog of approximately \$19.0 million.

Corporate and Available Information

We were originally incorporated as The BEP Group, Inc. in Delaware in June 2004. In November 2004, we changed our name to Intermolecular, Inc. We are headquartered in San Jose, California.

Our Internet address is www.intermolecular.com. Information included on our website is not part of this Form 10-K. We make available free of charge on our website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to those reports as soon as reasonably practicable after such material is electronically filed with or furnished to the SEC. See <http://ir.intermolecular.com>. Information contained on, or that can be accessed through, our website is not incorporated by reference into this Annual Report on Form 10-K, and you should not consider information on our website to be part of this Annual Report on Form 10-K. We have included our website address as an inactive textual reference only.

In addition, copies of our annual reports are available free of charge upon written request. The SEC also maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. The address of that site is <http://www.sec.gov/cgi-bin/browse-edgar>.

ITEM 1A. RISK FACTORS

We describe our business risk factors below. You should carefully consider the risks described below together with the other information set forth in this Form 10-K, which could materially affect our business, financial condition or future results. The risks described below are not the only risks facing our company. Risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition and operating results.

Risks Related to Our Business, Financial Condition and Results of Operations

We have a limited operating history and are substantially changing our business model, which makes it difficult for investors to evaluate our current business and future prospects.

We recently changed our business model substantially which included reducing our reliance on licensing and royalty revenues to achieve profitability, and we have not yet demonstrated that this new model can scale successfully. Additionally, we do not have a long history of operating results on which you can base your evaluation of our business. As a result, it may be difficult for analysts and investors to evaluate our future prospects. Furthermore, because of our limited operating history under the new model and because we are seeking to grow revenue by addressing industries we have not previously engaged, such as automotive and special metal alloys, we have limited experience in analyzing and understanding the trends that may emerge and affect our business. If we are unable to obtain significant licensing and royalty revenue from products that use or incorporate our proprietary technology, whether developed for our customers under CDP-type programs or developed independently by the

Company, our financial condition and results of operations could be materially and adversely affected.

Under our new business approach, we have a tiered engagement model with customers where royalties or license fees are not included in most levels of customer engagements, and we may not be able to achieve significant profitability without these fees.

While we continue to offer royalties and license fees as a component of our compensation to customers who may prefer a CDP-type program, our typical customer engagement no longer requires such fees and often does not include them. Instead of relying upon future royalty payments to recover losses incurred in performing a project, we now seek appropriate compensation primarily through program services fees that are charged upon completion of certain projects or milestones, in each case as contracted with the relevant customer, and, upon occasion, the

payment of one time success fees or commercialization fees when the details of the engagement permit them (for example, when the engagement requires use of our background technology in our customer's end product). In an effort to further improve our profitability and mitigate the potential loss of royalty revenue due to forgoing our prior CDP model, we are independently developing advanced materials for licensing. However, our new business model may not yield the level of profitability expected of our prior CDP model.

Under our new business model, customer engagements are typically 6 to 12 months in duration and maintaining and growing the business requires substantially more marketing and business development resources than under the CDP model. If we cannot begin new customer engagements as old customer engagements are ending, our revenues may fluctuate significantly from quarter to quarter.

Under our new business model, customer engagements typically involve a multi-year umbrella agreement under which our customer may have multiple active projects and can easily add new projects, if desired. Most projects are 6 to 12 months in duration. While our new approach has reduced our typical sales cycle for new customer engagements from 9 to 24 months to 3 to 12 months, the lack of multi-year projects requires a robust sales pipeline of customers to ensure that new projects begin as current projects end. Given the importance of current projects to our customers, it can be difficult to focus a customer on the next project in a timely manner in order to secure it without a gap between the end of one project and the beginning of the next. Also, customers may have no further need for us once a particular project ends. As a result of these changes to our business model, our reported backlog will likely be substantially reduced, and the success of our business will depend largely on our ability to constantly grow and refresh our sales opportunities.

Our operating results may fluctuate from quarter to quarter, which may make it difficult to predict our future performance.

Our revenue, expenses and operating results have fluctuated, and may in the future continue to fluctuate significantly from quarter to quarter due to a number of factors, many of which are outside our control. Factors that may contribute to these fluctuations include the following, as well as other factors described elsewhere in this Form 10-K:

- our dependence on a limited number of customers;
- the nature and length of our sales cycles for customer engagements, which make it difficult to predict the timing of new or expanded customer engagements;
- the additional development required by our customers to integrate technology developed under our prior CDPs ("CDP Technology") into their products, which makes it difficult to predict the timeframe in which CDP Technology will be available for commercialization;
- fluctuations in the volume and prices of products manufactured and sold by our customers that use or incorporate technology developed under our CDPs ("CDP Products") and that generate licensing and royalty revenue for us;
- our revenue mix, which may vary from quarter to quarter as (i) we enter into new customer arrangements; (ii) existing customer engagements, particularly for significant customers, are completed, extended, contracted or undergo a change in scope; (iii) licensing arrangements take effect; and/or (iv) we enter into IP sale transactions;
- the highly cyclical nature of and price volatility in the semiconductor industry;
- the financial stability of any of our customers;
- the timing and extent to which we enter into new customer engagements or complete, extend the duration, expand the scope or reduce the duration or scope of existing customer engagements;
- non-cash charges relating to stock-based compensation, amortization of intangible assets, write-down expenses related to inventory, and impairment expenses related to long-lived assets and our IP portfolio;
- any involvement in significant litigation, and in particular IP litigation;

- timing of our receipt of revenue under contracts included in backlog;
- any payments resulting from our IP indemnification policies and obligations;
- any need for significant additional capital to finance our business;
- any delay in shipments caused by shortages of components used or incorporated in program services, design errors, manufacturing problems, or other difficulties or delays in completing contracted results; and
- business interruptions such as power outages, earthquakes and other natural disasters.

You should not rely on quarter-to-quarter comparisons to predict our future performance. Unfavorable changes in any of these or other factors may adversely affect our business, financial condition and results of operations.

We have incurred operating losses since our inception and may not be able to achieve or maintain sustained profitability

We have generated net losses each year since our inception, including \$3.4 million, \$10.4 million and \$15.4 million for the fiscal years ended December 31, 2018, 2017 and 2016, respectively. Our accumulated deficit as of December 31, 2018 was \$181.7 million. We will need to significantly increase revenue and operating margins to achieve sustained profitability, which we may not be able to accomplish.

Our ability to achieve and maintain profitability will depend, in large part, on our success in transitioning to our new business model, as well as the other risk factors in this Item 1A.

We may be unable to achieve broad customer acceptance of our HPC platform and approach as an alternative to conventional research and development activities.

Historically, semiconductor companies have conducted R&D activities internally using conventional research methods, and they have vigorously protected the confidentiality of their R&D activities. In order for us to increase revenue, we must convince these companies that our technology and capabilities justify collaborating with us on their basic R&D programs. This may require us to make significant investments in the expansion of our sales and marketing efforts. We must also convince potential customers in industries outside of the semiconductor industry that our HPC platform and approach are useful tools in their field. We may not achieve the levels of customer acceptance necessary for us to maintain and grow a profitable business. Failure to achieve the necessary customer acceptance to extend or add current or new customer relationships would adversely affect our revenue and profitability.

We depend on a limited number of customers, and a loss of any of them, or a significant reduction in revenue from any of them, would adversely affect our business, financial condition and results of operations.

Our customer base is highly concentrated. Revenue has historically come from a few customers, and we expect that revenue from a small number of customers will continue to account for a high percentage of our revenue for the foreseeable future. Our three largest customers accounted for 83% of our revenue in the fiscal year ended December 31, 2018, 79% of our revenue in the fiscal year ended December 31, 2017, and 65% of our revenue in the fiscal year ended December 31, 2016.

For each of the fiscal years ended December 31, 2018, 2017 and 2016, our largest customer during such year accounted for 57%, 57% and 38% of our revenue, respectively. Our concentration of customers is somewhat a reflection of the concentrated nature of manufacturers in the DRAM, flash memory and complex logic markets, and our revenue is and may continue to be heavily reliant on key high-volume customers. The loss of any of these customers or a decrease or delay in the manufacturing or sales volumes of the program services, or a renegotiation of any licensing or royalty revenue owed to us by our customers, or their failure to pay amounts due to us or renew, extend or maintain their existing relationships with us, and the related impact on our future anticipated licensing and royalty revenue, would materially and adversely affect our business, financial condition and results of operations,

and we may not be able to replace the business from these customers. Additionally, any significant decrease in revenue from one or more key customers may require reductions in our employee workforce, which could reduce our ability to grow as well as expose us to an increased risk of employment and labor claims against us.

As an example, in June 2018, our customer, Samsung, opted to reduce the scale of development work related to NVM under its CDP with us, which resulted in a reduction in the scope of R&D activities and associated revenue in 2018, and Guardian notified us they would not extend the term of our CDP with them after their scheduled contract expiration on January 31, 2017, which had an adverse impact on our revenue in 2017. If additional customers do not renew their contracts with us, our business, financial condition and results of operations would be adversely affected.

The semiconductor industry is highly cyclical, subject to significant downturns, price volatility, and other dynamics that make the industry very unpredictable. These factors can have a material adverse impact on our business both directly, and indirectly through the impact on our customers in the industry.

The semiconductor industry is highly cyclical and has been subject to significant economic downturns at various times, characterized by diminished product demand, accelerated erosion of average selling prices and production overcapacity. The semiconductor industry also periodically experiences increased demand and production capacity constraints. The timing and length of these cycles is extremely difficult to predict, which makes it challenging for us to forecast our operating results, make business decisions and identify risks that may affect our business, financial condition and results of operations. In addition, the semiconductor industry has historically experienced price volatility. Because the substantial majority of our revenue comes from customers in the semiconductor industry, we may experience significant fluctuations in operating results due to the cyclical nature and price volatility of the industry.

The industry has also been affected in recent years by uncertainty in the credit markets. In addition, future uncertainty may cause sudden changes in our customers' manufacturing capacity requirements and spending, which depend in part on capacity utilization, demand for products using or incorporating our technology by consumers, inventory levels relative to demand, and access to affordable capital.

Industry consolidation (including but not limited to the transition of semiconductor manufacturing to foundries and large-scale manufacturers, and the subsequent concentration of research and innovation in manufacturing process development) has increased in recent years, and we may continue to see consolidation in the future. This will likely result in fewer small companies, and more large companies with greater financial resources - companies that may be less likely to become our customers than smaller companies with more limited R&D resources. Furthermore, if any of our CDP customers are acquired, the acquirer may not continue to engage in a CDP with us or may choose to focus its product development and commercialization on technologies not covered by our CDP.

If we are unable to scale our development services to accommodate new customer engagements, our growth prospects would be limited and our business, financial condition and results of operations could be adversely affected.

We have limited space and internal capacity, both in terms of personnel as well as capital equipment resources, to meet new demands from our customers. If the demand for our services and products exceeds our capacity to meet such demand, we may be required to turn down potential opportunities, which would cause us to lose potential revenue, and our potential customers may take their business to a competitor or decide to develop or expand internal R&D capabilities. If we are unable to scale our development services to meet demand, our future growth may be hindered and our business and operating results could be adversely affected.

We may be unable to make the substantial R&D investments required to remain competitive in our business.

The industries we serve require substantial investment in R&D to develop and bring to market new and enhanced technologies and products. To remain competitive, we anticipate that we will need to continue to increase our levels of R&D expenditures to keep pace with the development efforts of our customers. We are continually working to develop and broaden our HPC platform, including our software and informatics capabilities, to address a wider range of markets and customers for multiple applications within our target markets. This is an extremely

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complex and costly process. If we are unable to build new systems, or configure, modify, expand or customize our existing systems for these fields and develop our expertise to support these fields, our business growth might be limited, and our business and results of operations could be materially and adversely affected.

Although we are making progress in certain fields of technology, we have limited expertise and experience in other fields. We may be required to invest significantly greater resources than anticipated in our R&D efforts. If we are unable to develop expertise or experience in these fields, or if the investment of our resources in these fields is unsuccessful, our business and results of operations could be materially and adversely affected.

Our strategy includes conducting proprietary R&D efforts in collaboration with and on behalf of multiple customers. Any failure on our part to adequately protect against potential conflicts of interest and breaches of confidentiality by us would harm our reputation and our relationships with our customers, and our business prospects and operating results would be materially and adversely affected. Moreover, some customers may hesitate to grant us access to their proprietary information, which could impair our ability to provide value for such customers.

Our strategy includes conducting proprietary R&D efforts in collaboration with and on behalf of customers who in some cases may have overlapping interests and technologies. We seek to structure our collaborative agreements and business practices to minimize any potential conflicts among customers and the possibility of any breaches of confidentiality. We may need access to some of our customers' proprietary information, and they may be reluctant to share it with us because of the risk of a potential conflict between us and/or our customers and other potential customers and the risk of a breach of confidentiality. In an effort to address these significant potential conflicts of interest and confidentiality concerns, we have implemented internal restrictions on resource and information sharing. However, we cannot ensure that our existing and potential customers will perceive these measures to be adequate and effective, or that they will be, in all circumstances. Our failure to adequately and effectively address these concerns could result in our inability to attract new customers or retain existing customers, or lead to our having incomplete information with respect to existing customers that could impair our ability to fully address the customers' needs and demonstrate the value of our technology to the customers. Even though we make significant efforts to isolate each development activity from other development activities, we may fail to meet our contractual confidentiality commitments to one or more customers. Moreover, even if we meet these commitments, conflicts of interest between a customer and us, or between or among customers, could nevertheless arise. In either event, we may become involved in a dispute with our customers regarding the solutions developed during the collaboration or the rights to these solutions, including possible litigation. Disputes of this nature could harm the relationship between us and our customers, have a material adverse effect on our ability to retain and to enter into new customer engagements, and cause our revenue and operating results to decline significantly.

Our business strategy requires us to evaluate, integrate and develop elements of our customers' value chains, including development and manufacturing processes. Our ability to evaluate these effectively may sometimes depend on the cooperation from our customers' materials suppliers and equipment manufacturers as well as access to their data and tools. If these third parties do not cooperate with us or provide us access to the necessary data, materials, tools or equipment, we may not be able to deliver effective solutions to our customers, which would adversely affect our business and results of operations.

We have to evaluate multiple elements of our customers' value chains to help them test and develop end products that meet their specifications, including the materials, tools and equipment used by them during the manufacturing process. Our ability to evaluate a customer's value chain effectively may sometimes depend on cooperation from such customer's materials suppliers and equipment manufacturers and on access to their data and tools. Our evaluation of the materials and equipment in the value chain must be unbiased to maintain credibility with our customers, and our evaluation sometimes results in recommendations that our customers change materials and tools providers or equipment manufacturers. Our recommendations may negatively impact our relationships with materials and tools

providers and equipment manufacturers. Tensions in our relationships with these providers and manufacturers may cause these parties to limit or deny our access to their newest materials and equipment, which would in turn limit our ability to complete our development activities with our customers or control the quality of the combinatorial methods applied to our development efforts on their behalf, which would adversely affect our business and operations.

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Our future growth may present challenges to our management and administrative systems and resources, which could adversely affect our business, financial condition and results of operations.

In order to successfully expand our business we will need to grow in all operational areas and to successfully integrate new employees. In particular, we expect growth as we expand our R&D capacity for current and additional customer engagements. The expansion of our business may place a strain on our management, as well as our operational systems and facilities, which may make it difficult for us to implement our business strategy. We have experienced employment and labor claims against us by our employees in the past, and we may experience such claims in the future.

To effectively manage our operations and any future growth, we must continue to expend funds to enhance our operational, legal, financial and management controls, reporting systems and procedures, and to attract and retain sufficient numbers of talented employees. If we are unable to implement these enhancements efficiently, effectively and quickly, we will not be able to successfully grow our business in the future. Our future operating results will also depend on our management's ability to:

- improve our sales, marketing and customer support programs;
- improve our R&D efforts;
- enhance our operational and financial control systems;
- expand, train and manage our employee base and promptly replace departing employees with key skills; and
- effectively address new issues related to our growth as they arise.

We may not manage our expansion successfully, which could materially and adversely affect our business, financial condition and results of operations.

Acquisitions, strategic investments, joint ventures or strategic asset sales may harm our business and operating results, cause us to incur debt or assume contingent liabilities, or dilute our stockholders.

We have made and may in the future make strategic investments, acquisitions, asset sales, or enter into joint ventures with third parties where there is an opportunity to expand the potential applications and reach of our capabilities, including our HPC platform. Exploring and implementing any investments, acquisitions, asset sales or joint ventures may place strain upon our ability to manage our future growth and may divert management attention from our core businesses. There are also other risks associated with this strategy. We cannot assure you that we will be able to make investments, acquire businesses or sell assets on satisfactory terms, that any business acquired by us or in which we invest will be integrated successfully into our operations or be able to operate profitably, or that we will be able to realize any expected growth, synergies or benefits from such investments, acquisitions, sales or joint ventures.

Our relative inexperience in effecting such transactions heightens these risks. In addition, to finance any acquisitions, investments or joint ventures, we may utilize our existing funds, or might need to raise additional funds through public or private equity or debt financings. We may be unable to obtain financing to fund future acquisitions or investments on attractive terms, or at all. Additionally, equity financings may result in dilution to our stockholders. We cannot predict the number, timing or size of investments, acquisitions or joint ventures, or the effect that any such transactions might have on our operating results.

We may need additional capital in the future to finance our business.

Our future capital requirements may be substantial as we continue to develop our business and expand our collaborative development efforts. In particular, we may be required to raise additional capital if we choose to expand our business through strategic investments or acquisitions. Our need for additional capital will depend on many factors, including our rate of revenue growth, our expansion of our sales and marketing activities and overhead

expenses, the timing and extent of our spending to support our R&D efforts and our ability to expand customer engagements in the semiconductor and clean energy industries, whether we are successful in obtaining anticipated levels of payments from customers, the financial stability of our customers, whether we can enter into additional collaborations in our target industries and markets, the progress and scope of collaborative R&D projects

performed by us and our customers, the effect of any acquisitions of other businesses or technologies that we may make in the future, the filing, prosecution, maintenance and enforcement of patent claims, how much we need to develop or enhance our solutions or HPC platform, and any necessary responses to competitive pressures.

If our capital resources are insufficient to meet our capital requirements, and our revenue is insufficient to support any of these activities, then we will have to raise additional funds. If future financings involve the issuance of equity securities, our then-existing stockholders may suffer dilution. If we raise additional future debt financing, we may be subject to restrictive covenants, which would further limit our ability to conduct our business. We may not be able to raise sufficient funds on terms that are favorable to us, if at all. If we fail to raise sufficient funds and continue to incur losses, our ability to fund our operations, take advantage of strategic opportunities, develop products or technologies or otherwise respond to competitive pressures could be significantly limited. If this happens, we may be forced to delay or terminate R&D programs, curtail or cease operations, obtain funds through collaborative and licensing arrangements that may require us to relinquish commercial rights, or grant licenses on terms that are not favorable to us. If adequate funds are not available, we may not be able to successfully execute our business plan or continue our business.

If we lose one or more of our key personnel without obtaining adequate replacements in a timely manner, or if we are unable to retain and recruit skilled personnel, our operations could become disrupted and the growth of our business could be delayed or restricted.

Our success depends, in large part, on the continued contributions of our senior management team. None of our senior management is bound by written employment contracts to remain with us for a specified period. The loss of any of our senior management could harm our ability to implement our business strategy and respond to the rapidly changing market conditions in which we operate. Upon hiring or promotion, new senior management personnel must spend a significant amount of time learning our technology, business model and management systems and their new roles, in addition to performing their regular duties.

Accordingly, we may experience disruption to our ongoing operations. Moreover, the loss of a member of our senior management or our professional staff would require the remaining management to divert attention to seeking a replacement.

Our future success and competitiveness depends on our ability to retain and motivate our unique team of highly skilled scientists and engineers, and to recruit and hire similarly qualified replacements for any who leave the company. These scientists and engineers have expertise across various disciplines, fields and technologies, including engineering, materials science, process development and integration, equipment, device process technologies and device integration. In addition, as we grow, we will have to continue to retain, attract and motivate qualified and talented personnel, including our scientists and engineers, management, sales and marketing and legal and finance personnel. The loss of key scientists or engineers or other personnel could have an adverse effect on our ability to deliver results to a customer in a timely manner or at all. We do not know whether we will be able to retain all of these employees or hire appropriate replacements for any who leave the company, as we continue to pursue our business strategy. Competition for personnel is intense in the Silicon Valley.

We may encounter difficulties in hiring qualified scientists and engineers because there is a limited pool of scientists and engineers with the specialized expertise required to understand and implement our platform in conjunction with our customers. Further, we may have difficulty or delays in obtaining visas permitting entry for some of our employees who are foreign nationals into the United States, and in obtaining visas permitting entry into other key countries for several of our key personnel, which could disrupt our ability to strategically locate our personnel. The loss of the services of key employees or our inability to retain, attract and motivate qualified scientists and engineers could have a material adverse effect on our business, financial condition and results of operations.

If we cannot compete successfully in our industry, our results of operations and financial condition would be adversely affected.

Competition in our markets may intensify in the future, which could slow our ability to grow or execute our strategy and could lead to increased pricing pressure, negatively impacting our revenue and ability to attain and

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maintain profitability. Our current and potential customers may choose to develop their own methods to accelerate R&D activities, including their own combinatorial development methods, particularly if we are slow in developing or deploying our solutions or improving them to meet market needs. We currently face indirect competition from the internal R&D groups of our current and potential customers, particularly those of our customers who work with us to develop knowledge of combinatorial methods and who may then use our methods independently. They often compete with each other and with us in various applications. Our customers are generally much larger and have significantly greater resources than us. We also face indirect competition from university collaborations, consortia and alliance partnerships. In addition, there may be other providers of high-throughput or combinatorial solutions for the design of and accelerating R&D relating to integrated devices of which we are not aware, and there may be new entrants to the industry in the future, particularly if acceptance of these solutions grows. In addition, we believe that the demand for solutions that address the need for better integration between the design and manufacturing processes may encourage direct competitors to enter into our market. Other potential competitors include fabrication facilities that may decide to offer solutions competitive with ours as part of their value proposition to their customers. If these potential competitors change the pricing environment or are able to attract industry partners or customers faster than we can, we may not be able to grow and execute our strategy as quickly or at all.

Compliance with environmental, health and safety laws and regulations could increase costs or cause us to incur substantial liabilities.

We are subject to various foreign, federal, state and local environmental laws and regulations governing emissions and discharges of hazardous materials into the air and water; the use, generation, storage, handling, transportation and disposal of, and exposure to, hazardous materials and wastes; remediation of contamination; and employee health and safety. In addition, under certain of these environmental laws, liability can be joint and several and without regard to comparative fault. Our operations involve the use of hazardous materials and produce hazardous waste, and we could become liable for any injury or contamination that could arise due to such use or disposal of these materials. Failure to comply with environmental laws and regulations could result in the imposition of substantial civil and criminal fines and sanctions, could require operational changes or limits or the installation of costly equipment or otherwise lead to third party claims. Future environmental laws and regulations, stricter enforcement of existing laws and regulations, or the discovery of previously unknown contamination or violations of such laws and regulations could require us to incur costs or become the basis for new or increased liabilities, which could impair our operations and adversely affect our business and results of operations.

Global or regional economic, political and social conditions and foreign currency exchange rates could adversely affect our business, financial condition and results of operations.

We operate in multiple jurisdictions throughout the world and are subject to foreign business, political and economic risks. In particular, we are subject to risks arising from adverse changes in global economic conditions. Global economic uncertainties in the key markets of many of our customers may cause our customers to delay or reduce R&D and technology purchases and investments. The impact of this on us is difficult to predict, but if businesses require fewer program services, or if consumers defer purchases of new products that use or incorporate technology developed under our program services and CDPs, our revenue could decline. A decline in revenue would have an adverse effect on our results of operations and our financial condition.

In addition, our largest customers are located in Asia, which further exposes us to foreign risks. Also, a substantial portion of the consumer products market that serves as the end-market for the products we help our customers to develop is located in Asia. As a result, our operations are subject to substantial influence by political and economic conditions. Reduced end user demand as well as disruptions to the supply chain for our customers resulting from these or other events could lead to a reduction in our revenue and an adverse impact on our financial condition. Our licensing and royalty revenue is derived from sales of products that use or incorporate technology developed under our

CDPs. To the extent that sales for these products are denominated in U.S. dollars, the currency conversion and foreign exchange laws and regulations in the foreign countries in which we do business may delay or preclude us from receiving payment from our customers, which would have an adverse impact on our operations and financial condition. Additionally, to the extent that sales for these customer products are denominated in a foreign currency, an increase in the value of the U.S. dollar relative to such foreign currencies could also adversely affect our licensing and royalty revenue irrespective of the volume of such products sold, which could adversely affect our business and operating results.

We expect that a significant portion of our total future revenue will continue to be derived from companies based in foreign countries. If the U.S. dollar increases in value relative to the currencies in any of these countries, the cost of our program services and CDPs, which have historically been billed in U.S. dollars, will be more expensive to existing and potential customers in those countries, which could adversely affect our ability to generate new or expand existing program services and CDPs.

We are also subject to general geopolitical risks in connection with international operations, such as political, social, and economic instability, terrorism, interference with information or communication of networks or systems, potential hostilities, changes in diplomatic and trade relationships, and disease outbreaks, and any disruptive effect these events would have on our business operations. Although to date we have not experienced any material adverse effect on our operations as a result of these types of factors, we cannot assure investors that these factors will not have a material adverse effect on our business, financial condition, and operating results or require us to modify our current business practices. Inconsistencies among, and unexpected changes in, a wide variety of foreign laws and regulatory environments with which we are not familiar, including, among other issues, with respect to employees, currency controls, foreign exchange, protection of our intellectual property, and a wide variety of operational regulations and trade and export controls under domestic, foreign, and international law may also have unexpected, adverse impacts on our operations and financial condition.

Business interruptions could delay or prevent our business activities, which could have a material adverse effect on our business, financial condition and results of operations.

Our headquarters are located in the San Francisco Bay Area near known earthquake fault zones and are vulnerable to significant damage from earthquakes. We are also vulnerable to other types of natural disasters and other events that could disrupt our operations, such as cybersecurity breaches, terrorist acts and other events that may be beyond our control. We do not carry insurance for earthquakes and we may not carry sufficient business interruption insurance to compensate us for losses that may occur. Our business can be interrupted by a number of factors, including unexpected repairs and maintenance at our San Jose facility. Our business can also be impacted if our customers experience business interruptions as a result of natural disasters or other disruptive events. Any losses or damages we or our customers incur could have a material adverse effect on our cash flows and success as an overall business.

Our customers may not be successful in commercializing products that use or incorporate technology and IP developed under our CDPs with them.

While CDPs are no longer the focus of our customer engagement strategy, we continue to offer CDP-type programs for customers who prefer this model. However, we may not achieve significant revenue or profitability from a CDP-type program if the project to which we have devoted technology and significant resources fails to produce any measurable success or value to our customers in the form of differentiated technology and IP.

Further, even if we are successful in developing valuable technology for our CDP customers, they still face significant challenges in commercializing products that use or incorporate the technology. The markets for products related to our CDPs are intensely competitive and are characterized by rapid technological change. These changes result in frequent product introductions, short product life cycles and the necessity of continually increasing product capabilities. We cannot assure you that our CDP customers will dedicate the resources necessary to successfully execute their business strategies for these products. Our CDP customers are not contractually obligated to us to make or sell any CDP Products. They may not have the financial strength to cost-effectively manufacture the CDP Products at high volume and in quantities sufficient to meet demand, or the competitiveness to price, market and sell the CDP Products in intensely competitive markets. They may experience delays in shipments caused by shortages of components incorporated in the CDP Products, design errors or other manufacturing problems associated with the CDP Products. A decline in demand or average selling prices in the end markets for CDP Products could result in declining sales

revenue for our customers and could adversely affect our business and results of operations. Any failure of a customer to achieve market success for CDP Products could also negatively affect the customer's willingness to work with us on other collaborations and could more generally harm our reputation and business prospects. Even if a CDP customer is able to successfully commercialize a CDP Product, there may be a significant delay before we receive any licensing or royalty revenue due to the complexities inherent in production and manufacturing in our customers' target markets.

Existing and potential CDP customers may be resistant to paying license and royalty fees, and we may face challenges in monitoring and enforcing royalty agreements with existing customers.

Our royalty-bearing licenses with our CDP customers lay the framework for ongoing royalty revenue from CDP Products. Although our R&D activities under CDPs generate revenue for us, in order to achieve profitability we must be able to structure, negotiate and enforce agreements for the calculation and payment of higher-margin license and royalty revenue. Unless we adequately demonstrate the value of our platform to our customers and potential customers, we may face resistance to structuring royalty arrangements in the future that are acceptable to us, or our customers and our potential customers may not agree to enter into royalty-bearing licenses with us at all.

If we are able to negotiate royalty-bearing agreements, we will need to rely on our customers to make royalty payments on a timely basis. Licensing and royalty revenue we may receive in the future may be based on sales of CDP Products. In order to accurately report our financial results on a timely basis, we will need to receive timely, complete and accurate information from our customers regarding their sales and resulting payments they owe us.

If the information that we receive is not timely, complete or accurate, we may not receive the full amount of revenue to which we are entitled under these arrangements on a timely basis, which could result in adjustments to our financial results in a future period. Although we typically have audit rights with these customers, performing this type of audit could be harmful to our collaborative relationships, expensive and time-consuming and may not be sufficient to reveal any discrepancies in a timeframe consistent with our financial reporting requirements.

If a CDP to which we have devoted technology and significant resources fails to produce any measurable success or value to our customer in the form of differentiated technology and intellectual property that our customer can successfully commercialize, we may not earn licensing and royalty revenue sufficient to recover our upfront investment in the CDP, which could adversely affect our revenue and profitability.

As discussed above, while CDPs are no longer the focus of our customer engagement strategy, we continue to offer CDP-type programs to customers who prefer the CDP model. Under the CDP model, we are compensated with program revenues during the development stage, and we are owed royalties or success fees upon the successful commercialization of Program technology. The program revenue we receive from our customers during the development stage often is not sufficient for us to fully recover our costs and cash invested in HPC platforms dedicated to customer engagements, and the CDP business model relies on licensing and royalty revenue based on the sales by our customers in the end-markets of CDP Products. Our CDPs involve complex R&D, and our ability to develop the differentiated technology and intellectual property sought by our customers is inherently uncertain and difficult to predict, as is our customers' ability to commercialize such technology in a timely manner. If a CDP fails to produce any measurable value to a customer, or if we are otherwise not successful in maintaining and managing a CDP, we may not receive sufficient amounts of licensing and royalty revenue to recover our upfront investment in the CDP. Even if we are successful in delivering CDP Technology that a customer is able to commercialize, we will need to rely on our customers to bring the CDP Technology to market and to make royalty payments on a timely basis. Some of our CDP agreements include provisions that require minimum annual royalty payments to maintain exclusivity, and a customer may elect to forego such minimum payments and exclusivity, for example, if commercialization of the CDP Technology is delayed or uncertain. Licensing and royalty revenue we may receive in the future may be based on sales of CDP Products. In order to accurately report our financial results on a timely basis, we will need to receive timely, complete and accurate information from our customers regarding their sales and resulting payments they owe us. If the information that we receive is not timely, complete or accurate, we may not receive the full amount of revenue to which we are entitled under these arrangements on a timely basis, which could result in adjustments to our financial results in a future period. Although we typically have audit rights with these customers, performing this type of audit could be harmful to our collaborative relationships, expensive and time-consuming and may not be sufficient to reveal any discrepancies in a timeframe consistent with our financial

reporting requirements.

Our ability to use our net operating loss carryforwards to offset future taxable income, and our ability to use our tax credit carryforwards, may be subject to certain limitations.

In general, a corporation that undergoes an “ownership change” under Section 382 of the Internal Revenue Code is subject to limitations on its ability to utilize its pre-change net operating loss carryforwards (NOLs) to offset

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future taxable income and its ability to utilize tax credit carryforwards. As of December 31, 2018, we reported U.S. federal NOLs of approximately \$69.6 million. In general, an “ownership change” occurs if the aggregate stock ownership of certain stockholders (generally, 5% shareholders, applying certain aggregation and look-through rules) increases by more than 50 percentage points over such stockholders' lowest percentage ownership during the testing period which is generally, three years.

We experienced an ownership change on December 31, 2014 and utilization of NOL carryforwards will therefore be subject to annual limitation, pursuant to Internal Revenue Code Section 382. Our ability to use our remaining NOL carryforwards may be further limited if we experience a Section 382 ownership change in connection with future changes in our stock ownership.

Recent U.S. tax legislation and future changes to applicable U.S. or foreign tax laws and regulations may have a material adverse effect on our business, financial condition and results of operations.

We are subject to income and other taxes in the U.S. and foreign jurisdictions. Changes in laws and policy relating to taxes or trade may have an adverse effect on our business, financial condition and results of operations. For example, the U.S. government recently enacted significant tax reform, and certain provisions of the new law may adversely affect us. Changes include, but are not limited to, a federal corporate tax rate decrease from 34% to 21% for tax years beginning after December 31, 2017, the transition of U.S. international taxation from a worldwide tax system to a more generally territorial system, and a one-time transition tax on the mandatory deemed repatriation of foreign earnings. The legislation is unclear in many respects and could be subject to potential amendments and technical corrections, and will be subject to interpretations and implementing regulations by the Treasury and Internal Revenue Service, any of which could mitigate or increase certain adverse effects of the legislation. In addition, it is unclear how these U.S. federal income tax changes will affect state and local taxation. Generally, future changes in applicable U.S. or foreign tax laws and regulations, or their interpretation and application could have an adverse effect on our business, financial conditions and results of operations.

Specific Risks Relating to Our Intellectual Property

We may be unable to effectively protect or monetize our intellectual property, which would negatively affect our ability to compete.

We depend on our proprietary HPC platform for our success and ability to compete. If others are able to reproduce our technology, our business will suffer significantly unless we can prevent them from competing with us. As of December 31, 2018, we owned or had exclusive licenses to 410 U.S. patents and patent applications (some of which also have foreign counterparts), which we believe protect our rights in our HPC platform and our rights in the technology developed internally and under our customer engagements. While we have been filing patent applications to seek protection for the further advancements of our HPC platform, patent laws provide only limited protection. Furthermore, we may not be able to sustain the high rate of patenting we maintained in the previous three years due to the expense and resource-intensiveness of the patenting process. Finally, we actively manage our patent portfolio and regularly discontinue pursuing patent protection for inventions we believe are not or will not be commercially relevant or significant, and we could be mistaken in our judgments about which patents are valuable and which are not.

For these and other reasons, we cannot assure you that we have sought or that we will seek patent protection of all our rights in our HPC platform and our rights in the technology developed internally and under our customer engagements in all jurisdictions. We also cannot assure you that all maintenance fees have been paid or that all filings have been made with the appropriate regulatory or governmental authorities with respect to any IP rights (including patents) registered or applied for outside of the U.S. In addition, patent protection in foreign countries may be limited or unavailable where we need this type of protection.

The patent positions of technology companies, including ours, are often uncertain and involve complex legal and factual questions. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our proprietary technologies are covered by valid and enforceable patents, or are effectively maintained as trade secrets or other forms of legal protection. We apply for patents covering our HPC platform and further advancements of our HPC platform as we deem appropriate. However, we may not obtain patents on all

inventions for which we seek patents. Further, any patent claims we file for may be challenged during prosecution or any patent claims we are issued may be challenged after issuance. This may result in the claims being narrowed in scope or extinguished as a result of these challenges. Additional uncertainty may result from the recent and ongoing consideration and passage of patent reform legislation by the United States Congress, legal precedent as handed down by the United States Federal Circuit and Supreme Court as they determine legal issues concerning the scope and construction of patent claims, and inconsistent interpretation of patent laws by the lower courts. For these reasons, among others, our existing patents and any future patents we obtain may not be sufficiently effective in preventing others from practicing our technologies or from developing similar or superior products. In that case, our revenue and operating results could decline.

Historically, our customer engagement strategy included obtaining patent protection for technology developed for our customers under CDPs, and a portion of our revenue from our CDP customers derives from the licenses granted by us to our customers under these patents. In certain instances our ability to obtain patent protection may require customer approval. If the customer does not provide its approval, we cannot proceed with patent protection and the technology will be subject to trade secret protection only. If we are unable to obtain patent protection, we would not be able to enforce patent rights to the technologies in question. While the CDP model remains available to customers who prefer it, our baseline customer engagement strategy no longer includes a patent licensing component but instead relies upon program services fees.

In most instances, with respect to patents obtained for technology developed in collaboration with our customers, we grant our customers an exclusive license within a specific field-of-use under these patents thus reserving for us the right to grant licenses to third parties outside such field-of-use. In some cases, our customers must pay minimum annual royalties to maintain exclusivity, and the failure to make such minimum payments results in the license becoming non-exclusive. While a license is exclusive, we cannot grant licenses to third parties within the customer's exclusive field-of-use and may not be able to grant such third party licenses outside the field-of-use, which would not allow us to realize additional revenue from licensing such patents.

We have developed in the past, and may develop in the future, patented technology with U.S. federal government funding. When new technologies are developed with U.S. government funding, the government obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention for non-commercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise "march-in" rights to use or allow third parties to use our patented technology. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the U.S. government-funded technology, because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations, or to give preference to U.S. industry. In addition, U.S. government-funded technology may be subject to restrictions on transfer to foreign entities, and some U.S. government-funded data may be subject to public disclosure under the Freedom of Information Act.

Many of our customers and competitors have significant operations outside the United States. However, foreign laws may not afford us sufficient protections for our intellectual property, and we may not always seek patent protection outside the United States. We believe that our success depends, in part, upon our ability to obtain international protection for our IP rights. However, the laws and judicial systems of some foreign countries may not be as comprehensive as those of the United States and may not be sufficient to protect or enforce our proprietary rights abroad. Accordingly, our international competitors could obtain foreign patent protection for, and market overseas, products and technologies for which we are seeking patent protection in the United States, and may also be able to successfully enforce such patents in such foreign countries against us or against our customers.

Confidentiality agreements with employees and others may not adequately prevent disclosures of trade secrets and other proprietary information.

We rely in part on confidentiality and trade secret protection to protect our confidential and proprietary information and processes. However, trade secrets are difficult to protect. We have taken measures to protect our trade secrets and proprietary information, but these measures may not be effective. We require new employees and consultants to execute confidentiality agreements upon the commencement of an employment or consulting arrangement with us. These agreements generally require that all confidential information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept

confidential and not disclosed to third parties. These agreements also generally provide that all rights in and to the inventions conceived by the individual in the course of rendering services to us shall be assigned to us. Nevertheless, employees, collaborators or consultants may still disclose or misuse our confidential information, and we may not be able to meaningfully protect such information or our trade secrets. In addition, others may independently develop substantially equivalent information or techniques or otherwise lawfully gain access to our trade secrets, and thereafter communicate this information to others without maintaining its confidentiality. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection or enforce our trade secrets could adversely affect our competitive business position.

Significant litigation over intellectual property in the industry may cause us to become involved in costly and lengthy litigation, which could subject us to liability, require us to stop licensing our developed technology or force us to develop new technology.

Whether or not patents are granted to us, litigation may be necessary to enforce our IP rights, to defend against a claim of infringement of IP rights of others or to determine the validity and scope of our proprietary rights or the proprietary rights of others. Because infringement is a fact-intensive inquiry, and because patent applications in the United States and many foreign jurisdictions are typically not published until eighteen months after filing (or, in some cases, are not published until they issue as patents), we cannot be certain that we do not now, and will not in the future, infringe a third party's patent rights. We may also become party to claims by our customers to IP rights developed by us in connection with a CDP. If our customers become involved in disputes with third parties over allegations that our customers' practice of our IP rights infringes the IP rights of such third parties, it may also become necessary for us to become involved in such disputes.

Any claim, even if without merit, could be time consuming to defend, result in costly litigation, or require us to enter into licensing agreements, resulting in unexpected operating costs and reduction in our operating profit. Moreover, our opponents in any litigation may have significantly more resources with which to defend against or assert claims in the litigation. A successful claim of infringement against us in connection with the use of our technologies could force us to stop using our technologies that incorporate the infringed IP; pay substantial monetary damages or royalties; grant cross-licenses to third parties relating to our own IP; obtain a license from the owner of the infringed IP, which may not be available to us on acceptable terms or at all; or re-engineer our platform or products to avoid further IP infringement, which may be technically impossible or commercially infeasible. The occurrence of any of these eventualities could adversely affect our business. Even if we are successful in defending such a claim, litigation could also divert our resources, including our managerial and engineering resources. Any infringement claim or other litigation against or by us could have a material negative effect on our business.

Our intellectual property indemnification policies and obligations may adversely impact our business and operating results.

A third party asserting ownership or other rights to technology developed under our customer engagements could result in our customers becoming the target of litigation, and we may be bound to indemnify our customers under the terms of our license agreements. These obligations could result in substantial expenses to us, which could have a material adverse effect on our business, financial condition and results of operations. In addition to the time and expense required for us to satisfy our support and indemnification obligations to our customers, any litigation could severely disrupt or shut down the business of our customers, which in turn could damage our relations with them and have a material adverse effect on our reputation, business, financial condition and results of operations.

Risks Related to Ownership of Our Common Stock

Our stock price may be volatile, which may cause the value of our common stock to decline and subject us to securities class action litigation.

The market price of our common stock could be subject to significant fluctuations. The stock markets in general have experienced price and volume fluctuations that have affected, and continue to affect, the market prices of equity securities of many companies. A portion of most future fluctuations in our stock price will likely be related to the risk factors described in this section. However, price fluctuations may be disproportionate, or even unrelated,

to our operating performance. In the past, many companies that have experienced volatility in the market price of their stock have become subject to securities class action litigation. We may be the target of this type of litigation in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business. Factors that could contribute to volatility in our stock price include but are not limited to the following:

- fluctuations in our financial results or outlook, or those of our customers or of companies perceived to be similar to us;
- changes in estimates of our financial results or recommendations by securities analysts;
- changes in market valuations of similar companies;
- changes in our capital structure, such as future issuances of securities or the incurring of debt;
- announcements by us or our competitors of significant contracts, acquisitions or strategic alliances;
- litigation involving us, our general industry or both;
- additions or departures of key personnel;
- regulatory developments in the U.S., countries in Asia, and/or other foreign countries;
- significant fluctuations in daily trading volume of our stock due to selling of large blocks of stock by significant stockholders;
- investors' general perception of us; and
- general economic and political conditions in the U.S. and globally, such as recessions, interest rate changes and international currency fluctuations.

The bid price of our common stock closed below \$1.00 per share on multiple days during 2018, and we cannot assure investors that we will be able to remain in compliance with the continued listing requirements of the Nasdaq Global Select Market.

Our common stock is listed on the Nasdaq Global Select Market (Nasdaq), and as such, is subject to various requirements for continued listing under the rules of the Nasdaq Stock Market (the Listing Rules), including the \$1.00 per share minimum bid price requirement set forth in Rule 5450(a)(1) of the Listing Rules (the Bid Price Requirement). Under Rule 5810(c)(3)(A) of the Listing Rules, we will be found in violation of the Bid Price Requirement if the bid price of our common stock closes below \$1.00 per share for 30 consecutive business days. In December 2018, we received a letter from the listing qualifications department of Nasdaq indicating that for 30 consecutive business days our common stock did not maintain a minimum closing bid price of \$1.00 (Minimum Bid Price Requirement) per share as required by Nasdaq requirements. While Nasdaq confirmed in January 2019 that we had regained compliance with the Minimum Bid Price Requirement, if we are unable to maintain compliance with the Bid Price Requirement in the future, we may be required to take remedial actions in order to avoid delisting. If our common stock is delisted from Nasdaq, we could be required to list on the OTC (over-the-counter) market, which may adversely affect the price and trading liquidity of our common stock. Delisting from the Nasdaq may have other negative results, including the potential loss of confidence in us by suppliers, customers and employees, the loss of institutional investor interest, fewer business development opportunities and greater difficulty in obtaining financing on favorable terms or at all.

The concentration of our capital stock ownership by our executive officers, directors and 5% stockholders will limit your ability to influence corporate matters.

Our executive officers, directors, current five percent or greater stockholders and entities affiliated with them together beneficially owned more than 50% of our common stock outstanding as of December 31, 2018. Based on public filings and our internal records, entities affiliated with Raging Capital Management, LLC (Raging Capital) beneficially owned approximately 29.6% of our common stock outstanding as of December 31, 2018, and Neil S. Subin and Redpoint Ventures also each beneficially owned more than 5% of our common stock outstanding as of such date. This significant concentration of share ownership may adversely affect the trading price for our common

stock because investors often perceive disadvantages in owning stock in companies with concentrated stock ownership. Also, these stockholders, acting together, will be able to influence our management and affairs and determine the outcome of matters requiring stockholder approval, including the election of directors and the approval of significant corporate transactions, such as mergers, consolidations or the sale of substantially all of our assets, and their interests may differ from those of our other stockholders. Consequently, this concentration of ownership may have the effect of delaying or preventing a change of control, including a merger, consolidation or other business combination involving us, or discouraging a potential acquirer from making a tender offer or otherwise attempting to obtain control, even if that change of control would benefit our other stockholders.

A significant portion of our total outstanding shares may be sold into the public market at any given time, which could cause the market price of our common stock to drop significantly.

If our existing stockholders sell, or if the market believes our existing stockholders will sell, substantial amounts of our common stock in the public market, the market price of our common stock could decline significantly. As of December 31, 2018, we had 49.8 million shares of common stock outstanding. All of these shares can be resold at any time, subject in some cases to the volume limitations and other restrictions of Rule 144 promulgated under the Securities Act of 1933, as amended (the Securities Act) and upon the lapse of our right of repurchase with respect to any unvested shares. Certain of our officers and directors may sell shares from time to time pursuant to 10b5-1 automated sales plans, and investors may react negatively to any insiders disposing of shares of our stock.

In addition, as of December 31, 2018, the holders of approximately 8.2 million shares of our common stock are entitled to certain rights with respect to the registration of such shares under the Securities Act. If we register such shares of common stock, these stockholders could sell those shares in the public market without being subject to the volume and other restrictions of Rule 144.

We also registered approximately 19.5 million shares of our common stock reserved for issuance under our equity plans. These shares can be freely sold in the public market upon issuance, subject to vesting restrictions described above.

If securities or industry analysts do not publish or cease publishing research or reports about us, our business or our market, or if they change their recommendations regarding our stock adversely, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts may publish about us, our business, our market or our competitors. If any of the analysts who cover us change their recommendations regarding our stock adversely, or provide more favorable relative recommendations about our competitors, our stock price would likely decline. If any analyst who covers us were to cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Anti-takeover provisions contained in our certificate of incorporation and bylaws, as well as provisions of Delaware law, could impair a takeover attempt.

Our amended and restated certificate of incorporation and our amended and restated bylaws contain provisions that could delay or prevent a change in control of our company. These provisions could also make it more difficult for stockholders to elect directors and take other corporate actions. These provisions include:

- staggered board of directors;

-

authorizing the board to issue, without stockholder approval, preferred stock with rights senior to those of our common stock;

authorizing the board to amend our bylaws and to fill board vacancies until the next annual meeting of the stockholders;

prohibiting stockholder action by written consent;

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- limiting the liability of, and providing indemnification to, our directors and officers;
- eliminating the ability of our stockholders to call special meetings; and
- requiring advance notification of stockholder nominations and proposals.

Section 203 of the Delaware General Corporation Law prohibits, subject to some exceptions, “business combinations” between a Delaware corporation and an “interested stockholder,” which is generally defined as a stockholder who becomes a beneficial owner of 15% or more of a Delaware corporation's voting stock, for a three-year period following the date that the stockholder became an interested stockholder.

These and other provisions in our amended and restated certificate of incorporation and our amended and restated bylaws could discourage potential takeover attempts, reduce the price that investors might be willing to pay in the future for shares of our common stock, and result in the market price of our common stock being lower than it would be without these provisions.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Facilities

Our facilities currently consist of an aggregate of approximately 146,000 square feet of office, research and development clean room space in San Jose, California, pursuant to a lease that expires in 2025. As of December 31, 2018, we were using approximately 68% of the capacity of our clean room space in San Jose. We have historically expanded and invested in our facilities to support the growth of our programs and we expect to be able to continue to do so on commercially reasonable terms as we engage in new programs in the future. We have no reason to believe that additional space that we may need in the future will not be available on commercially reasonable terms.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we may become involved in legal proceedings and claims arising in the ordinary course of our business, including but not limited to legal proceedings and claims brought by employees or former employees relating to working conditions or other issues. We are not currently a party to any legal proceedings the outcome of which, if determined adversely to us, we believe would individually or in the aggregate have a material adverse effect on our business, operating results, financial condition or cash flows.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER REPURCHASE OF EQUITY SECURITIES

Market Information for Common Stock

Our common stock has been listed on The Nasdaq Global Select Market, or Nasdaq, under the symbol "IMI" since our initial public offering on November 18, 2011. The following table sets forth on a per share basis, for the periods indicated, the low and high sale prices of our common stock as reported by Nasdaq.

| | Low | High |
|---|---------|---------|
| For the Fiscal Year Ended December 31, 2018 | | |
| First Quarter | \$ 1.22 | \$ 1.61 |
| Second Quarter | \$ 1.18 | \$ 1.67 |
| Third Quarter | \$ 1.09 | \$ 1.95 |
| Fourth Quarter | \$ 0.90 | \$ 1.25 |

| | Low | High |
|---|---------|---------|
| For the Fiscal Year Ended December 31, 2017 | | |
| First Quarter | \$ 0.92 | \$ 1.15 |
| Second Quarter | \$ 0.80 | \$ 0.98 |
| Third Quarter | \$ 0.86 | \$ 1.05 |
| Fourth Quarter | \$ 1.03 | \$ 1.40 |

As of March 05, 2019, there were approximately 28 holders of record of our common stock. In addition, a substantially greater number of stockholders may be "street name" or beneficial holders, whose shares are held of record by banks, brokers and other financial institutions.

Dividend Policy

We have never declared or paid any cash dividends on our common stock. We currently intend to retain any future earnings for use in the operation and expansion of our business, and do not plan to declare or pay any dividends on shares of our common stock in the foreseeable future. Subject to the foregoing, the payment of cash dividends in the future, if any, will be at the discretion of our board of directors and will depend upon a number of factors, including our earnings, capital requirements, requirements under the Delaware General Corporation Law, restrictions and covenants pursuant to any credit facilities we may enter into, our overall financial condition and any other factors deemed relevant by our board of directors.

Performance Graph

The following graph compares the cumulative 5-year total stockholder return on our common stock (IMI) relative to the cumulative total return of the Nasdaq Composite Index (^IXIC) and Philadelphia Stock Exchange Semiconductor Index (SOX). The graph assumes that the value of the investment in our common stock on December 31, 2013 and in each of the foregoing indices on December 31, 2013 (including reinvestment of dividends, if any) was \$100 and tracks

it each year thereafter on the last trading day of each year through December 31, 2018. The comparisons are required by the SEC and are not intended to forecast or be indicative of possible future performance of our common stock. This graph shall not be deemed "soliciting material" or to be "filed" for

purposes of Section 18 of the Exchange Act or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act or the Exchange Act.

Recent Sales of Unregistered Securities

None.

Recent Purchases of Equity Securities by the Issuer and Affiliated Purchasers

None.

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ITEM 6. SELECTED FINANCIAL DATA

The following selected consolidated financial data should be read together with our consolidated financial statement and accompanying notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations" appearing elsewhere in this Form 10-K. The selected consolidated financial data in this section is not intended to replace our consolidated financial statements and the accompanying notes. Our historical results are not necessarily indicative of our future results.

We derived the consolidated statements of operations data for 2018, 2017, and 2016 and the consolidated balance sheets data as of December 31, 2018 and 2017 from our audited consolidated financial statements appearing elsewhere in this filing. The consolidated statements of operations data for 2015 and 2014 and the consolidated balance sheets data as of December 31, 2016, 2015 and 2014 have been derived from our audited consolidated financial statements not included in this filing. Certain amounts in the prior year's presentations have been reclassified to conform to the current presentation. These reclassifications had no effect on previously reported net income. The data should be read in conjunction with the consolidated financial statements, related notes, and other financial information included herein.

| | Years Ended December 31, | | | | |
|---|--|-------------|-------------|-------------|-------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 |
| | (in thousands, except share and per share amounts) | | | | |
| Consolidated Statement of Operations | | | | | |
| Data: | | | | | |
| Revenue: | | | | | |
| Program revenue | \$31,984 | \$29,010 | \$39,690 | \$33,930 | \$30,624 |
| Licensing and royalty revenue | 1,676 | 8,193 | 7,608 | 11,392 | 17,071 |
| Total revenue | 33,660 | 37,203 | 47,298 | 45,322 | 47,695 |
| Cost of revenue | 10,008 | 12,105 | 15,830 | 19,304 | 24,651 |
| Gross profit | 23,652 | 25,098 | 31,468 | 26,018 | 23,044 |
| Operating expenses: | | | | | |
| Research and development | 17,228 | 21,535 | 28,126 | 28,576 | 24,320 |
| Sales and marketing | 3,256 | 4,019 | 7,383 | 5,881 | 5,770 |
| General and administrative | 7,516 | 9,198 | 10,713 | 12,287 | 12,636 |
| Restructuring | — | 1,351 | 1,114 | — | 1,361 |
| Total operating expenses | 28,000 | 36,103 | 47,336 | 46,744 | 44,087 |
| Loss from operations | (4,348) | (11,005) | (15,868) | (20,726) | (21,043) |
| Other income (expense): | | | | | |
| Interest income (expense), net | 594 | 266 | 173 | (267) | (682) |
| Other income (expense), net | 344 | 337 | 265 | (12) | (29) |
| Total other income (expense), net | 938 | 603 | 438 | (279) | (711) |
| Loss before provision for income taxes | (3,410) | (10,402) | (15,430) | (21,005) | (21,754) |
| Provision for income taxes | 1 | 1 | 7 | 8 | 7 |
| Net loss | (3,411) | (10,403) | (15,437) | (21,013) | (21,761) |
| Net loss attributable to common | | | | | |
| stockholders | \$(3,411) | \$(10,403) | \$(15,437) | \$(21,013) | \$(21,761) |
| Net loss per share of common stock, basic | \$(0.07) | \$(0.21) | \$(0.31) | \$(0.44) | \$(0.47) |

and diluted

Weighted-average number of shares used in

computing net loss per share of common

| | | | | | |
|--------------------------|------------|------------|------------|------------|------------|
| stock, basic and diluted | 49,688,644 | 49,546,959 | 49,395,635 | 48,158,378 | 46,718,495 |
|--------------------------|------------|------------|------------|------------|------------|

Other Data:

| | | | | | |
|-----------------------------|----------|-----------|-------------|-------------|-------------|
| Adjusted EBITDA (unaudited) | \$ 1,766 | \$ (651) | \$ (1,325) | \$ (4,871) | \$ (2,782) |
|-----------------------------|----------|-----------|-------------|-------------|-------------|

| | | | | | |
|-------------------------------|-------------|-------------|--------------|--------------|--------------|
| Adjusted earnings (unaudited) | \$ (2,358) | \$ (7,580) | \$ (10,696) | \$ (15,340) | \$ (14,379) |
|-------------------------------|-------------|-------------|--------------|--------------|--------------|

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| | Years Ended December 31, | | | | |
|---|--------------------------|----------|----------|----------|----------|
| | 2018 | 2017 | 2016 | 2015 | 2014 |
| | (in thousands) | | | | |
| Consolidated Balance Sheet Data: | | | | | |
| Cash, cash equivalents and investments | \$30,449 | \$25,807 | \$27,789 | \$35,332 | \$65,069 |
| Working capital | 28,392 | 25,469 | 27,298 | 32,810 | 62,077 |
| Total assets | 43,393 | 44,309 | 53,168 | 69,677 | 105,437 |
| Long-term debt, including current portion | — | — | — | — | 23,000 |
| Total stockholders' equity | \$34,384 | \$36,073 | \$44,996 | \$56,099 | \$70,265 |

Non-GAAP Financial Measure

We believe that the use of adjusted EBITDA and adjusted earnings, both non-GAAP financial measures, are helpful for an investor in determining whether to invest in our common stock. We include both adjusted EBITDA and adjusted earnings in this Annual Report on Form 10-K because (i) we seek to manage our business to consistent levels of adjusted EBITDA and adjusted earnings, (ii) these measures are a key basis upon which our management assesses our operating performance, (iii) they are primary metrics investors use in evaluating companies' performance in our industry and (iv) they are factors in the evaluation of the performance of our management in determining compensation. We define adjusted EBITDA as net income (loss) less interest, provision for income taxes, depreciation and amortization expense, non-cash impairment charges, restructuring related charges and stock-based compensation expense. We define adjusted earnings as net income (loss) less restructuring related charges and stock-based compensation expense.

We use adjusted EBITDA and adjusted earnings as key performance measures because we believe they facilitate operating performance comparisons from period to period by excluding potential differences caused by variations in capital structures, tax positions (such as the impact of changes in effective tax rates or fluctuations in permanent differences or discrete quarterly items), the impact of depreciation and amortization expense, the impact of non-cash impairment charges, restructuring related charges and the impact of stock-based compensation expense.

We believe adjusted EBITDA and similar measures are widely used by investors, securities analysts, ratings agencies and other interested parties in our industry as a measure of financial performance and debt-service capabilities. Our use of adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for analysis of our results as reported under GAAP. Some of these limitations are:

- Adjusted EBITDA does not reflect our cash expenditures for capital equipment, restructuring related charges or other contractual commitments;
- Although depreciation and amortization are non-cash charges, the assets being depreciated and amortized may have to be replaced in the future, and adjusted EBITDA does not reflect cash capital expenditure requirements for such replacements;
- Adjusted EBITDA does not reflect changes in, or cash requirements for, our working capital needs;
- Adjusted EBITDA does not reflect the interest expense or the cash requirements necessary to service interest or principal payments on our indebtedness;
- Adjusted EBITDA does not reflect certain tax payments that may represent a reduction in cash available to us; and
- Other companies, including companies in our industry, may calculate adjusted EBITDA measures differently, which reduces their usefulness as a comparative measure.

We also believe adjusted earnings and similar measures are also widely used by investors, securities analysts, ratings agencies and other interested parties in our industry as a measure of financial performance and debt-service capabilities. Our use of adjusted earnings has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for analysis of our results as reported under GAAP. Some of these limitations are:

- Adjusted earnings do not reflect our cash expenditures for capital equipment, restructuring related charges or other contractual commitments;
- Adjusted earnings do not reflect changes in, or cash requirements for, our working capital needs; and
- Other companies, including companies in our industry, may calculate adjusted earnings measures differently, which reduces their usefulness as a comparative measure.

Because of these limitations, adjusted EBITDA and adjusted earnings should not be considered as a measure of discretionary cash available to us to invest in the growth of our business. When evaluating our performance, you should consider adjusted EBITDA and our adjusted earnings alongside other financial performance measures, including our net loss and other GAAP results.

The following tables present a reconciliation of adjusted EBITDA and our adjusted earnings to our net loss, the most comparable GAAP measure, for each of the periods indicated:

| Adjusted EBITDA: | Years Ended December 31, | | | | |
|--|--------------------------|------------|------------|------------|------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 |
| | (in thousands) | | | | |
| Net loss | \$(3,411) | \$(10,403) | \$(15,437) | \$(21,013) | \$(21,761) |
| Non-GAAP adjustments: | | | | | |
| Interest (income) expense, net | (594) | (266) | (173) | 267 | 682 |
| Provision for taxes | 1 | 1 | 7 | 8 | 7 |
| Depreciation, amortization, impairment and accretion | 4,717 | 7,194 | 9,537 | 10,728 | 10,908 |
| Restructuring charges | — | 1,351 | 1,114 | — | 1,361 |
| Stock based compensation expense (1) | 1,053 | 1,472 | 3,627 | 5,673 | 6,021 |
| Adjusted EBITDA | \$1,766 | \$(651) | \$(1,325) | \$(4,337) | \$(2,782) |

| Adjusted Earnings: | Years Ended December 31, | | | | |
|--------------------------------------|--------------------------|------------|------------|------------|------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 |
| | (in thousands) | | | | |
| Net loss | \$(3,411) | \$(10,403) | \$(15,437) | \$(21,013) | \$(21,761) |
| Non-GAAP adjustments: | | | | | |
| Restructuring charges | — | 1,351 | 1,114 | — | 1,361 |
| Stock-based compensation expense (1) | 1,053 | 1,472 | 3,627 | 5,673 | 6,021 |
| Adjusted earnings | \$(2,358) | \$(7,580) | \$(10,696) | \$(15,340) | \$(14,379) |

(1) Includes stock-based compensation as follows:

| Years Ended December 31, | | | | |
|--------------------------|------|------|------|------|
| 2018 | 2017 | 2016 | 2015 | 2014 |
| (in thousands) | | | | |

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| | | | | | |
|--------------------------------|---------|---------|---------|---------|---------|
| Cost of revenues | \$170 | \$191 | \$510 | \$1,114 | \$1,315 |
| Research and development | 297 | 373 | 949 | 1,668 | 1,234 |
| Sales and marketing | 121 | 119 | 527 | 651 | 1,470 |
| General and administrative | 465 | 789 | 1,641 | 2,240 | 2,002 |
| Total stock-based compensation | \$1,053 | \$1,472 | \$3,627 | \$5,673 | \$6,021 |

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Our Management's Discussion and Analysis of Financial Condition and Results of Operations (MD&A) is provided in addition to the accompanying consolidated financial statements and notes to assist readers in understanding our results of operations, financial condition, and cash flows. Our MD&A is organized as follows:

• **Overview.** Discussion of our business and overall analysis of financial and other highlights affecting the Company in order to provide context for the remainder of this MD&A.

• **Strategy.** Our overall strategy.

• **Basis of Presentation.** A summary of the primary elements of our financial results.

• **Critical Accounting Estimates.** Accounting estimates that we believe are most important to understanding the assumptions and judgments incorporated in our reported financial results and forecasts.

• **Results of Operations.** An analysis of our financial results comparing the year ended December 31, 2018 to the year ended December 31, 2017 and the year ended December 31, 2017 to the year ended December 31, 2016.

• **Liquidity and Capital Resources.** An analysis of changes in our balance sheets and cash flows, and discussion of our financial condition and potential sources of liquidity.

The following discussion and analysis should be read in conjunction with our audited consolidated financial statements and the related notes that appear elsewhere in this Annual Report on Form 10-K. This Annual Report on Form 10-K contains "forward-looking statements" within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. These statements are often identified by the use of words such as "may," "will," "expect," "believe," "anticipate," "intend," "could," "should," "estimate," or "continue," and similar expressions or variations. Such forward-looking statements are subject to risks, uncertainties and other factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed in the section titled "Risk Factors," set forth in Part I, Item 1A of this Annual Report on Form 10-K and elsewhere in this report. The forward-looking statements in this Annual Report on Form 10-K represent our views as of the date of this Annual Report on Form 10-K. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Annual Report on Form 10-K.

Overview

We are a trusted partner for the innovation of advanced materials using high throughput experimentation. Advanced materials are critical to sustaining and advancing many industries, including semiconductor and semiconductor related industries. Using traditional experimental techniques, it can take many years to discover new advanced materials and many more years to deploy them in the marketplace. By leveraging our proprietary HPC equipment platform, advanced characterization abilities and multi-disciplinary development team, we strive to enable our customers to more rapidly discover advanced materials and tailor them to suit their needs.

We were founded in 2004 and are headquartered in San Jose, California. Our total revenue decreased to \$33.6 million for the year ended December 31, 2018 from \$37.2 million for the year ended December 31, 2017.

Our net loss decreased to \$3.4 million for the year ended December 31, 2018 from a net loss of \$10.4 million for the year ended December 31, 2017. Since inception, we have incurred net losses leading to an accumulated deficit of \$181.7 million as of December 31, 2018.

Strategy

We currently target large markets that rely on advanced materials for differentiation. Within these broad markets, we target customers that have track records of technological innovation, have significant materials-based research and development (R&D), and are pursuing technical advancements that are critical to their success and strategy.

Generally, our approach is most relevant to industries that rely heavily upon advanced thin film materials such as those achieved using physical vapor deposition (PVD) and atomic layer deposition (ALD) processing tools; however, our approach is also relevant to discovering and understanding advanced materials more broadly, including advanced bulk materials such as metal alloys. Historically, we have partnered most extensively in the semiconductor industry and particularly in the area of semiconductor memory such as dynamic RAM (DRAM), phase-change RAM (PCM) and new non-volatile memory (NVM) technologies. Going forward, we currently plan to continue growing our footprint within semiconductors, while expanding our engagement with semiconductor materials and equipment makers.

Basis of Presentation

How We Generate Revenue

Our customer engagement process primarily generates revenue in two ways: program revenue; and licensing and royalty revenue. Since changing our business model, programs have become our primary engagement model with customers and are structured to result in program fees, and in some cases licensing and/or royalty revenue arrangements.

| | Years Ended December 31, | | |
|-------------------------------|--------------------------|----------|----------|
| | 2018 | 2017 | 2016 |
| | (in thousands) | | |
| Revenue: | | | |
| Program revenue | \$31,984 | \$29,010 | \$39,690 |
| Licensing and royalty revenue | 1,676 | 8,193 | 7,608 |
| Total revenue | \$33,660 | \$37,203 | \$47,298 |

Program revenue. Program revenue may include service-based fees such as payments for research services, milestone payments, and subscription payments for dedicated and shared workflow tools used in the programs and reimbursed payments for consumables and outside services from third parties. Individual programs typically range from six months up to twelve months. We recognize program revenue in a manner consistent with activities performed. As we engage new customers and negotiate extensions for existing customer agreements that are nearing completion, we expect program revenue to continue to fluctuate.

Licensing and royalty revenue. Licensing and royalty revenue consists of licensing fees and royalties for granting our customers rights to our proprietary technology and intellectual property (IP). Specifically, this includes licensing the HPC capabilities of our workflows, licensing our informatics and analysis software, and licensing fees and royalties on products commercialized by our customers that incorporate technology developed through our programs. In certain instances, minimum license fees and royalties may be guaranteed by customer contracts and are recognized as revenue ratably over the related periods. In addition, licensing and royalty revenue may include sale of intellectual property when title transfers if there are no remaining performance obligations related to the intellectual property transfer. During the first quarter of 2017, in connection with a CDP, we recognized revenue on the sale of intellectual property that was developed during the term of the CDP. We anticipate our licensing and royalty revenue to continue

to represent a low percentage of overall revenue in the future as we transition to a purely program services model.
Key Financial Metrics

We monitor the key financial metrics set forth below to help us evaluate growth trends, establish budgets, measure the effectiveness of our sales and marketing efforts, manage our human resources and assess operational efficiencies.

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Revenue growth and mix. We monitor revenue from programs for existing and new customers. To increase our ability to serve and accelerate innovation more broadly across certain market segments, we expect to engage in an increasing number of pre-competitive programs that allow us to accumulate, reuse and more broadly license information and innovation that we discover and develop.

Adjusted EBITDA. We monitor our adjusted EBITDA to measure the profitability of our business. We use adjusted EBITDA as a key performance measure because we believe it facilitates operating performance comparisons from period to period by excluding potential differences caused by variations in capital structures, tax positions (such as the impact of changes in effective tax rates or fluctuations in permanent differences or discrete quarterly items), interest expense or the cash requirements necessary to service interest or principal payments on our indebtedness, the impact of depreciation and amortization expense, restructuring related charges, and the impact of stock-based compensation expense. See "Selected Consolidated Financial Data—Non-GAAP Financial Measure" for a reconciliation of adjusted EBITDA to our net loss, the most comparable GAAP measure.

Adjusted earnings. We monitor our adjusted earnings to measure the profitability of our business. We use adjusted earnings as a performance measure because we believe it facilitates operating performance comparisons from period to period by excluding potential differences caused by variations in capital structures, restructuring related charges, and the impact of stock-based compensation expense. See "Selected Consolidated Financial Data—Non-GAAP Financial Measure" for a reconciliation of our adjusted earnings to our net loss, the most comparable GAAP measure.

Factors Affecting our Performance

Reliance on continued customer engagement. Our current preferred approach to customer engagement is to enter into multi-year umbrella agreements that allow our customers during the term to selectively engage in multiple projects, each typically having a duration of six to twelve months and each subject to its own payment obligations that we refer to as program service fees or service fees. These multi-year umbrella agreements can also include success fees or royalties depending on how the project leverages our development team or incorporates our background technology. Similarly, we seek an additional fee if a customer decides to commercialize our background technology. While our flexible engagement model has substantially reduced our sales cycle, it has made us more reliant on continued customer programs and customer satisfaction with our deliverables.

Exposure to semiconductor memory end markets. Our performance is linked to the end markets in which our customers operate. Certain of these markets, such as the semiconductor memory markets have historically shown significant price volatility as a result of imbalances in supply and demand. As such, these markets have been traditionally challenging for participants. We attempt to manage this end market risk by participating in multiple end markets and by selecting customers that we believe will be successful in those markets however, in recent periods and going forward we have, and intend to focus primarily on, the semiconductor market and as a result, our revenue going forward could be more affected by this end market's volatility.

Revenue mix. Our revenue from programs vary from contract to contract depending on the customer's requirements and the scope of the service. The gross profit from programs may vary based on the size and scope of the contract. We target an average gross margin contribution that is consistent across the industries and end markets we serve.

Extended sales cycles. Our sales cycles can be extended, and we may commit significant resources and expenses for a project before a potential customer commits to a program. Under our business model, they have ranged between 3 and 9 months with existing customers and 6 to 12 months when engaging with a customer that is new to us. Investment of time and resources in a particular customer engagement that does not ultimately result in material revenue will adversely affect our revenue and results of operations.

Customer concentration. Due to the concentrated nature of manufacturers in the DRAM and complex logic markets, our revenue is and may continue to be concentrated to a limited number of key high-volume customers. However, we believe there is an opportunity to expand our engagements with our customers into new applications over time. In addition, because our platform is broadly applicable to industries whose products rely on thin films for differentiation, including semiconductors, flat glass coatings and glass-based devices, special metal alloys, LEDs, flat-panel displays and other technologies, we believe we have significant opportunities to engage with a broad range of customers.

Cost of Revenue and Operating Expenses

Cost of Revenue

The following table sets forth our cost of revenue by revenue category:

| | Years Ended December 31, | | |
|---------------------------------------|--------------------------|----------|----------|
| | 2018 | 2017 | 2016 |
| | (in thousands) | | |
| Cost of revenues: | | | |
| Cost of program revenue | \$9,999 | \$11,449 | \$15,705 |
| Cost of licensing and royalty revenue | 9 | 656 | 125 |
| Total cost of revenues | \$10,008 | \$12,105 | \$15,830 |

Our cost of revenue is variable and depends on the product mix and type of revenue earned in each period relating to our customer programs.

• **Cost of program revenue.** Our cost of program revenue primarily consists of salaries and other personnel-related expenses, including stock-based compensation, for our research and development scientists, engineers and development fab process operations employees. Additionally, our cost of revenue includes costs of wafers, targets, materials, program-related supplies, third-party professional fees and depreciation of equipment used in programs. We include inventory obsolescence and customer related asset impairments in cost of program revenue.

• **Cost of licensing and royalty revenue.** Our cost of licensing and royalty revenue consist of the amortization of acquired patents, which were acquired as part of our Symyx asset purchase in November 2011, and ongoing licensing obligations.

Research and Development

Our R&D expenses consist of costs incurred for development and continuous improvement of our HPC platform, expansion of software capabilities and application research and development that are not associated with customer programs. R&D costs include personnel-related expenses, including stock-based compensation expenses, for our technical staff as well as consultant costs, parts and prototypes, wafers, chemicals, supply costs, facilities costs, utilities costs related to laboratories and offices occupied by technical staff, depreciation on equipment used by technical staff, long-lived R&D assets impairment, and outside services, such as machining and third-party R&D costs. We recognize R&D overhead costs that are not allocated to a customer program as expenses within R&D.

Sales and Marketing

Our sales and marketing expenses consist primarily of personnel-related costs, including stock-based compensation, for our sales and marketing employees, as well as payments of commissions to our sales employees, facility costs and professional expenses. Professional expenses consist of external website and marketing communication consulting costs and market research.

General and Administrative

General and administrative expenses consist primarily of personnel-related costs, including stock-based compensation, as well as professional services and facilities costs related to our executive, finance, legal, human resources,

management information systems and information technology functions. Professional services consist of outside accounting, information technology, consulting and legal costs. We also incur significant accounting and legal costs related to compliance with rules and regulations enacted by the Securities and Exchange Commission, including the costs of maintaining compliance with Section 404 of the Sarbanes-Oxley Act, as well as insurance, investor relations and other costs associated with being a public company.

Restructuring Expense

Our restructuring expense primarily consisted of costs associated with employee severance and termination benefits. There were no restructuring expenses for 2018. In March 2017, we initiated a reduction in our workforce to reduce non-core activities and operating costs and to improve profitability. As a result of the reduction in our workforce, we recorded expenses related to employee severance and termination benefits of approximately \$1.4 million in 2017.

Interest Income (Expense), net

Interest income represents interest earned on our cash, cash equivalents and investments. We expect interest income will vary each reporting period depending on our average investment balances during the period and market interest rates.

Other Income (Expense), net

Other income primarily consists of sublease income that we receive from subleasing a portion of our office space under a sublease agreement entered into in December 2015. The term of the lease is for three years and annual gross rent is approximately \$0.3 million. The sub-lessee moved in and occupied the space during the second quarter of 2016. Other income (expense) also includes foreign exchange gains and losses that have not been significant.

Provision for Income Taxes

We are subject to taxes in the United States as well as other tax jurisdictions or countries in which we conduct business. Earnings from our non-U.S. activities are subject to local country income tax and may be subject to current U.S. income tax. To date, we have incurred net losses and have not recorded any U.S. federal income tax benefits as these losses have been offset by valuation allowances. As of December 31, 2018, we had net operating loss carryforwards for federal and state income tax purposes of approximately \$69.6 million and \$64.6 million, respectively.

In addition, we had \$3.9 million in U.S. federal R&D credit and \$12.8 million in California R&D credit carryforwards to offset future income tax liabilities. Our ability to use our net operating loss carryforwards to offset future taxable income and our ability to use our tax credit carryforwards to offset future income tax liabilities may be subject to certain limitations arising from "ownership changes" within the meaning of Section 382 of the Internal Revenue Code.

Critical Accounting Policies and Estimates

Our consolidated financial statements have been prepared in conformity with generally accepted accounting principles in the United States and include our accounts and the accounts of our wholly-owned subsidiaries. The preparation of our consolidated financial statements requires our management to make estimates, assumptions and judgments that affect the reported amounts of assets and liabilities and disclosures for contingent assets and liabilities as of the date of the financial statements, and the reported amounts of revenue and expenses during the applicable periods. Management bases its estimates, assumptions and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances. Different assumptions and judgments would change the estimates used in the preparation of our consolidated financial statements which, in turn, could change the results from those reported. Our management evaluates its estimates, assumptions and judgments on an ongoing basis.

Critical accounting estimates are listed in the footnotes to our consolidated financial statements.

Results of Operations

Comparison of the Years Ended December 31, 2018 and 2017

| | Years Ended December 31, | | \$ Change | % Change | |
|--|-----------------------------|------------|--------------|-------------|---|
| | 2018 | 2017 | | | |
| | (in thousands) | | | | |
| Revenue: | | | | | |
| Program revenue | \$31,984 | \$29,010 | \$2,974 | 10 | % |
| Licensing and royalty revenue | 1,676 | 8,193 | (6,517) | -80 | % |
| Total revenue | 33,660 | 37,203 | (3,543) | -10 | % |
| Cost of revenue: | | | | | |
| Gross profit | 10,008 | 12,105 | (2,097) | -17 | % |
| Operating expenses: | | | | | |
| Research and development | 23,652 | 25,098 | (1,446) | -6 | % |
| Research and development | 17,228 | 21,535 | (4,307) | -20 | % |
| Sales and marketing | 3,256 | 4,019 | (763) | -19 | % |
| General and administrative | 7,516 | 9,198 | (1,682) | -18 | % |
| Restructuring charges | — | 1,351 | (1,351) | -100 | % |
| Total operating expenses | 28,000 | 36,103 | (8,103) | -22 | % |
| Loss from operations | (4,348) | (11,005) | 6,657 | | |
| Other income (expense): | | | | | |
| Interest income (expense), net | 594 | 266 | 328 | | |
| Other income (expense), net | 344 | 337 | 7 | | |
| Total other income (expense), net | 938 | 603 | 335 | | |
| Loss before provision for income taxes | (3,410) | (10,402) | 6,992 | | |
| Provision for income taxes | 1 | 1 | — | | |
| Net loss | \$(3,411) | \$(10,403) | \$6,992 | | |

Revenue

Our revenue decreased by \$3.5 million, or 10%, to \$33.6 million during the year ended December 31, 2018, from \$37.2 million during the year ended December 31, 2017, driven by an 80% decrease in licensing and royalty revenue, partially offset by a 10% increase in program revenue. The increase in program revenue was primarily a result of a \$3.5 million increase from new customers, which was offset by \$0.5 million decrease in revenue from existing customers. The decrease in licensing and royalty revenue was primarily due to the ending of a patent exclusivity agreement with a customer for \$5.0 million and a 2017 patent sale to a customer for \$1.5 million.

We expect our revenue to fluctuate from period to period based on demand for, and our resources to fulfill, our services, project completion schedules and royalty-related end-market sales.

The following table presents revenue by geographic region (based on invoiced locations) during the years ended December 31, 2018 and 2017 in dollars (in thousands) and as a percentage of revenue for the periods presented:

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| | Years Ended December 31, | | | | | |
|------------------------|--------------------------|---------------|------------|---------------|---|--|
| | 2018 | | 2017 | | | |
| | Revenues | % of Revenues | Revenues | % of Revenues | | |
| United States | \$8,041 | 24 | % \$11,793 | 32 | % | |
| Japan | 144 | — | % 401 | 1 | % | |
| APAC ex Japan | 25,475 | 76 | % 24,859 | 67 | % | |
| Europe and Middle East | — | — | % 150 | — | % | |
| Total | \$33,660 | 100 | % \$37,203 | 100 | % | |

Cost of Revenue

Cost of revenue decreased by \$2.1 million, or 17%, to \$10.0 million during the year ended December 31, 2018 from \$12.1 million during the prior year which ended December 31, 2017, primarily due to decreases in costs from depreciation and amortization, materials and other costs associated with our programs.

Gross Margin

Our gross profit as a percentage of net revenues, or gross margin, has been and will continue to be affected by a variety of factors, including the mix of program revenue and licensing and royalty revenue recognized during the period. We achieve a higher gross margin on licensing and royalty revenue as compared to program revenue.

Gross margin was 70.3% during the year ended December 31, 2018 compared to 67.5% for the year ended December 31, 2017. This increase was primarily on account of lower depreciation and amortization expenses in 2018 compared to 2017 due to assets that were fully depreciated.

Research and Development

R&D expenses decreased by \$4.3 million, or 20%, to \$17.2 million during the year ended December 31, 2018, from \$21.5 million compared to the year ended December 31, 2017. The changes were primarily attributable to decreases in our personnel-related expenses, professional services fees, and depreciation and amortization expense. The decrease in personnel-related expenses and professional services fees were attributable to a reduction in force in 2017. The decrease in depreciation and amortization expense was due to assets that were fully depreciated.

Stock-based compensation, which was included in personnel-related expenses, decreased by \$0.1 million for the year ended December 31, 2018, compared to the year ended December 31, 2017.

Sales and Marketing

Sales and marketing expenses decreased by \$0.8 million, or 19%, to \$3.3 million during the year ended December 31, 2018, from \$4.0 million during the year ended December 31, 2017. The changes were primarily attributable to decreases in our personnel-related expenses and professional services fees. The decrease in personnel-related expenses and professional services fees were attributable to a reduction in force in 2017.

Stock-based compensation, which was included in personnel-related expenses, increased by \$2,000 for the year ended December 31, 2018, compared to the year ended December 31, 2017.

General and Administrative

General and administrative expenses decreased by \$1.7 million, or 18%, to \$7.5 million during the year ended December 31, 2018, from \$9.2 million for the year ended December 31, 2017. The changes were primarily attributable to decreases in our personnel-related expenses and professional services fees. The decrease in personnel-related expenses and professional services fees were attributable to a reduction in force in 2017.

Stock-based compensation, which was included in personnel-related expenses, decreased by \$0.3 million for the year ended December 31, 2018, compared to the year ended December 31, 2017.

Restructuring Charges

There were no restructuring expenses during the year ended December 31, 2018 compared to \$1.4 million during the year ended December 31, 2017. In March 2017, we initiated a reduction in our workforce to reduce non-core activities and operating costs in an effort to improve profitability. The reduction in workforce constituted approximately 18% of our global workforce. As a result of the reduction in our workforce, we recorded expenses related to employee severance and termination benefits of approximately \$1.4 million.

Loss from Operations

Our operating loss decreased by \$6.6 million to \$4.3 million during the year ended December 31, 2018, compared to \$11.0 million for the year ended December 31, 2017, driven principally by an \$8.0 million and \$2.0 million decrease in our operating expenses and cost of revenue respectively, which was partially offset by a \$3.5 million reduction in revenue primarily due to a loss of licensing and royalty revenue.

Interest Income (Expense), net

The increases in interest income (or decreases in interest expense) of \$0.3 million during the year ended December 31, 2018, compared to the year ended December 31, 2017, were primarily attributable to increase in income on our investments due to higher cash balances and yields.

Other Income (Expense), net

Other income, net, for the year ended December 31, 2018 consisted principally of lease income that we received from subleasing a portion of our office space under an agreement entered into in December 2015. The sublease began during the second quarter of 2016. Other income (expense) during the year ended December 31, 2018 consisted of foreign exchange gains and losses and was not significant.

Provision for Income Taxes

Provision for income taxes during the years ended December 31, 2018 and 2017 consisted principally of state minimum income tax and were not significant during either period.

Net Loss

Our net loss decreased by \$7.0 million to a net loss of \$3.4 million during the year ended December 31, 2018, compared to \$10.4 million for the year ended December 31, 2017. The differences between operating loss and net loss during the year ended December 31, 2018 and 2017 were primarily attributable to our sublease income and income on our investments.

Comparison of the Years Ended December 31, 2017 and 2016

| | Years Ended December 31, | | \$ Change | % Change | |
|--|-----------------------------|--------------|--------------|-------------|---|
| | 2017 | 2016 | | | |
| | (in thousands) | | | | |
| Revenue: | | | | | |
| Program revenue | \$29,010 | \$ 39,690 | \$(10,680) | -27 | % |
| Licensing and royalty revenue | 8,193 | 7,608 | 585 | 8 | % |
| Total revenue | 37,203 | 47,298 | (10,095) | -21 | % |
| Cost of revenue: | 12,105 | 15,830 | (3,725) | -24 | % |
| Gross profit | 25,098 | 31,468 | (6,370) | -20 | % |
| Operating expenses: | | | | | |
| Research and development | 21,535 | 28,126 | (6,591) | -23 | % |
| Sales and marketing | 4,019 | 7,383 | (3,364) | -46 | % |
| General and administrative | 9,198 | 10,713 | (1,515) | -14 | % |
| Restructuring charges | 1,351 | 1,114 | 237 | 21 | % |
| Total operating expenses | 36,103 | 47,336 | (11,233) | -24 | % |
| Loss from operations | (11,005) | (15,868) | 4,863 | | |
| Other income (expense): | | | | | |
| Interest income (expense), net | 266 | 173 | 93 | | |
| Other income (expense), net | 337 | 265 | 72 | | |
| Total other income (expense), net | 603 | 438 | 165 | | |
| Loss before provision for income taxes | (10,402) | (15,430) | 5,028 | | |
| Provision for income taxes | 1 | 7 | (6) | | |
| Net loss | \$(10,403) | \$ (15,437) | \$5,034 | | |

Revenue

Our revenue decreased by \$10.1 million, or 21%, to \$37.2 million during the year ended December 31, 2017, from \$47.3 million during the year ended December 31, 2016, driven by a 27% decrease in program revenue, partially offset by 8.0% increase in licensing and royalty revenue. The decrease in program revenue of \$10.7 million was primarily a result of \$14.3 million decrease in revenue related to the scheduled completion and reduction of program agreements, which was partially attributable to the implementation of our new business model, which was partially offset by a \$1.3 million increase in revenue from new customer engagements and \$2.3 million increase in current customer growth. The increase in licensing and royalty revenue of \$0.6 million was primarily due to the sale of certain patents to a customer for \$1.5 million and was partially offset by lower royalty-related end-market sales and the ending of an exclusivity agreement.

The following table presents revenue by geographic region (based on invoiced locations) during the years ended December 31, 2017 and 2016 in dollars (in thousands) and as a percentage of revenue for the periods presented:

Years Ended December 31,

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| | 2017 | | 2016 | | |
|------------------------|----------|---------------|------------|---------------|---|
| | Revenues | % of Revenues | Revenues | % of Revenues | |
| United States | \$11,793 | 32 | % \$21,728 | 46 | % |
| Japan | 401 | 1 | % 313 | 1 | % |
| APAC ex Japan | 24,859 | 67 | % 23,830 | 50 | % |
| Europe and Middle East | 150 | — | % 1,427 | 3 | % |
| Total | \$37,203 | 100 | % \$47,298 | 100 | % |

Cost of Revenue

Cost of revenue decreased by \$3.7 million, or 24%, to \$12.1 million during the year ended December 31, 2017 from \$15.8 million during the prior year which ended December 31, 2016, due to decreases in labor and personnel-related expenses, depreciation, materials and other costs associated with programs. Stock-based compensation, which was included in personnel-related expenses, decreased by \$0.3 million for the year ended December 31, 2017, compared to the year ended December 31, 2016.

Gross Margin

Our gross profit as a percentage of net revenues, or gross margin, has been and will continue to be affected by a variety of factors, including the mix of program revenue and licensing and royalty revenue recognized during the period. We achieve a higher gross margin on licensing and royalty revenue as compared to program revenue.

Gross margin was 67.5% during the year ended December 31, 2017 compared to 66.5% for the year ended December 31, 2016. This increase in gross margin was primarily attributable to a higher mix of licensing and royalty revenue in 2017 compared to 2016.

Research and Development

R&D expenses decreased by \$6.6 million, or 23%, to \$21.5 million during the year ended December 31, 2017, from \$28.1 million compared to the year ended December 31, 2016. The changes were primarily attributable to decreases in our personnel-related expenses, partially due to our restructuring, and professional services fees.

Stock-based compensation, which was included in personnel-related expenses, decreased by \$0.6 million for the year ended December 31, 2017, compared to the year ended December 31, 2016.

Sales and Marketing

Sales and marketing expenses decreased by \$3.3 million, or 46%, to \$4.0 million during the year ended December 31, 2017, from \$7.4 million during the year ended December 31, 2016. The changes were attributable to decrease in our personnel-related expenses, partially due to our restructuring and professional service fees.

Stock-based compensation, which was included in personnel-related expenses, decreased by \$0.4 million for the year ended December 31, 2017 compared to the year ended December 31, 2016.

General and Administrative

General and administrative expenses decreased by \$1.5 million, or 14%, to \$9.2 million during the year ended December 31, 2017, from \$10.7 million for the year ended December 31, 2016. This decrease was primarily attributable to decrease in our personnel-related expenses, partially due to our restructuring, and professional services fees.

Stock-based compensation, which was included in personnel-related expenses, decreased by \$0.9 million for the year ended December 31, 2017, compared to the year ended December 31, 2016.

Restructuring Charges

Restructuring expenses were \$1.4 million and \$1.1 million during the year ended December 31, 2017 and December 31, 2016, respectively. In March 2017, we initiated a reduction in our workforce to reduce non-core activities and operating costs and to improve profitability. This reduction in our workforce constituted approximately 18% of our global workforce. As a result of the reduction in our workforce, we recorded expenses related to employee severance and termination benefits of approximately \$1.4 million in 2017. In September 2016, we initiated a restructuring plan to reduce workforce by 13%, pursuant to which charges of \$1.1 million were incurred for severance and other personnel related costs.

Loss from Operations

Our operating loss decreased by \$4.9 million to \$11.0 million during the year ended December 31, 2017, compared to \$15.9 million for the year ended December 31, 2016, driven principally by an \$11.2 million and \$3.7 million decrease in our operating expenses and cost of revenue respectively, and was partially offset by a \$10.1 million reduction in revenue primarily due to loss of program revenue..

Interest Income (Expense), net

The increases in interest income (or decreases in interest expense) of \$0.1 million during the year ended December 31, 2017, compared to the year ended December 31, 2016 were primarily related to income on our investments.

Other (Expense) Income, net

Other income, net, for the year ended December 31, 2017 and December 31, 2016 consisted principally of lease income that we received from subleasing a portion of our office space under an agreement entered into in December 2015. The sublease began during the second quarter of 2016. Other income (expense) during the year ended December 31, 2017 consisted of foreign exchange gains and losses and was not significant.

Provision for Income Taxes

Provision for income taxes during the years ended December 31, 2017 and 2016 consisted of income taxes on our foreign entities and state minimum income tax and were not significant during either period.

Net Loss

Our net loss decreased by \$5.0 million to a net loss of \$10.4 million during the year ended December 31, 2017, compared to \$15.4 million for the year ended December 31, 2016. The differences between operating loss and net loss during the year ended December 31, 2017 and 2016 were primarily attributable to our sublease income and income on our investments in each year.

Quarterly Results of Operations

You should read the following tables presenting our quarterly results of operations in conjunction with the consolidated financial statements and related notes contained elsewhere in this Form 10-K. We have prepared the unaudited information on the same basis as our audited consolidated financial statements. Please note that our operating results for any quarter are not necessarily indicative of results for any future quarters or for a full year. Our unaudited quarterly results of operations for the eight quarters ended December 31, 2018 were as follows (in thousands, except per share amounts):

| | Three Months Ended | | | | | | | |
|---|---|--------------------|---------------|----------------|-------------------|--------------------|---------------|----------------|
| | December 31, 2018 | September 30, 2018 | June 30, 2018 | March 31, 2018 | December 31, 2017 | September 30, 2017 | June 30, 2017 | March 31, 2017 |
| | (In thousands, except per share amounts, Unaudited) | | | | | | | |
| Revenue: | | | | | | | | |
| Program revenue | \$6,009 | \$ 7,354 | \$9,365 | \$9,256 | \$ 8,850 | \$ 6,869 | \$6,480 | \$6,812 |
| Licensing and royalty | | | | | | | | |
| revenue | 312 | 508 | 437 | 419 | \$ 1,698 | 1,753 | 1,609 | 3,133 |
| Total revenue | 6,321 | 7,862 | 9,802 | 9,675 | 10,548 | 8,622 | 8,089 | 9,945 |
| Cost of revenue | 1,714 | 2,058 | 2,859 | 3,376 | 3,697 | 2,875 | 2,547 | 2,987 |
| Gross profit | 4,607 | 5,804 | 6,943 | 6,299 | 6,851 | 5,747 | 5,542 | 6,958 |
| Operating expenses: | | | | | | | | |
| Research and | | | | | | | | |
| development | 4,677 | 4,463 | 4,056 | 4,032 | 4,206 | 4,835 | 5,385 | 7,108 |
| Sales and marketing | 910 | 692 | 858 | 796 | 734 | 874 | 931 | 1,481 |
| General and | | | | | | | | |
| administrative | 1,901 | 1,581 | 1,748 | 2,286 | 1,974 | 2,000 | 2,217 | 3,008 |
| Restructuring charges | — | — | — | — | — | — | 3 | 1,348 |
| Total operating | | | | | | | | |
| expenses | 7,488 | 6,736 | 6,662 | 7,114 | 6,914 | 7,709 | 8,536 | 12,945 |
| Loss from operations | (2,881) | (932) | 281 | (815) | (63) | (1,962) | (2,994) | (5,987) |
| Other income (expense): | | | | | | | | |
| Interest income | | | | | | | | |
| (expense), net | 180 | 168 | 140 | 106 | 84 | 70 | 58 | 55 |
| Other income (expense), | | | | | | | | |
| net | 104 | 78 | 75 | 87 | 95 | 64 | 82 | 97 |
| Total other income | | | | | | | | |
| (expense), net | 284 | 246 | 215 | 193 | 179 | 134 | 140 | 152 |
| Income (Loss) before provision for income taxes | (2,597) | (686) | 496 | (622) | 116 | (1,828) | (2,854) | (5,835) |

| | | | | | | | | |
|--|-----------|-----------|--------|-----------|--------|-----------|-----------|-----------|
| Provision for income taxes | - | - | - | 1 | - | - | - | 1 |
| Net income (loss) | (2,597) | (686) | 496 | (623) | 116 | (1,828) | (2,854) | (5,836) |
| Net income (loss) per share of common stock, basic | \$(0.05) | \$(0.01) | \$0.01 | \$(0.01) | \$0.00 | \$(0.04) | \$(0.06) | \$(0.12) |
| Shares used in computing net loss per share of common stock, basic | 49,751 | 49,746 | 49,673 | 49,582 | 49,559 | 49,555 | 49,555 | 49,519 |

Liquidity and Capital Resources

As of December 31, 2018, we had \$30.4 million of cash, cash equivalents and investments and \$28.4 million of net working capital.

To date, we have incurred significant losses. During the years ended December 31, 2018, 2017 and 2016, we incurred net losses of \$3.4 million, \$10.4 million, and \$15.4 million respectively. As of December 31, 2018, our accumulated deficit was \$181.7 million.

We believe that we have the financial resources needed to meet business requirements for the next 12 months. However, our forecast of the period of time through which our financial resources will be adequate to meet business requirements are forward-looking statements and involve risks and uncertainties. Our future capital requirements will depend on many factors, many of which are set forth in greater detail under the caption "Risk Factors," but generally include without limitation our rate of revenue growth; our expansion of our sales and marketing activities and overhead expenses; the timing and extent of our spending to support our R&D efforts and our ability to expand customer programs in the semiconductor industry; whether we are successful in obtaining payments from customers; the financial stability of our customers; whether we can enter into additional programs in our target industries; the progress and scope of collaborative R&D projects performed by us and our customers; the effect of any acquisitions

of other businesses or technologies that we may make in the future; the filing, prosecution and enforcement of patent claims; how much we need to develop or enhance our solutions or HPC platform; and any necessary responses to competitive pressures. To the extent that existing cash, cash equivalents, short-term investments and cash from operations are insufficient to fund our operations, we may need to raise additional funds through public or private equity or debt financing. We may also seek to invest in or acquire complementary businesses, applications or technologies, any of which could also require us to seek additional equity or debt financing. Additional funds may not be available on terms favorable to us or at all. We maintain almost all of our cash in the United States and therefore are not subject to restrictions or tax obligations as we access the cash.

Cash Flows

The following summary of our cash flows for the periods indicated has been derived from our consolidated financial statements included elsewhere in this filing:

| | Years Ended December 31, | | |
|---|-----------------------------|----------|-----------|
| | 2018 | 2017 | 2016 |
| Net cash (used in) provided by operating activities | \$5,938 | \$(873) | \$(5,404) |
| Net cash (used in) provided by investing activities | \$(3,862) | \$1,210 | \$(1,214) |
| Net cash (used in) provided by financing activities | \$185 | \$(6) | \$701 |

Cash Flows from Operating Activities

We experienced a positive cash flow from operating activities during the year ended December 31, 2018, primarily due to our operating results.

Net cash provided by operating activities during the year ended December 31, 2018 of \$5.9 million was primarily attributable to a net loss of \$3.4 million, which was offset by non-cash charges of \$4.7 million for depreciation, amortization, impairment and accretion and \$1.0 million for stock-based compensation. Cash flow from our operating assets and liabilities increased \$3.6 million primarily as a result of a decrease in accounts receivable of \$2.6 million, prepaid expenses and other current assets of \$0.2 million, materials inventory of \$0.1 million and an increase of \$0.9 million in accrued and other liabilities, offset by a decrease in accounts payable of \$0.2 million.

Net cash used in operating activities during the year ended December 31, 2017 of \$0.9 million was primarily attributable to our net loss of \$10.4 million, offset by non-cash charges of \$7.2 million for depreciation, amortization, impairment and accretion and \$1.5 million for stock-based compensation. Cash flow from our operating assets and liabilities increased \$0.8 million primarily as a result of an increase in accounts payable, materials inventory and prepaid expenses and other assets of \$0.6 million each, offset by an increase in accounts receivable of \$0.5 million and decrease in deferred revenue \$0.6 million.

Net cash used in operating activities during the year ended December 31, 2016 of \$5.4 million was primarily attributable to our net loss of \$15.4 million and cash payouts related to accrued compensation liabilities of \$3.1 million, offset by non-cash charges of \$9.5 million for depreciation, amortization, impairment and accretion and \$3.6 million for stock-based compensation.

We expect that cash flows from operating activities will fluctuate in future periods due to a number of factors, including our operating results, amounts of non-cash charges, and the timing of our billings, collections and disbursements.

Cash Flows from Investing Activities

Our investing activities consist primarily of purchases and maturities of short-term investments, capital expenditures to purchase property and equipment and our investments in intangible assets relating to our patents and trademarks. In the future, we expect we will continue to make modest capital expenditures to support our operations and incur costs to protect our investment in our developed technology and IP.

During the year ended December 31, 2018, cash used in investing activities was \$3.9 million as a result of \$2.6 million in purchases, net of maturities, of short-term investments, and \$1.3 million in capital expenditures.

During the year ended December 31, 2017, cash provided by investing activities was \$1.2 million as a result of \$2.0 million in redemptions, net of maturities, of short-term investments, partially offset by \$0.8 million in capital expenditures.

During the year ended December 31, 2016, cash used in investing activities was \$1.2 million as a result of \$2.4 million spent in capital expenditures partially offset by \$1.2 million received in the net redemption of our investments.

Cash Flows from Financing Activities

To date, we have financed our operations primarily with proceeds from the private sales of our redeemable convertible preferred stock and proceeds received from our initial public offering.

During the year ended December 31, 2018, cash provided for financing activities was \$0.2 million, primarily as a result of proceeds from the exercise of common stock options.

During the year ended December 31, 2017, cash used in financing activities was \$6,000, primarily as a result of principal payments on capital lease of \$17,000, which was terminated in August 2017, offset by proceeds from the exercise of common stock options of \$11,000.

During the year ended December 31, 2016, cash provided by financing activities of \$0.7 million was primarily from proceeds from common stock option exercises.

Contractual Obligations and Commitments

The following summarizes our contractual obligations as of December 31, 2018 (in thousands):

| | Payments Due by Period | | | | |
|-----------------------------|------------------------|--------------------|-------------|-------------|-------------------|
| | Total | Less Than One Year | 1 - 3 Years | 3 - 5 Years | More Than 5 Years |
| Operating lease obligations | \$17,557 | \$2,521 | \$5,232 | \$5,497 | \$4,307 |
| Purchase obligations | 880 | 880 | — | — | — |
| Total | \$18,437 | \$3,401 | \$5,232 | \$5,497 | \$4,307 |

Operating lease agreements represent our obligations to make payments under our non-cancelable lease agreement for our facility in San Jose, California. During the year ended December 31, 2018, we made regular lease payments of \$2.5 million under this operating lease agreement and our lease obligation under the agreement as of December 31, 2018 was \$17.6 million. Purchase obligations consist of firm, non-cancelable agreements to purchase property and equipment and inventory items.

Off-Balance Sheet Arrangements

As of December 31, 2018, we did not have any relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes.

Recent Accounting Pronouncements

See Note 1 of the Notes to Consolidated Financial Statements included in this Form 10-K for recent accounting pronouncements that could have an effect on us.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

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

Interest Rate Sensitivity

Our exposure to market risk for changes in interest rates relates primarily to our investment portfolio. Our cash, cash equivalents and investment accounts as of December 31, 2018 totaled \$30.4 million consisting of cash equivalents and investments in a variety of securities, including commercial paper, corporate debt securities and money market funds. If overall interest rates fell 10% for the year ended December 31, 2018, our interest income would have decreased by an immaterial amount, assuming consistent investment levels.

Our primary exposure to market risk is interest income sensitivity, which is affected by changes in the general level of the interest rates in the United States. However, because of the short-term nature of the instruments in our portfolio, a sudden change in market interest rates would not be expected to have a material impact on our consolidated financial condition or our results of operation.

Foreign Currency Exchange Risk

As we expand internationally, our consolidated results of operations and cash flows will become increasingly subject to fluctuations due to changes in foreign currency exchange rates. Our revenue is denominated in U.S. dollars. Our expenses are generally denominated in the currencies in which our operations are located, which is primarily in the United States, with an insignificant portion of expenses incurred in our wholly-owned subsidiaries in Hong Kong and Taiwan in their local currencies. 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. To date, we have not entered into any material foreign currency hedging contracts although we may do so in the future.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and

Stockholders of Intermolecular, Inc. and Subsidiaries

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Intermolecular, Inc. and Subsidiaries (collectively the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company at December 31, 2018 and 2017, and the related consolidated results of its operations and cash flows for each of the two years in the period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company has changed its method of accounting for revenue in 2018 due to the adoption of Accounting Standards Update ("ASU") No. 2014-09, Revenue from Contracts with Customers ("Topic 606"), using the modified retrospective method.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States ("PCAOB")) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. ~~The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an~~

~~understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.~~

~~Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.~~

We have served as the Company's auditor since 2016.

/s/ Armanino^{LLP}

San Ramon, California

March 8, 2019

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INTERMOLECULAR, INC. AND SUBSIDIARIES

Consolidated Balance Sheets

(In thousands, except share and per share data)

| | December 31, 2018 | December 31, 2017 |
|--|----------------------|----------------------|
| ASSETS | | |
| Current assets: | | |
| Cash and cash equivalents | \$ 8,351 | \$ 6,090 |
| Short-term investments | 22,098 | 18,060 |
| Accounts receivable, net of allowance for doubtful accounts of \$0 as of | | |
| December 31, 2018 and December 31, 2017 | 3,349 | 5,519 |
| Prepaid expenses and other current assets | 936 | 1,069 |
| Total current assets | 34,734 | 30,738 |
| Long-term investments | — | 1,657 |
| Materials inventory | 2,638 | 2,781 |
| Property and equipment, net | 3,432 | 5,913 |
| Intangible assets, net | 2,075 | 2,620 |
| Other assets | 514 | 600 |
| Total assets | \$ 43,393 | \$ 44,309 |
| LIABILITIES AND STOCKHOLDERS' EQUITY | | |
| Current liabilities: | | |
| Accounts payable | \$ 760 | \$ 928 |
| Accrued liabilities | 1,234 | 865 |
| Accrued compensation and employee benefits | 3,431 | 2,535 |
| Deferred revenue | 917 | 941 |
| Total current liabilities | 6,342 | 5,269 |
| Deferred rent, net of current portion | 2,667 | 2,939 |
| Other long-term liabilities | — | 28 |
| Total liabilities | 9,009 | 8,236 |
| Commitments and contingencies (note 5) | | |
| Stockholders' equity: | | |
| Common stock, par value \$0.001 per share—200,000,000 shares | | |
| authorized; 49,752,516 and 49,569,721 shares issued and outstanding | | |
| as of December 31, 2018 and December 31, 2017, respectively | 50 | 50 |
| Additional paid-in capital | 216,034 | 214,796 |
| Accumulated other comprehensive loss | (27) | (35) |
| Accumulated deficit | (181,673) | (178,738) |
| Total stockholders' equity | 34,384 | 36,073 |
| Total liabilities and stockholders' equity | \$ 43,393 | \$ 44,309 |

See accompanying notes to consolidated financial statements

INTERMOLECULAR, INC. AND SUBSIDIARIES

Consolidated Statements of Operations

(In thousands, except per share data)

| | Years Ended December 31, | |
|--|-----------------------------|------------|
| | 2018 | 2017 |
| Revenue: | | |
| Program revenue | \$31,984 | \$29,010 |
| Licensing and royalty revenue | 1,676 | 8,193 |
| Total revenue | 33,660 | 37,203 |
| Cost of revenue: | | |
| Cost of program revenue | 9,999 | 11,449 |
| Cost of licensing and royalty revenue | 9 | 656 |
| Total cost of revenue | 10,008 | 12,105 |
| Gross profit | 23,652 | 25,098 |
| Operating expenses: | | |
| Research and development | 17,228 | 21,535 |
| Sales and marketing | 3,256 | 4,019 |
| General and administrative | 7,516 | 9,198 |
| Restructuring charges | — | 1,351 |
| Total operating expenses | 28,000 | 36,103 |
| Loss from operations | (4,348) | (11,005) |
| Other income (expense): | | |
| Interest income (expense), net | 594 | 266 |
| Other income (expense), net | 344 | 337 |
| Total other income (expense), net | 938 | 603 |
| Loss before provision for income taxes | (3,410) | (10,402) |
| Provision for income taxes | 1 | 1 |
| Net loss | \$(3,411) | \$(10,403) |
| Basic and diluted net loss per common share | \$(0.07) | \$(0.21) |
| Shares used in basic and diluted net loss per common share | 49,689 | 49,547 |

Related Party Transactions

The Consolidated Statements of Operations shown above include the following related party transactions:

Years Ended
December 31,
2018 2017

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| | | |
|---------------------------------------|----|----------|
| Revenue: | | |
| Program revenue | \$ | — \$ — |
| Licensing and royalty revenue | — | 383 |
| Total revenue | \$ | — \$ 383 |
| Cost of Revenue: | | |
| Cost of program revenue | \$ | — \$ — |
| Cost of licensing and royalty revenue | — | 1 |
| Total cost of revenue | \$ | — \$ 1 |

See accompanying notes to consolidated financial statements

INTERMOLECULAR, INC. AND SUBSIDIARIES

Consolidated Statements of Comprehensive Loss

(In thousands)

| | Years Ended December 31, | |
|---|-----------------------------|------------|
| | 2018 | 2017 |
| Net loss | \$(3,411) | \$(10,403) |
| Change in unrealized gain (loss) on available-for-sale-securities, net of tax | 9 | (3) |
| Comprehensive loss, net of income tax | \$(3,402) | \$(10,406) |

See accompanying notes to consolidated financial statements

INTERMOLECULAR, INC. AND SUBSIDIARIES

Consolidated Statements of Stockholders' Equity

(In thousands, except share data)

| | Stockholders' Equity | | | Accumulated deficit | Accumulated other comprehensive loss | Total stockholders' equity |
|---------------------------------------|----------------------|--------|----------------------------|---------------------|--------------------------------------|----------------------------|
| | Common stock Shares | Amount | Additional paid-in capital | | | |
| Balances as of December 31, 2016 | 49,513,528 | \$ 50 | \$ 213,313 | \$ (168,335) | \$ (32) | \$ 44,996 |
| Issuance of common stock upon | | | | | | |
| option exercises | 6,270 | — | 11 | — | — | 11 |
| Forfeiture of restricted stock awards | (12,500) | — | — | — | — | — |
| Vesting of restricted stock units | 62,423 | — | — | — | — | — |
| Stock-based compensation | — | — | 1,472 | — | — | 1,472 |
| Other comprehensive loss | — | — | — | — | (3) | (3) |
| Net loss | — | — | — | (10,403) | — | (10,403) |
| Balances as of December 31, 2017 | 49,569,721 | \$ 50 | \$ 214,796 | \$ (178,738) | \$ (35) | \$ 36,073 |
| Issuance of common stock upon | | | | | | |
| option exercises | 163,780 | — | 185 | — | — | 185 |
| Vesting of restricted stock units | 19,015 | — | — | — | — | — |
| Stock-based compensation | — | — | 1,053 | — | — | 1,053 |
| Other comprehensive gain | — | — | — | — | 9 | 9 |
| ASC 606 adjustment | — | — | — | 475 | — | 475 |
| Net loss | — | — | — | (3,411) | — | (3,411) |
| Balances as of December 31, 2018 | 49,752,516 | \$ 50 | \$ 216,034 | \$ (181,674) | \$ (26) | \$ 34,384 |

See accompanying notes to consolidated financial statements

INTERMOLECULAR, INC. AND SUBSIDIARIES

Consolidated Statements of Cash Flows

(In thousands)

| | Years Ended | |
|---|--------------|------------|
| | December 31, | |
| | 2018 | 2017 |
| Cash flows from operating activities: | | |
| Net loss | \$(3,411) | \$(10,403) |
| Adjustments to reconcile net loss to net cash used in operating activities: | | |
| Depreciation, amortization, and accretion | 4,717 | 7,194 |
| Stock-based compensation | 1,053 | 1,472 |
| (Gain) loss on disposal of property and equipment | (9) | 68 |
| Changes in operating assets and liabilities: | | |
| Accounts receivable | 2,646 | (456) |
| Prepaid expenses and other current assets | 219 | 585 |
| Materials inventory | 50 | 557 |
| Accounts payable | (197) | 592 |
| Accrued and other liabilities | 894 | 110 |
| Deferred revenue | (24) | (592) |
| Net cash provided by (used in) operating activities | 5,938 | (873) |
| Cash flows from investing activities: | | |
| Purchase of investments | (27,362) | (20,888) |
| Redemption of investments | 24,775 | 22,861 |
| Purchase of property and equipment | (1,287) | (777) |
| Proceeds from sale of equipment | 12 | 14 |
| Net cash provided by (used in) investing activities | (3,862) | 1,210 |
| Cash flows from financing activities: | | |
| Principal payment under capital leases obligation | — | (17) |
| Proceeds from exercise of common stock options | 185 | 11 |
| Net cash provided by (used in) financing activities | 185 | (6) |
| Net increase in cash and cash equivalents | 2,261 | 331 |
| Cash and cash equivalents at beginning of period | 6,090 | 5,759 |
| Cash and cash equivalents at end of period | \$8,351 | \$6,090 |
| Supplemental disclosure of cash flow information: | | |
| Cash paid for interest | \$— | \$6 |
| Cash paid for income taxes, net of refunds received | \$1 | \$1 |
| Noncash investing/operating activities: | | |
| Transfer of property and equipment to materials inventory | \$105 | \$409 |
| Transfer of materials inventory to property and equipment | \$206 | \$428 |
| Additions to property, equipment and intangible assets not paid | \$258 | \$55 |

at the end of the period

See accompanying notes to consolidated financial statements

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INTERMOLECULAR, INC. AND SUBSIDIARIES

Notes to Consolidated Financial Statements

1. Summary of Significant Accounting Policies

Business

Intermolecular, Inc. and subsidiaries (the Company) is headquartered in San Jose, California and has wholly-owned subsidiaries in Hong Kong and Taiwan.

The Company is a trusted partner for advanced materials innovation. The Company believes advanced materials are at the core of innovation in the 21st century for a wide range of industries including semiconductors, consumer electronics, automotive and aerospace. With its substantial materials expertise, accelerated learning and experimentation platform, and information and analytics infrastructure, the Company has a track record helping leading companies accelerate and de-risk materials innovation.

The consolidated financial statements include the accounts of our Company and all of our subsidiaries. We generated \$5.9 million from operations and carry no debt. The cash, cash equivalents and investments as of December 31, 2018 was \$30.4 million.

Basis of Presentation

The Company's consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America (GAAP) and include the accounts of the Company and its consolidated subsidiaries. All intercompany transactions and balances have been eliminated during consolidation.

Use of Estimates

The preparation of the accompanying consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions about future events. These estimates and the underlying assumptions affect the amounts of assets and liabilities reported, disclosures about contingent assets and liabilities, and reported amounts of revenue and expenses. Management uses estimates and judgments in determining recognition of revenues, valuations of accounts receivable, inventories, intangible assets, warrants and assumptions used in the calculation of income taxes and stock-based compensation, among others. These estimates and assumptions are based on management's best estimates and judgment. Management evaluates its estimates and assumptions on an ongoing basis using historical experience and other factors and adjusts such estimates and assumptions when facts and circumstances dictate. As future events and their effects cannot be determined with precision, actual results could differ significantly from these estimates.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentration of credit risk consist of cash, cash equivalents and accounts receivable. The Company's cash and cash equivalents consist of demand deposits and money market accounts maintained with high quality financial institutions. The Company's accounts receivable consist of

non-interest bearing balances due from credit-worthy customers.

Cash, Cash Equivalents and Investments

The Company holds its cash and cash equivalents in checking, money market and investment accounts with high credit quality financial institutions. The Company considers all highly liquid investments with original maturities of three months or less when purchased to be cash equivalents.

Short-term investments consist principally of corporate debt securities and commercial paper. If applicable, the Company considers marketable securities with remaining time to maturity greater than one year to be classified as long-term. The Company considers all other marketable securities to be short-term marketable securities. The

short-term marketable securities are classified as current assets because they can be readily converted into securities with a shorter remaining time to maturity or into cash. The Company determines the appropriate classification of its marketable securities at the time of purchase and re-evaluates such designations as of each balance sheet date. All marketable securities and cash equivalents in the portfolio are classified as available-for-sale and are stated at fair value and any changes to fair values are recognized through net income. Unrealized gains and losses on available-for-sale securities are excluded from net income and reported in accumulated other comprehensive income (loss) as a separate component of stockholders' equity. Fair value is based on quoted market rates or direct and indirect observable markets for these investments. The amortized cost of debt securities is adjusted for amortization of premiums and accretion of discounts to maturity. Such amortization and accretion are included in interest income. The cost of securities sold and any gains and losses on sales are based on the specific identification method.

The Company reviews its investment portfolio periodically to assess for other-than-temporary impairment in order to determine the classification of the impairment as temporary or other-than-temporary, which involves considerable judgment regarding factors such as the length of the time and the extent to which the market value has been lower than the amortized cost, the nature of underlying assets, and the financial condition, credit rating, market liquidity conditions and near-term prospects of the issuer. If the fair value of a debt security is less than its amortized cost basis at the balance sheet date, an assessment would have to be made as to whether the impairment is other-than-temporary. If the Company considers it more likely than not that it will sell the security before it will recover its amortized cost basis, another-than-temporary impairment will be considered to have occurred. Another-than-temporary impairment will also be considered to have occurred if the Company does not expect to recover the entire amortized cost basis of the security, even if it does not intend to sell the security. The Company has recognized no other-than-temporary impairments for its marketable securities.

Materials Inventory

Materials inventory are stated at the lower of cost or net realizable value, with cost determined on an average cost basis. Materials inventory consist of raw materials in the amount of \$2.6 million and \$2.8 million, as of December 31, 2018 and December 31, 2017, respectively. Materials inventory is used to build and as replacement parts for repairs and maintenance on property plant and equipment. Inventory is no longer purchased for resale as in prior years. Materials inventory that are determined to be in excess of the company requirements or are considered obsolete, are recorded as a cost of revenue in the period in which they are determined to be excess or obsolete. The Company recorded inventory impairment charges of \$0.2 million and \$0.6 million for the year ended December 31, 2018 and 2017, respectively.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation and amortization. Depreciation of equipment is recognized on a straight-line basis over the estimated useful lives of the equipment, generally ranging from three to five years. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the assets. Maintenance and repairs that do not extend the life of or improve an asset are expensed in the period incurred.

Intangible Assets

Intangible assets consist of issued and pending patents and trademarks as a result of third-party legal fees incurred in the patent and trademark application processes and patents acquired. Intangible assets with finite lives are amortized on a straight-line basis over their useful lives, while intangible assets without finite lives are not amortized.

Upon the issuance of pending patent and trademark applications, the period of benefit will be determined. Patents, upon issuance, have a maximum life of 20 years from their application filing date. Trademarks, upon issuance, have

an indefinite life and will not be amortized.

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Impairment of Long-Lived Assets

The Company evaluates its long-lived assets, which consist of property and equipment and intangible assets, for indicators of possible impairment when events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. In addition, the company reviews and if necessary, tests its long-lived assets for impairment at least annually. Impairment exists if the carrying amounts of such assets exceed the estimates of future net undiscounted cash flows expected to be generated by such assets. Should impairment exist, the impairment loss would be measured based on the excess carrying value of the asset over the estimated fair value of the asset. The Company generally records impairment of long-lived assets in research and development expense on the Consolidated Statements of Operations. The Company recorded a \$0.1 million and \$0.1 million impairment loss on property and equipment and a \$0.3 million and \$0.6 million impairment loss on intangible assets during the year ended December 31, 2018 and 2017, respectively.

Revenue Recognition

The Company derives its revenue from two principal sources: 1) program services and 2) licensing and royalty revenues, which consist of technology licensing and royalty fees. Product sales have been made historically, but are not a principal source of revenue.

Program revenue - The Company enters into development programs and other research and development service agreements with customers under which the Company conducts research and development activities with customers. The agreements specify minimum levels of research effort required to be performed by the Company. Payments received under the agreements are not refundable if the research effort is not successful. In some contracts, the Company retains rights to certain elements of technology developed in the course of its performance, which the customer has an option to license in the future under the terms defined in the agreement. The Company generates a significant portion of its program revenue from certain research and development service contracts delivered over a specific period of time. These contracts require reliable estimation of costs to perform obligations and the overall scope of each engagement. Revenue from contracts is recognized using the following five steps:

- a) Identify the contract(s) with a customer
- b) Identify the performance obligations in the contract
- c) Determine the transaction price
- d) Allocate the transaction price to the performance obligations in the contract
- e) Recognize revenue when (or as) the Company satisfies a performance obligation

A contract contains a promise (or promises) to transfer goods or services to a customer. A performance obligation is a promise (or a group of promises) that is distinct. The transaction price is the amount of consideration a Company expects to be entitled from a customer in exchange for providing the goods or services.

The unit of account for revenue recognition is a performance obligation (a good or service). A contract may contain one or more performance obligations. Performance obligations are accounted for separately if they are distinct. A good or service is distinct if the customer can benefit from the good or service either on its own or together with other resources that are readily available to the customer, and the good or service is distinct in the context of the contract. Otherwise performance obligations are combined with other promised goods or services until the Company identifies a bundle of goods or services that is distinct.

The transaction price is allocated to all the separate performance obligations in an arrangement. It reflects the amount of consideration to which the Company expects to be entitled in exchange for transferring goods or services, which may include an estimate of variable consideration to the extent that it is probable of not being subject to significant reversals in the future based on the Company's experience with similar arrangements. The transaction

price also reflects the impact of the time value of money if there is a significant financing component present in an arrangement. The transaction price excludes amounts collected on behalf of third parties, such as sales taxes.

Revenue is recognized when the Company satisfies each performance obligation by transferring control of the promised goods or services to the customer. Goods or services can transfer at a point in time or over time depending on the nature of the arrangement.

A majority of our program services revenue is recognized as services are performed using percentage of completion method of contract accounting based on the output or input (i.e., units or labor hours) method, whichever is the most appropriate measure of progress towards completion of the contract.

Input method: The use of the input method requires the Company to make reasonably dependable estimates. We use the input method based on labor hours, where revenue is calculated based on the percentage of total hours incurred in relation to total estimated hours at completion of the contract. The input method is reasonable when the hours best reflect the Company's efforts toward satisfying the performance obligation over time. As circumstances change over time, the Company updates its measure of progress to reflect any changes in the outcome of the performance obligation. Such changes to the Company's measure of progress is accounted for as a change in accounting estimate.

Output method: We use the output method based on results achieved and delivered to the customer, where revenue is calculated based on the deliverables transferred to the customers as a percentage of total deliverables to be transferred to the customer at completion of the contract. The output method is reasonable when the deliverables best reflect the Company's efforts toward satisfying the performance obligation over time.

Licensing and royalty revenue - The Company recognizes revenue for licenses to intellectual property when earned pursuant to the terms of the agreements. Time-based license revenue is recognized ratably over the license term. Licensing and royalty revenue that becomes triggered by specific customer actions, such as exercise of a license option or by sales volume, is based on estimated end-market sales of products that incorporate our intellectual property. Revenue on the sale of intellectual property is recognized in full when title transfers if there are no remaining deliverables related to the intellectual property purchase.

Deferred Revenue

Deferred revenue represents amounts collected from customers for which the related revenue has not been recognized, because one or more of the revenue recognition criteria have not been met, net of the associated costs. The current portion of deferred revenue represents the amount that is expected to be recognized as revenue within one year from the balance sheet date. When deferred revenues are recognized as revenues, the associated deferred costs are also recognized as cost of revenues.

Accounts Receivable and Allowance for Doubtful Accounts

Trade accounts receivable are recorded at invoiced amounts and unbilled contractually obligated amounts. Trade accounts receivable are presented net of allowances for doubtful accounts, if applicable, and do not bear interest. The allowance for doubtful accounts is based on the Company's assessment of the collectability of its customer accounts. The Company reviews the allowance by considering certain factors such as historical experience, industry data, credit quality, age of balances and current economic conditions that may affect customers' ability to pay. The Company did not have any allowances for doubtful accounts as of December 31, 2018 and December 31, 2017.

Concentration of Revenue and Accounts Receivable

Significant customers are those that represent 10% or more of the Company's total revenue or accounts receivable. For each significant customer, including related parties, revenue as a percentage of total revenue and accounts receivable as a percentage of total accounts receivable are as follows:

| | Revenue | | Accounts Receivable | |
|------------|-------------------------------------|--------|----------------------------------|-------------------------------|
| | Years Ended December 31, 2018 | 2017 | As of December 31, 2018 | As of December 31, 2017 |
| Customer A | 57 % | 57 % * | 72 % | 72 % |
| Customer B | * | 13 % * | * | * |
| Customer C | 18 % | * * | 10 % | 19 % |
| Customer D | * * | * * | 26 % | * |
| Customer E | * * | * * | 12 % | * |
| Customer F | * * | * * | 26 % | * |
| Customer G | * * | * * | 17 % | * |

*less than 10%

Cost of Revenue

Cost of revenue is primarily comprised of salaries and other personnel-related expenses for research and development scientists, engineers and development process operations employees. Additionally, cost of revenue includes wafers, targets, materials, program-related supplies, depreciation on equipment used in programs and allocated facility-related costs.

Inventory obsolescence and customer related asset impairments are included in cost of program and services revenue. Product cost of revenue consists of cost of products sold. Cost of licensing and royalty includes amortization of acquired patents and licensing obligations.

Research and Development

Research and development expenses, including direct and allocated expenses, are expensed as incurred. Research and development costs include salaries of technical staff, consultant costs, research and development parts and prototypes, wafers, chemicals, research and development supply costs, facilities rental, utilities costs related to laboratories and offices occupied by technical staff, depreciation on equipment used by technical staff, impairment expense, and outside services, such as machining and third-party research and development costs.

Income Taxes

Income taxes have been accounted for under the asset and liability method. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax basis of assets and liabilities as measured by the enacted tax rates that will be in effect when these differences reverse. Accordingly, realization of any deferred tax assets is dependent on future taxable income against which these deductions, losses and credits can be utilized.

The Company assesses the likelihood that the deferred tax assets will be recovered and establishes a valuation allowance to the extent the Company believes that it is more likely than not that all or some portion of the asset will not be realized due to the inability to generate sufficient taxable income in the period and/or of the character necessary to utilize the benefit of the deferred tax asset. The Company recorded a full valuation allowance against its deferred tax assets as of December 31, 2018 and 2017. Based on the available evidence, the Company believed it was more likely than not that it would not be able to utilize its deferred tax assets in the future. The Company intends to maintain a full valuation allowance until and if sufficient evidence exists to support all or a portion of its reversal.

The Company regularly reviews its tax positions for benefits to be realized. A tax position must be more likely than not to be sustained upon examination to justify recognition of a benefit for that position. The amount recognized is measured as the largest amount of benefit that is more likely than not to be realized upon settlement. The Company's policy is to recognize interest and penalties related to income tax matters as income tax expense. As of December 31, 2018, the Company has not recognized any interest or penalties associated with unrecognized tax benefits.

Stock-Based Compensation

The Company measures and recognizes compensation expense for all stock-based payment awards issued to employees and directors including employee stock options and restricted stock units based on estimated fair values. The Company uses the grant-date fair value of its common stock to determine the fair value of restricted stock units. The Company uses the Black-Scholes-Merton option pricing model to determine the fair value of stock options. Stock-based compensation cost is recorded net of estimated forfeitures on a straight-line basis over the requisite service period (generally the vesting period).

The Company accounts for stock options issued to nonemployees based on the fair value of the options determined using the Black-Scholes-Merton option-pricing model. The fair value of stock options granted to nonemployees is re-measured each reporting period as the stock options vest and the resulting change in value, if any, is recognized in the Company's consolidated statements of operations during the period the related services are rendered.

Employee Savings Plan

The Company has a savings plan in the United States that qualifies under Section 401(k) of the Internal Revenue Code. Participating employees may contribute up to the statutory limits. The Company is not committed to make and has not made employer contributions to the plan to date.

Segment Information

The Company operates in one reportable segment. The Company's chief operating decision-maker, its chief executive officer, reviews its operating results on an aggregate basis and manages its operations as a single operating segment.

Fair Value of Financial Instruments

The Company measures and reports its cash equivalents and short-term investments at fair value. Fair value is defined as the exchange price that would be received for an asset or an exit price paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. The fair value hierarchy defines a three-level valuation hierarchy for disclosure of fair value measurements as follows:

Level I - Unadjusted quoted prices in active markets for identical assets or liabilities;

Level II - Inputs other than quoted prices included within Level I that are observable, unadjusted quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the related assets or liabilities; and

Level III - Unobservable inputs that are supported by little or no market activity for the related assets or liabilities.

The categorization of a financial instrument within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

The Company's financial instruments consist of Level I and Level II assets. Level I securities include highly liquid money market funds and certificates of deposit and Level II securities include corporate debt securities and commercial paper. There were no Level III assets or liabilities during the two year period ended December 31, 2018.

Foreign Currency

The functional currency of foreign subsidiaries is the U.S. dollar and foreign currency transaction gains and losses are recorded in other income (expense), net.

Net Loss per Share of Common Stock

The Company's basic net loss per share of common stock is calculated by dividing the net loss by the weighted average number of shares of common stock outstanding for the period. The diluted net loss per share of common stock is computed by giving effect to all potential common stock equivalents outstanding for the period determined using the treasury stock method for common stock equivalents. For purposes of this calculation, options to purchase common stock, common stock subject to repurchase and warrants to purchase common stock are considered to be common stock equivalents but have been excluded from the calculation of diluted net loss per share of common stock as their effect is antidilutive.

Recent Accounting Pronouncements

Standards adopted in 2018

Revenue Recognition

On January 1, 2018, we adopted ASU 2014-09 (or "ASC 606"), the comprehensive new revenue recognition standard issued by the Financial Accounting Standards Board (FASB). The core principle of the new standard is that a company should recognize revenue to depict the transfer of promised services or products to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those services or products. The standard creates a five step model that requires companies to exercise judgment when considering the terms of a contract and all relevant facts and circumstances.

We adopted the new revenue recognition standard using the modified retrospective basis and applied the guidance to all contracts that were not completed as of January 1, 2018. This resulted in an immaterial cumulative-effect adjustment to retained earnings as of January 1, 2018. The comparative financial information has not been restated and continues to be reported under the revenue accounting standards in effect during those periods. The adoption of this standard did not have a material impact to our consolidated financial position, reported revenue, results of operations or cash flows as of and for the year ended December 31, 2018.

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The cumulative effect of the changes made to our Condensed Consolidated Balance Sheet, as of January 1, 2018, as a result of the adoption of ASC 606 were as follows (in thousands):

| | Balance at December 31, 2017 | Adjustment Due to ASC 606 | Balance at January 1, 2018 |
|---|------------------------------------|---------------------------------|----------------------------------|
| Condensed Consolidated Balance Sheet | | | |
| Assets | | | |
| Accounts receivable | \$5,519 | \$ 475 | \$5,994 |
| Stockholders' equity | | | |
| Accumulated deficit | \$(178,738) | \$ 475 | \$(178,263) |

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The impact of ASC 606 adoption on our condensed consolidated Statement of Operations and Balance Sheet were as follows (in thousands):

| | For the Year ended | | |
|---|--------------------|-----------------------------|---------------------------------|
| | December 31, 2018 | | |
| | As Reported | Without Adoption of ASC 606 | Effect of Change Higher/(Lower) |
| Condensed Consolidated Statement of Operations | | | |
| Revenues | | | |
| Licensing and royalty revenue | \$1,676 | \$1,762 | \$ (86) |
| Net loss | (3,411) | (3,325) | 86 |
| Condensed Consolidated Balance Sheet | | | |
| Assets | | | |
| Accounts receivable | 3,349 | 2,960 | 389 |
| Stockholders' equity | | | |
| Accumulated deficit | \$(181,673) | \$(182,062) | \$ (389) |

Contract balances

The timing of revenue recognition, billings and cash collections results in billed accounts receivable, unbilled receivables (contract assets), and deferred revenue (contract liabilities) on the Condensed Consolidated Balance Sheet. For our contracts, amounts are billed at periodic intervals, such as on monthly basis. Generally, contract assets results from revenue recognition in advance of billings, and contract liabilities results from billing in advance of revenue recognition. These assets and liabilities are reported on the Condensed Consolidated Balance Sheets at the end of each reporting period. The following table provides information about contract assets and contract liabilities from contracts with customers (in thousands):

| | Balance at December 31, 2018 | Balance at December 31, 2017 |
|--|------------------------------|------------------------------|
| Receivables, which are included in Accounts receivable | \$ 2,258 | \$ 5,259 |
| Contract assets | 1,091 | 260 |
| Contract liabilities | \$ 917 | \$ 941 |

All of the contract liability balance at the beginning of year of \$0.9 million was recognized as revenue for the year ended December 31, 2018.

Practical Expedients and Exemptions

We generally expense sales commissions when incurred because the amortization period would have been one year or less. These costs are recorded within sales and marketing expenses.

We do not disclose the value of unsatisfied performance obligations for contracts with an original expected length of one year or less.

Standards not yet adopted

Leases

In February 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update No. 2016-02 (Topic 842) "Leases." Topic 842 supersedes the lease requirements in Accounting Standards

Codification (ASC) Topic 840, "Leases." Under Topic 842, lessees are required to recognize assets and liabilities on the balance sheet for most leases and provide enhanced disclosures. Leases will continue to be classified as either finance or operating. We will adopt Topic 842 effective January 1, 2019 using the modified retrospective transition method and will not restate comparative periods. As permitted under the transition guidance, we will carry forward the assessment of whether our contracts contain or are leases, classification of our leases and remaining lease terms. Based on our portfolio of leases as of December 31, 2018, approximately \$11.6 million of lease assets and liabilities will be recognized on our balance sheet upon adoption, primarily relating to real estate.

Nonemployee Share-Based Payments

In June 2018, the FASB issued ASU 2018-07, Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting ("ASU 2018-07"), to simplify the accounting for share-based payments to nonemployees by aligning it with the accounting for share based payments to employees with certain exceptions. Under the guidance, the measurement of equity-classified nonemployee awards will be fixed at the grant date, which may lower their cost and reduce volatility in the income statement. The guidance is effective for us for our first quarter of 2019. Early adoption is permitted. ASU 2018-07 shall be applied on a modified retrospective basis through a cumulative-effect adjustment to retained earnings as of the beginning of the fiscal year in which the guidance is adopted. We have evaluated this new guidance and do not expect the adoption of the guidance to have a material impact on our consolidated financial statements.

2. Fair Value of Financial Instruments

The Company measures and reports its cash equivalents and investments at fair value. The carrying amounts for cash equivalents and investments approximate their fair values. The following tables set forth the fair value of the Company's cash equivalents and investments by level within the fair value hierarchy (in thousands):

| | As of December 31, 2018 | | | |
|--|-------------------------|---------|----------|-----------|
| | Fair Value | Level I | Level II | Level III |
| Assets: | | | | |
| Money market funds | \$5,383 | \$5,383 | \$— | \$— |
| Corporate debt securities and commercial paper | 22,098 | — | 22,098 | — |
| Total assets measured at fair value | \$27,481 | \$5,383 | \$22,098 | \$— |

| | As of December 31, 2017 | | | |
|--|-------------------------|---------|----------|-----------|
| | Fair Value | Level I | Level II | Level III |
| Assets: | | | | |
| Money market funds | \$2,279 | \$2,279 | \$— | \$— |
| Corporate debt securities and commercial paper | 19,717 | — | 19,717 | — |
| Total assets measured at fair value | \$21,996 | \$2,279 | \$19,717 | \$— |

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Investments are classified as “available-for-sale” and are carried at fair value based on quoted markets or other readily available market information. The Company's investment policy requires investments to have a less than twenty four month maturity term and a minimum credit rating of A-. Unrealized gains and losses, net of taxes, are included in accumulated other comprehensive loss. Gains and losses are determined using the specific identification method. Cash, cash equivalents, and investments consisted of the following as of December 31, 2018 (in thousands):

| | As of December 31, 2018 | | | Estimated |
|---|-------------------------|------------------|-------------------|------------------|
| | Amortized Cost | Unrealized Gains | Unrealized Losses | Fair Value |
| Assets: | | | | |
| Cash | \$2,968 | \$ — | \$ — | \$ 2,968 |
| Money market funds | 5,383 | — | — | 5,383 |
| Corporate debt securities and commercial paper | 22,125 | — | (27) | 22,098 |
| Total cash, cash equivalents and investments | \$30,476 | \$ — | \$ (27) | \$ 30,449 |

As of December 31, 2017 the Company had \$36,000 of unrealized losses.

3. Property and Equipment

Property and equipment consist of the following (in thousands):

| | As of | |
|---------------------------------|---------------|-------------------|
| | December 2018 | December 31, 2017 |
| Lab equipment and machinery | \$59,413 | \$ 58,937 |
| Leasehold improvements | 6,420 | 6,248 |
| Computer equipment and software | 4,512 | 4,726 |
| Furniture and fixtures | 221 | 221 |
| Construction in progress | 1,025 | 282 |
| Total property and equipment | 71,591 | 70,414 |
| Less accumulated depreciation | (68,159) | (64,501) |
| Property and equipment, net | \$3,432 | \$ 5,913 |

During 2018, the Company determined that it identified indicators of impairment relating to certain lab equipment. Based on this evaluation, the Company recorded an impairment charge of \$0.1 million. Fair value was based on expected future cash flows using Level 3 inputs under ASC 820. Because of changing market conditions, it is reasonably possible that the estimate of expected future cash flows may change in the near term resulting in the need to further adjust our determination of fair value. As discussed in Note 1, Impairment of Long-Lived Assets, the Company recorded \$0.1 million impairment-related expenses during the year ended December 31, 2017.

The following table presents depreciation expense included in the Consolidated Statement of Operations and includes amortization of leasehold improvements (in thousands):

| | Years Ended | |
|----------------------|-------------------|-------------------|
| | December 31, 2018 | December 31, 2017 |
| Depreciation expense | \$3,958 | \$5,736 |

4. Intangible Assets

Intangible assets consist of the following (in thousands):

| | As of | |
|--------------------------|--------------|--------------|
| | December 31, | December 31, |
| | 2018 | 2017 |
| Patents issued | \$2,847 | \$ 3,829 |
| Patents pending | 89 | 128 |
| Trademarks | 40 | 40 |
| Total intangible assets | 2,976 | 3,997 |
| Less patent amortization | (901) | (1,377) |
| Intangible assets, net | \$2,075 | \$ 2,620 |

Amortization commences upon patent issuance. The useful life of the patents, once issued, will not exceed 20 years, and will depend on the nature of the patent. The average estimated amortization period of the Company's current portfolio is approximately 17 years from the date of patent issuance factoring in approximately 3 years on average for prosecution of the pending patents.

During 2018, the Company identified certain patents with carrying values deemed to not be recoverable. Based on this evaluation, the Company recorded an impairment charge of \$0.3 million related to these patents. Fair

value was based on expected future cash flows using Level 3 inputs under ASC 820. The cash flows are those expected to be generated by the market participants, discounted at the risk-free rate of interest. Because of changing market conditions (i.e., less marketplace demand and rising interest rates), it is reasonably possible that the estimate of expected future cash flows may change in the near term resulting in the need to further adjust our determination of fair value. As discussed in Note 1, Impairment of Long-Lived Assets, the Company recorded impairment-related expenses of \$0.6 million during the year ended December 31, 2017.

The following table presents patent amortization expense included in the Consolidated Statement of Operations (in thousands):

| | Years Ended December 31, | |
|----------------------|-----------------------------|--------|
| | 2018 | 2017 |
| Amortization expense | \$ 214 | \$ 317 |

Estimated future aggregate annual amortization expense for both issued and pending intangible assets is as follows (in thousands):

| As of December 31, 2018: | |
|--------------------------|---------|
| 2019 | \$207 |
| 2020 | 178 |
| 2021 | 178 |
| 2022 | 178 |
| 2023 | 178 |
| Thereafter | 1,116 |
| Total | \$2,035 |

5. Commitments and Contingencies

Operating Leases

The Company entered into an operating lease agreement in May 2010 for its San Jose headquarters that was subsequently modified in November 2013, which extended the term of the lease for a period of approximately one hundred thirty-nine (139) months from the date of the modified agreement and provided the Company with four months of free rent. In addition, the Company received a tenant improvement allowance of \$1.0 million in the aggregate that was paid to the Company in equal installments over the course of the ten months after the date of the modified agreement to be used for the modification, refurbishment, construction or installation of improvements to the facility. On May 6, 2015, the lease was further amended (second amendment) to reflect the building's new ownership and an adjustment in rent schedules, in which case the monthly rent payments were reduced by \$49,000 each month from July 2015 to October 2015 and were then increased by the same amount from November 2015 to February 2016. The total rent payments under the lease, however, remain unchanged.

The following table presents rent expense included in the Consolidated Statement of Operations (in thousands):

| | Years Ended December 31, | |
|--------------|-----------------------------|---------|
| | 2018 | 2017 |
| Rent expense | \$2,250 | \$2,249 |

Future commitments and obligations under this operating lease to be satisfied as they become due over the term are as follows (in thousands) as of December 31, 2018:

| The years ending December 31, | |
|-------------------------------|----------|
| 2019 | 2,521 |
| 2020 | 2,584 |
| 2021 | 2,648 |
| 2022 | 2,714 |
| 2023 | 2,782 |
| Thereafter | 4,308 |
| Total | \$17,557 |

During 2018, the Company made payments in the amount of \$2.5 million related to this operating lease. In December 2015, the company signed a sublease to lease out a portion of office space. The sublessee began during the second quarter of fiscal 2016. The term of the lease is for 3 years and rental payments from the sublessee are approximately \$0.3 million per annum.

Capital Leases

During the third quarter of 2016, the Company leased a furnace under a three year lease agreement which was accounted for as a capital lease under ASC 840-30; the underlying asset is included in lab equipment and machinery. The Company terminated the lease in August 2017, recognized a loss of \$29,000 and the capital lease obligation of \$49,000 was cancelled with no future commitments or obligations thereunder being due in any subsequent period. The net book value of the underlying asset as of the termination date was \$79,000.

Depreciation expense of the furnace recorded under the capital lease obligations was \$11,000 for the year ended December 31, 2017.

Litigation

The Company is subject to various claims arising in the ordinary course of business. Although no assurance may be given, the Company believes that it is not presently a party to any litigation of which the outcome, if determined adversely, would individually or in the aggregate be reasonably expected to have a material adverse effect on the business, operating results, cash flows or financial position of the Company.

Third parties and others may claim in the future that the Company has infringed their past, current or future intellectual property rights. These claims, whether meritorious or not, could be time-consuming, result in costly litigation, require expensive changes in the Company's methods of doing business or require the Company to enter into costly royalty or licensing agreements, if available. As a result, these claims could harm the Company's business, operating results, cash flows and financial position.

6. Stock-Based Compensation

During the year ended December 31, 2011, the board of directors approved the 2011 Equity Incentive Plan (2011 Plan). A total of 4,225,648 shares of common stock were reserved for future issuance under the 2011 Plan, which became effective on November 17, 2011. The Company has a 2004 Equity Incentive Plan (2004 Plan), but no longer grants stock options under this plan. Canceled or forfeited stock option grants under the 2004 Plan will be added to the total amount of shares available for grant under the 2011 Plan. In addition, shares authorized but unissued as of November 17, 2011 under the 2004 Plan were added to shares available for grant under the 2011 Plan. The 2011 Plan contains an "evergreen" provision, pursuant to which the number of shares available for issuance under the 2011 Plan may be increased on the first day of the fiscal year, in an amount equal to the least of (a) 2,535,389 shares, (b) 4.5% of the outstanding Shares on the last day of the immediately preceding fiscal year or (c) such number of shares determined by the board of directors. During 2018 the Company registered an additional 2,230,637 shares under its 2011 Plan.

The 2011 Plan allows the Company to award stock options (incentive and non-qualified), restricted stock, restricted stock units, stock appreciation rights, deferred stock awards, dividend equivalents, performance awards, stock payments, performance shares and other incentive awards, or any combination thereof to employees, officers, directors and consultants of the Company. The exercise price of incentive stock options, which may only be granted to employees, granted under the 2011 Plan to participants with less than 10% voting power of all classes of stock of the Company or any parent or subsidiary company may not be less than 100% of the fair market value of the Company's common stock on the date of the grant. The exercise price of incentive stock options granted under the 2011 Plan to participants with 10% or more voting power of all classes of stock of the Company or any parent or subsidiary company may not be less than 110% of the fair market value of the Company's common stock on the date of the grant. Options granted under the 2011 Plan generally expire ten years from the date of grant and are generally exercisable at any time after the date of grant when the shares are vested. Incentive and nonstatutory stock options granted generally vest at a rate of 25% on the first anniversary of the commencement or grant date and 1/48th each month thereafter. Incentive stock options granted to participants with 10% or more of the voting power of all classes of the Company's common stock on the date of grant have a maximum term of five years from the date of grant. During 2014, the Company granted \$1.3 million of options with two year vesting, with 50% vesting on the first anniversary of the vesting commencement date and the remaining shares vesting monthly such that all shares are vested on the second anniversary of the vesting commencement date.

Option activity for the periods presented is as follows:

| | Options Outstanding | | Weighted-Average Remaining Contractual Life (Years) | Aggregate Intrinsic Value (in thousands) |
|---|-------------------------------------|---|---|--|
| | Number of Stock Options Outstanding | Weighted-Average Exercise Price per share | | |
| Balance as of December 31, 2016 | 10,023,600 | 2.04 | 7.2 | 15 |
| Granted | 2,831,600 | 1.08 | | |
| Exercised | (6,270) | 0.99 | | |
| Cancelled | (4,440,702) | 2.02 | | |
| Balance as of December 31, 2017 | 8,408,228 | \$ 1.72 | 7.6 | \$ 993 |
| Granted | 1,654,400 | 1.36 | | |
| Exercised | (163,780) | 1.14 | | |
| Cancelled | (3,569,111) | 2.09 | | |
| Balance as of December 31, 2018 | 6,329,737 | \$ 1.44 | 7.8 | \$ 137 |
| Exercisable as of December 31, 2018 | 3,078,712 | \$ 1.65 | 6.7 | \$ 67 |
| Vested and expected to vest as of December 31, 2018 | 5,546,608 | \$ 1.47 | 7.6 | \$ 122 |

Restricted stock award and restricted stock unit (RSUs) activity for the periods presented is as follows:

| | Number of Stock RSUs Outstanding | Weighted- Average Grant Date Fair Value per share |
|---|--|--|
| Balance as of December 31, 2016 | 352,413 | 2.44 |
| Granted | 300,000 | 0.96 |
| Vested | (73,673) | 5.39 |
| Forfeited | (54,725) | 3.37 |
| Balance as of December 31, 2017 | 524,015 | 1.09 |
| Granted | 1,845,000 | 1.21 |
| Vested | (24,015) | 3.60 |
| Forfeited | (500,000) | 0.96 |
| Balance as of December 31, 2018 | 1,845,000 | \$ 1.21 |
| Vested and expected to vest as of December 31, 2018 | 1,349,030 | |

Typically, vesting of RSUs occurs over four years and is subject to the employee's continuing service to the Company. The aggregate intrinsic value of RSUs outstanding at December 31, 2018 and 2017 was \$1.9 million and \$0.7 million, respectively.

RSUs that vested during 2018 and 2017 had fair values of thirty-three thousand and \$0.1 million as of the vesting date, respectively.

The following table presents details on grants made by the Company for the following periods:

| | Years Ended December 31, 2018 | | Years Ended December 31, 2017 | |
|---------------|----------------------------------|--|----------------------------------|--|
| | Shares Granted | Weighted- Average Grant Date Fair Value per share | Shares Granted | Weighted- Average Grant Date Fair Value per share |
| Stock options | 1,654,400 | \$ 1.36 | 2,831,600 | \$ 1.08 |
| RSUs | 1,845,000 | \$ 1.21 | 300,000 | \$ 0.96 |

As of December 31, the Company had reserved shares of common stock for issuance as follows:

| | 2018 | 2017 |
|-------------------------------------|------------|-----------|
| Number of stock options outstanding | 6,329,737 | 8,408,228 |
| Number of RSUs outstanding | 1,845,000 | 519,015 |
| Shares available for future grant | 11,280,677 | 8,780,322 |

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Total shares reserved 19,455,414 17,707,565

The Company recognized stock-based compensation expense for awards granted to its employees and nonemployees as follows (in thousands):

| | Years Ended | |
|--------------------------------|--------------|---------|
| | December 31, | |
| | 2018 | 2017 |
| Cost of revenue | \$170 | \$191 |
| Research and development | 297 | 373 |
| Sales and marketing | 121 | 119 |
| General and administrative | 465 | 789 |
| Total stock-based compensation | \$1,053 | \$1,472 |

The following table presents stock-based compensation expense, net of estimated forfeitures, by grant type (in thousands):

| | Years Ended | |
|--|--------------|---------|
| | December 31, | |
| | 2018 | 2017 |
| Stock options | \$878 | \$1,301 |
| Restricted stock awards and restricted stock units | | |
| (RSUs) | 175 | 171 |
| Total stock-based compensation | \$1,053 | \$1,472 |

The following table presents unrecognized compensation expense, net of estimated forfeitures, related to the Company's equity compensation plans as of December 31, 2018, which is expected to be recognized over the following weighted-average periods, (in thousands, except for weighted-average period):

| | Unrecognized Compensation Expense | Weighted-Average Period (in years) |
|---------------|-----------------------------------|------------------------------------|
| Stock options | \$ 1,480 | 2.6 |
| RSUs | \$ 1,381 | 1.8 |

There were no capitalized stock-based compensation costs or recognized stock-based compensation tax benefits during the years ended December 31, 2018 and 2017.

Additional information regarding options outstanding as of December 31, 2018, is as follows:

| Range of Exercise Prices | Options Outstanding | | Weighted-Average Exercise Price per Share | Options Exercisable | |
|--------------------------|---------------------|---|---|---------------------|---------------------------------|
| | Options Outstanding | Weighted-Average Remaining Contractual Life (Years) | | Exercisable | Weighted-Average Exercise Price |
| \$0.00 to \$1.50 | 4,836,092 | 8.43 | \$ 1.20 | 1,689,738 | \$ 1.15 |
| \$1.51 to \$3.00 | 1,365,695 | 5.49 | 1.84 | 1,261,024 | 1.84 |
| \$3.01 to \$4.50 | 21,950 | 1.95 | 3.40 | 21,950 | 3.40 |
| \$6.01 to \$7.50 | 73,000 | 2.78 | 6.37 | 73,000 | 6.37 |
| \$7.51 to \$9.00 | 30,000 | 4.41 | 8.21 | 30,000 | 8.21 |
| \$9.01 to \$10.50 | 3,000 | 4.07 | 9.46 | 3,000 | 9.46 |
| | 6,329,737 | 7.77 | \$ 1.44 | 3,078,712 | \$ 1.65 |

Determining Fair Value of Stock Options

Stock-based compensation cost is measured at the grant date based on the fair value of the award. We are required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates. We use historical data to estimate forfeitures and record stock-based compensation expense only for those awards that are expected to vest.

Valuation Method — The Company estimates the fair value of its stock options using the Black-Scholes-Merton option-pricing model.

Expected Term — The expected term represents the period that the stock-based awards are expected to be outstanding. For option grants that are considered to be "plain vanilla," the Company used the simplified method to determine the expected term as provided by the Securities and Exchange Commission. The simplified method calculates the expected term as the average of the time-to-vesting and the contractual life of the options.

Expected Volatility — The expected volatility is derived from the Company's historical stock price following its IPO in November 2011.

Risk-Free Interest Rate — The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant for zero coupon U.S. Treasury notes with maturities approximately equal to the expected term of the options.

Expected Dividend — The expected dividend has been zero as the Company has never paid dividends and does not expect to pay dividends.

Summary of Assumptions — The fair value of the employee stock options were estimated on the grant dates using a Black-Scholes-Merton option-pricing model with the following weighted average assumptions:

| | Years Ended | |
|--------------------------|--------------|-------|
| | December 31, | |
| | 2018 | 2017 |
| Expected term (in years) | 6.0 | 6.0 |
| Risk-free interest rate | 2.8 % | 2.1 % |
| Expected volatility | 54 % | 55 % |
| Expected dividend rate | — % | — % |

7. Net Loss per Share of Common Stock

The following outstanding shares of common stock equivalents were excluded from the computation of diluted net loss per share of common stock for the periods presented because including them would have been antidilutive:

| | Years Ended | |
|--|--------------|-----------|
| | December 31, | |
| | 2018 | 2017 |
| Stock options to purchase common stock | 6,329,737 | 8,408,228 |
| RSUs | 1,845,000 | 519,015 |

8. Income Taxes

The Company follows FASB ASC 740, Income Taxes, for the computation and presentation of its tax provision. For the year ended December 31, 2018, the income tax provision of \$1,000 represents a provision for income taxes of nil related to foreign income taxes and state minimum income taxes of \$1,000.

The provision for annual income taxes consisted of the following (in thousands):

| | As | |
|----------------------------------|-----------------|------|
| | of December 31, | |
| | 2018 | 2017 |
| U.S. Federal | \$ — | \$ — |
| State | 1 | 1 |
| Foreign | — | — |
| Total current | \$ 1 | \$ 1 |
| Deferred | \$ — | \$ — |
| Total deferred | \$ — | \$ — |
| Total provision for income taxes | \$ 1 | \$ 1 |

The reconciliation of federal statutory income tax to the Company's provision for income taxes is as follows (in thousands):

| | As of December 31, | |
|---|-----------------------|-------------|
| | 2018 | 2017 |
| Expected tax benefit at statutory federal rate | \$ (718) | \$ (3,641) |
| State tax—net of federal benefit | 1 | 1 |
| U.S. federal research credit | (673) | (654) |
| Non deductible expenses | 878 | 23 |
| Others | 3 | (9) |
| Change in valuation allowance | 510 | (6,017) |
| Rate differential impact on tax cuts and jobs act | — | 10,298 |
| Provision for income taxes | \$ 1 | \$ 1 |

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets and liabilities are as follows (in thousands):

| | As of December 31, | |
|---|-----------------------|-------------|
| | 2018 | 2017 |
| Deferred tax assets: | | |
| Net operating loss federal and state | \$ 19,134 | \$ 18,494 |
| Research and foreign tax credits | 11,185 | 10,007 |
| Accrued compensation and vacation | 222 | 226 |
| Deferred revenue, other accruals and reserves | 2,543 | 2,463 |
| Stock-based compensation | 1,172 | 2,048 |
| Patents | 435 | 723 |
| Property and equipment | 1,323 | 1,225 |
| Gross deferred tax assets | \$ 36,014 | \$ 35,186 |
| Valuation allowance | \$ (36,014) | \$ (35,186) |
| Total deferred tax asset | \$ — | \$ — |
| Deferred tax liabilities: | | |
| Property and equipment | \$ — | \$ — |
| Total deferred tax liabilities | \$ — | \$ — |
| Net deferred tax assets | \$ — | \$ — |

The Company has established valuation allowances for U.S. federal and state deferred tax assets. The valuation allowances require an assessment of both positive and negative evidence when determining whether it is more likely than not that deferred tax assets are recoverable. Such assessment is required on a jurisdiction by jurisdiction basis.

During the year ended December 31, 2018, the Company continued to maintain the valuation allowances for U.S. federal and state deferred tax assets. The Company intends to maintain a full valuation allowance until sufficient positive evidence exists to support reversal. The valuation allowance for deferred tax assets was \$36.0 million and \$35.2 million as of December 31, 2018 and 2017, respectively. The increase in the valuation allowance during the year ended December 31, 2018 was \$0.8 million. The decrease in the valuation allowance during the years ended December 31, 2017 was \$26.6 million primarily comprised of \$24.6M due to Sec. 382 limitation on tax attributes and \$10.3M due to the reduction in the corporate tax rate as a result of the Job Cuts and Tax Act, offset by an increase of \$5.9M due to the impact of ASU 2016-09.

As of December 31, 2018, the Company has net operating loss carryforwards for U.S. federal and state income tax purposes of approximately \$69.6 million and \$64.6 million, respectively. The U.S. federal net operating loss carryforwards will begin to expire in 2026 while for state purposes, the net operating losses will begin to expire in 2028. The Internal Revenue Code (IRC) contains a provision which limits the amount of net operating loss (NOL) and research credit carryforwards that can be used in any given year if a significant change in ownership has occurred. As of December 31, 2018, \$70.4 million and \$45.4 million of the Company's federal and California NOL carryovers, respectively, are both subject to an annual limitation of \$1.2 million imitation, of which \$23.1 million of

both federal and California NOLs, would be available to offset future taxable income in the twenty-year carryforward period.

In addition, the Company has \$3.9 million U.S. federal R&D credit and \$12.8 million California R&D credit carryforwards to offset future income tax liabilities. U.S. federal R&D tax credits can be carried forward for 20 years and will start to expire in 2028. California R&D credits can be carried forward indefinitely. As of December 31, 2018, \$7.8 million of the Company's R&D credit carryovers is subject to an annual limitation of \$1.2 million limitation, of which Nil R&D credits would be available to offset future taxable income in the twenty-year carryforward period.

Uncertain Tax Positions

For the year ended December 31, 2018, the total amount of unrecognized tax benefits excluding interest thereon was \$3.3 million, none of which would impact the effective tax rate if realized during the year. The Company has not accrued interest and penalties related to the unrecognized tax benefits reflected in the financial statements for the years ended December 31, 2018 and 2017. Although the timing and outcome of income tax audits is highly uncertain, unrecognized tax benefits are not expected to decrease in the next twelve months.

The following table summarizes the activity related to unrecognized tax benefits (in thousands):

| | Years Ended December 31, | |
|--|-----------------------------|---------|
| | 2018 | 2017 |
| Unrecognized benefit—beginning of period | \$3,007 | \$4,212 |
| Gross decreases—prior period tax positions | — | (1,557) |
| Gross increases—current period tax positions | 327 | 352 |
| Unrecognized benefit—end of period | \$3,334 | \$3,007 |

The Company's U.S. federal, state and local and foreign income tax returns are subject to audit by relevant tax authorities. The Company's income tax reporting periods beginning with tax year ended December 31, 2014 for the U.S., and tax year ended December 31, 2013 for the Company's major state and local jurisdictions remain generally open to audit by relevant tax authorities.

Tax Cuts and Jobs Act

On December 22, 2017, the United States (U.S.) enacted the Tax Cuts and Jobs Act (The Act), which made significant changes to U.S. federal income tax law affecting Company. Set forth below is a discussion of certain provisions of The Act and Company's assessment of the impact of such provisions on its financials.

Reduction in Corporate Tax Rate: Effective January 1, 2018, the Company's U.S. income will be taxed at a 21% down from the 35% federal corporate rate. As a result of the reduction in the corporate income tax rate, the Company

revalued its net deferred tax asset at December 31, 2017. This resulted in a reduction of \$10.2 million in the value of the net deferred tax asset, which was entirely offset by the change in valuation allowance due to the Company's full valuation allowance position.

Accelerated Expensing of Property: The Act extended and modified IRC §168(k) bonus depreciation provisions, allowing businesses to immediately deduct 100% of the cost of eligible property in the year it is placed in service, through 2022. The amount of allowable bonus depreciation is then phased down over four years: 80% will be allowed for property placed in service in 2023, 60% in 2024, 40% in 2025, and 20% in 2026. This provision did not have a material impact to the Company for 2018.

Section 162(m): The Act expanded the scope of the \$1 million deduction limitation and expanded the definition of a “covered person” under Internal Revenue Code (“IRC”) §162(m) for tax years beginning after December 31, 2017. The Act repealed the performance base exception; therefore, all compensation paid to a covered employee in excess of \$1 million will be nondeductible, unless it is subject to the transition rule. The Company has not limited its executive compensation tax deduction.

GILTI: The Act includes certain anti-deferral and anti-abuse erosion provisions, including a new minimum tax on global intangible low-taxed income ('GILTI'). The Act subjects the Company to current tax on GILTI of its controlled foreign corporations. At December 31, 2018, based on the Company's profile, this provision did not have a material impact and there is no tax expense impact related to GILTI inclusion.

On December 22, 2017, the SEC issued Staff Accounting Bulletin 118 ("SAB 118"), which provides guidance on accounting for tax effects of the Tax Act. SAB 118's measurement period close on December 22, 2018, one year from the Tax Act enactment. In accordance with SAB 118, the Company took a provisional amount for the one-time "deemed repatriation" of accumulated foreign earnings for the year ended December 31, 2017. Upon finalization of the provisional adjustment, there was no material change resulting in an adjustment to tax expense.

9. Related Party Transactions

In November 2006, the Company entered into an Alliance Agreement with a related party that was a beneficial owner of more than 5% of the Company's common stock at the time. As of December 31, 2015, this related party owned less than 5% of the Company's common stock. During the third quarter of 2016, this related party sold all its holdings of the Company's stock. Since November 2006, the agreement has been amended numerous times with the last amendment signed in December 2013. The other party to the Alliance Agreement and the Company each had an independent board member that served on both companies' boards of directors; however the independent board member for the other party to the Alliance Agreement did not stand for re-election as director at the other company effective May 24, 2017 and thus the other company is no longer a related party. As of December 31, 2018 and December 31, 2017, the Company had no accounts receivable or deferred revenue balance in either period with respect to its related party relationships.

The following table presents related party revenue included in the Consolidated Statement of Operations (in thousands):

| | Years Ended December 31, 2018 2017 | |
|-------------------------------|--|--------|
| Related party revenue | \$ — | \$ 383 |
| Related party cost of revenue | \$ — | \$ 1 |

As of December 31, 2018, two representative of an investment firm that is a beneficial owner of approximately 29.6% of the Company's common stock, are members of the board of directors of the Company. The Company incurred a director fees expense of \$97,000 and \$79,000 to the investment firm for fiscal year ended 2018 and 2017 respectively.

10. Information about Geographic Areas

Revenue

Revenue by geography is based on the billing address of the customer. The following table sets forth revenue by geographic area (in thousands):

| | Years Ended December 31, | |
|------------------------|-----------------------------|----------|
| | 2018 | 2017 |
| United States | \$8,041 | \$11,793 |
| Japan | 144 | 401 |
| Asia-Pacific ex Japan | 25,475 | 24,859 |
| Europe and Middle East | — | 150 |
| Total | \$33,660 | \$37,203 |

Long-Lived Assets

Substantially all of the Company's long-lived assets are located in the U.S. An insignificant amount of long-lived assets reside in the Company's foreign subsidiaries in Hong Kong and Taiwan.

11. Restructuring Charges

There were no restructuring charges in 2018. In March, 2017, the Company initiated a reduction in force to reduce non-core activities and operating costs and to improve profitability. The reduction in force constituted approximately 18% of the Company's global workforce. As a result of the reduction in force, the Company recorded expenses related to employee severance and termination benefits of approximately \$1.4 million. All such related expenses are recorded within "Restructuring charges" on the Consolidated Statements of Operations. The following table presents severance and related expenses and payments (in thousands) as of December 31, 2018.

| | As of December 31, 2017 | Charges | Cash Payments | As of December 31, 2018 |
|--------------------------------|-------------------------------|---------|---------------|-------------------------------|
| Severance and related expenses | \$ 15 | \$ — | \$ (15) | \$ — |

12. Subsequent Event

The Company has evaluated events up to the filing date of the Form 10-K and determined that no subsequent event activity required disclosure.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of the design and operation of our disclosure controls and procedures, as such term is defined in Rule 13a-15(e) promulgated under the Securities Exchange Act of 1934, as amended, as of December 31, 2018.

The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), means controls and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is (i) recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms and (ii) accumulated and communicated to our management, including the Chief Executive Officer and Chief Financial Officer, as the principal executive and financial officers, respectively, to allow timely decisions regarding required disclosures.

Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control over financial reporting is a process designed 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.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2018. In making this assessment, management used the criteria set forth in the framework established by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) entitled Internal Control-Integrated Framework (2013). Based on our assessment, management concluded that, as of December 31, 2018, our internal control over financial reporting was effective based on these criteria.

Changes in Internal Control over Financial Reporting

We made no changes to our internal control over financial reporting during the quarterly period ended December 31, 2018 that has materially affected, or that is reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our Chief Executive Officer and our Chief Financial Officer, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of internal control will be met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of the controls must be considered relative to their costs. While our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of their effectiveness, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, will be detected. These inherent limitations include the realities that judgments in decision making can be faulty and that

breakdowns can occur because of simple errors or mistakes. Controls can also be circumvented by the individual acts of some persons, by collusion of two or more people or by management override of the controls. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and may not be detected. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this item concerning our directors, executive officers, compliance with Section 16 of the Exchange Act, our code of ethics and Nominating and Corporate Governance Committee and Audit Committee is incorporated by reference to the information set forth in the sections under the headings "Election of Directors," "Executive Officers," "Section 16(a) Beneficial Ownership Reporting Compliance" and "Board of Directors, Corporate Governance and Related Matters" in our Definitive Proxy Statement to be filed with the Securities and Exchange Commission in connection with our 2019 Annual Meeting of Stockholders (the 2019 Proxy Statement).

We have adopted a Code of Business Conduct and Ethics that applies to all of our directors, officers and employees (the "Code of Ethics"). The Code of Ethics is available at the Investors/Governance/Governance Documents section of our website at www.intermolecular.com. A copy of the Code of Ethics is available in print, free of charge, to stockholders upon request to us at the address set forth in Item 1 of this Annual Report on Form 10-K. We intend to satisfy the disclosure requirements under the Securities and Exchange Act of 1934, as amended, regarding an amendment to or waiver from a provision of our Code of Ethics by posting such information on our web site.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item concerning executive compensation is incorporated by reference to the information in the 2019 Proxy Statement under the headings "Executive Compensation," "Board of Directors, Corporate Governance and Related Matters" and "Executive Compensation—Compensation Committee Report."

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this item concerning securities authorized for issuance under equity compensation plans and security ownership of certain beneficial owners and management is incorporated by reference to the information in the 2019 Proxy Statement under the headings "Executive Compensation—Equity Compensation Plan Information" and "Security Ownership of Directors and Executive Officers and Certain Beneficial Owners."

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by this item concerning transactions with related persons and director independence is incorporated by reference to the information in the 2019 Proxy Statement under the subheadings "Director Independence," "Transactions with Related Persons" and "Related Person Transaction Policy" under the heading "Board of Directors, Corporate Governance and Related Matters."

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item is incorporated by reference from the information in the 2019 Proxy Statement under the headings "Audit-related Matters" and "Ratification of the Appointment of the Independent Registered Public Accounting Firm."

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The following documents are filed as part of this report:

1. Financial Statements: See "Index to Consolidated Financial Statements" in Part II, Item 8 of this Form 10-K
2. All schedules are omitted because either they are not required information, or the required information is in the financial statements or notes thereto.
3. Exhibits: The exhibits listed in the accompanying index to exhibits are filed or incorporated by reference as part of this Form 10-K.

ITEM 16. FORM 10-K SUMMARY

None.

EXHIBITS

| Exhibit Number | Exhibit Description | Incorporated By Form | Reference Date | Filed Number | Herewith |
|----------------|---|----------------------|----------------|--------------|----------|
| 2.1 | <u>Asset Purchase Agreement by and between Intermolecular, Inc. and Symyx Technologies, Inc. dated as of July 28, 2011.</u> ⁽¹⁾ | S-1/A | 9/9/2011 | 2.1 | |
| 3.1 | <u>Amended and Restated Certificate of Incorporation of Intermolecular, Inc.</u> | 10-K | 03/16/2012 | 3.1 | |
| 3.2 | <u>Amended and Restated Bylaws of Intermolecular, Inc.</u> | 10-K | 03/16/2012 | 3.2 | |
| 4.1 | <u>Specimen Common Stock Certificate.</u> | S-1/A | 11/7/2011 | 4.1 | |
| 4.2 | <u>Warrant to purchase shares of common stock issued to Timane S.a.r.l. dated June 20, 2008.</u> | S-1 | 7/29/2011 | 4.2 | |
| 4.3 | <u>Fourth Amended and Restated Investor Rights Agreement dated as of March 4, 2011, by and among Intermolecular, Inc. and certain stockholders named therein, as amended by Amendment No. 1 to Fourth Amended and Restated Investor Rights Agreement dated as of June 14, 2011.</u> | S-1 | 7/29/2011 | 10.1 | |
| 4.4 | <u>Governance Agreement by and between Intermolecular, Inc. and Raging Capital Management, LLC.</u> | 8-K | 11/16/2016 | 10.1 | |
| 10.1 | <u>†Collaborative Development Program Agreement by and among SanDisk Corporation, Toshiba Corporation and Intermolecular, Inc. dated March 15, 2010.</u> | S-1/A | 11/7/2011 | 10.3 | |
| 10.2 | <u>†Alliance Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of November 17, 2006.</u> | S-1/A | 10/26/2011 | 10.4 | |
| 10.3 | <u>†Wets Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of July 13, 2007, as amended by the Addendum to Wets Workflow Purchase Agreement dated as of December 21, 2007, the Amendment to Addendum to Wets Workflow Purchase Agreement dated as of December 16, 2008 and the Supplemental Agreement to the Amendment to the Addendum to Wets Workflow Purchase Agreement dated as of March 16, 2009.</u> | S-1/A | 11/7/2011 | 10.5 | |
| 10.4 | <u>†Dry Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of December 16, 2008.</u> | S-1/A | 10/26/2011 | 10.6 | |

- 10.5 †Modification to the Wets Workflow Purchase Agreement and Dry Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of August 27, 2010. S-1/A 9/30/2011 10.7
- 10.6 †Amendment Number 5 to the Wets Workflow Purchase Agreement and Dry Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of March 3, 2011. S-1/A 9/30/2011 10.8

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| Exhibit Number | Exhibit Description | Incorporated By Form | Reference Date | Filed Number | Herewith |
|----------------|--|----------------------|----------------|--------------|----------|
| 10.7 | † <u>CDP Services Addendum to Dry Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of October 1, 2011, Amendment Number 6 to the Wets Workflow Purchase Agreement and Dry Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of October 27, 2011, and Amendment Number 7 to the Wets Workflow Purchase Agreement and Dry Workflow Purchase Agreement by and between Intermolecular, Inc. and Advanced Technology Materials, Inc. dated as of October 27, 2011.</u> | 10-K | 03/16/2012 | 10.8 | |
| 10.8 | <u>Form of Indemnification Agreement between Intermolecular, Inc. and each of its directors, officers and certain employees.</u> | S-1/A | 11/7/2011 | 10.12 | |
| 10.9a | + <u>Intermolecular, Inc. 2004 Equity Incentive Plan, as amended.</u> | S-1 | 7/29/2011 | 10.13a | |
| 10.9b | + <u>Form of Early Exercise Stock Option Agreement under the 2004 Equity Incentive Plan.</u> | S-1 | 7/29/2011 | 10.13b | |
| 10.9c | + <u>Form of Stock Option Agreement under the 2004 Equity Incentive Plan.</u> | S-1 | 7/29/2011 | 10.13c | |
| 10.10a | + <u>Intermolecular, Inc. 2011 Incentive Award Plan.</u> | S-1/A | 11/7/2011 | 10.14a | |
| 10.10b | + <u>Form of Stock Option Grant Notice and Stock Option Agreement under the 2011 Incentive Award Plan.</u> | S-1/A | 11/7/2011 | 10.14b | |
| 10.10c | + <u>Form of Restricted Stock Award Grant Notice and Restricted Stock Award Agreement under the 2011 Incentive Award Plan.</u> | S-1/A | 11/7/2011 | 10.14c | |
| 10.10d | + <u>Form of Restricted Stock Unit Award Grant Notice and Restricted Stock Unit Award Agreement under the 2011 Incentive Award Plan.</u> | S-1/A | 11/7/2011 | 10.14d | |
| 10.11a | + <u>Amendment to Intermolecular, Inc. Change in Control Severance Agreement Scot A. Griffin.</u> | 10-Q | 08/06/2015 | 10.14c | |
| 10.11b | + <u>Form of Change in Control and Severance Agreement.</u> | 10-Q | 08/6/2015 | 10.14d | |
| 10.11c | + <u>Change in Control and Severance Agreement between Intermolecular, Inc. and Christian Kramer.</u> | 10-Q | 11/02/2016 | 10.11d | |
| 10.12 | † <u>Amendment dated March 28, 2012 to the Collaborative Development Agreement by and among SanDisk Corporation, Toshiba Corporation and Intermolecular, Inc. dated March 15, 2010.</u> | 10-Q | 05/08/2012 | 10.1 | |

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| Exhibit Number | Exhibit Description | Incorporated By Reference Form Date | Filed Number Herewith |
|----------------|---|-------------------------------------|-----------------------|
| 10.13 | <u>†Research Agreement by and among Guardian Industries Corp. and Intermolecular, Inc. dated as of February 8, 2010 (the “Sol-Gel Agreement”), incorporating Task Order #1 effective as of February 8, 2010, Task Order #1.1 effective as of July 22, 2010, Task Order #2 effective as of October 22, 2010 and Task Order #3 effective as of May 1, 2011, as amended on November 1, 2011. Research Agreement by and among Guardian Industries Corp. and Intermolecular, Inc. dated as of July 15, 2010 (the “Master Agreement”), incorporating Task Order #1 effective as of July 22, 2010 and Task Order #2 effective as of November 30, 2010. Amendment Number One to Sol-Gel Agreement and Master Agreement effective as of January 1, 2012.</u> | 10-Q 05/08/2012 | 10.2 |
| 10.14 | <u>†First Fee Triggering Technology Agreement by and between Elpida Memory, Inc. and Intermolecular, Inc. dated December 29, 2012.</u> | 10-K 03/04/2013 | 10.17 |
| 10.15 | <u>†Amendment No. 8 to the Wets Workflow Purchase Agreement and Dry Workflow Purchase Agreement by and between Advanced Technology Materials, Inc. and Intermolecular, Inc. dated as of December 31, 2012.</u> | 10-K 03/04/2013 | 10.18 |
| 10.16 | <u>†Second Addendum to Collaborative Development Program Agreement, dated March 27, 2013, by and among Toshiba Corporation, SanDisk Corporation and Intermolecular, Inc.</u> | 10-Q 05/02/2013 | 10.20 |
| 10.18 | <u>†Collaborative Development Agreement, effective April 1, 2013, by and between Micron Technology, Inc. and Intermolecular, Inc.</u> | 10-Q 08/07/2013 | 10.27 |
| 10.19 | <u>†Equipment Supply and Technology Licensing Agreement for the Dry Equipment effective September 29, 2013, by and between Ulyanovsk Center for Technology Transfer of the Russian Federation and Intermolecular Inc.</u> | 10-Q 11/07/2013 | 10.28 |
| 10.20 | <u>†Equipment Supply and Technology Licensing Agreement for the Wet Equipment effective September 29, 2013, by and between Ulyanovsk Center for Technology Transfer of the Russian Federation and Intermolecular Inc.</u> | 10-Q 11/07/2013 | 10.29 |
| 10.21 | <u>†Joint Development Program Agreement effective September 29, 2013, by and between Ulyanovsk Center for Technology Transfer of the Russian Federation and Intermolecular Inc.</u> | 10-Q 11/07/2013 | 10.30 |
| 10.22 | <u>First amendment to the Lease Agreement between SBC&D Co. and Intermolecular, Inc., dated as of October 16, 2013.</u> | 10-Q 11/07/2013 | 10.31 |

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| Exhibit Number | Exhibit Description | Incorporated By Reference Form | Date | Reference Number | Filed Herewith |
|----------------|---|--------------------------------|------------|------------------|----------------|
| 10.23 | † <u>Amendment Number 10 to the Wets Workflow Purchase Agreement and Dry Workflow Agreement between Advanced Technology Materials, Inc., and Intermolecular, Inc., dated December 30, 2013.</u> | 10-K | 03/10/2014 | 10.32 | |
| 10.24 | † <u>Amendment No. 2 to the Research Agreements between Guardian Industries and Intermolecular dated December 30, 2013.</u> | 10-K | 03/10/2014 | 10.34 | |
| 10.25 | † <u>Amendment No. 3 to the Research Agreements between Guardian Industries and Intermolecular dated February 6, 2014.</u> | 10-Q/A | 10/03/2014 | 10.36 | |
| 10.26 | † <u>Amendment No. 4 to the Research Agreements between Guardian Industries and Intermolecular dated October 30, 2014.</u> | 10-K | 02/27/2015 | 10.37 | |
| 10.27 | + <u>Employment Agreement, effective October 12, 2014, by and between Bruce McWilliams and Intermolecular, Inc.</u> | 10-K | 02/27/2015 | 10.38 | |
| 10.28 | + <u>Employment Agreement by and between Intermolecular, Inc. and Christian Kramer.</u> | 10-Q | 11/02/2016 | 10.29 | |
| 10.29 | + <u>Separation Agreement by and between Intermolecular, Inc. and Scot A. Griffin.</u> | 10-Q | 11/02/2016 | 10.30 | |
| 10.30 | + <u>Amended and Restated Change in Control and Severance Agreement.</u> | 10-Q | 05/04/2017 | 10.1 | |
| 10.31 | + <u>Offer Letter by and between Intermolecular, Inc. and Bill Roeschlein.</u> | 10-Q | 05/04/2017 | 10.2 | |
| 10.32 | + <u>Separation Agreement by and between Intermolecular, Inc. and Bruce McWilliams.</u> | 10-Q | 05/04/2017 | 10.3 | |
| 10.33 | + <u>Separation Agreement by and between Intermolecular, Inc. and C. Richard Neely, Jr.</u> | 10-Q | 05/04/2017 | 10.4 | |
| 10.34 | + <u>Consulting Agreement by and between Intermolecular, Inc. and Bruce McWilliams.</u> | 10-Q | 08/08/2017 | 10.1 | |
| 16.1 | <u>Letter to Securities and Exchange Commission from KPMG LLP, dated April 1, 2016</u> | 8-K | 04/01/2016 | 16.1 | |
| 23.1 | <u>Consent of Independent Registered Public Accounting Firm.</u> | | | | X |
| 31.1 | <u>Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u> | | | | X |

- | | | |
|------|--|---|
| 31.2 | <u>Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u> | X |
| 32.1 | <u>Certification of Chief Executive Officer pursuant to 18 U.S.C. §1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u> | X |

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| Exhibit Number | Exhibit Description | Incorporated By | |
|----------------|--|---------------------|-----------------------|
| | | Reference Form Date | Filed Number Herewith |
| 32.2 | <u>Certification of Chief Financial Officer pursuant to 18 U.S.C. §1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u> | | X |
| 101.INS | XBRL Instance Document | | X |
| 101.SCH | XBRL Taxonomy Extension Schema Document | | X |
| 101.CAL | XBRL Taxonomy Extension Calculation Linkbase Document | | X |
| 101.DEF | XBRL Taxonomy Extension Definition Linkbase Document | | X |
| 101.LAB | XBRL Taxonomy Extension Label Linkbase Document | | X |
| 101.PRE | XBRL Taxonomy Extension Presentation Linkbase Document | | X |

+Indicates a management contract or compensatory plan.

¶Certain portions have been omitted pursuant to a confidential treatment request. Omitted information has been filed separately with the SEC.

(1) All exhibits, schedules and similar attachments to this exhibit have been omitted. Copies of such exhibits, schedules and similar attachments will be furnished supplementally to the SEC upon request.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) 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.

INTERMOLECULAR, INC.
Date: March 8, 2019 By: /s/ CHRISTIAN F. KRAMER
Christian F. Kramer
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

| Signature | Title | Date |
|---|--|------------------|
| /s/ KENNETH H. TRAUB Kenneth H. Traub | Chairman of the Board of Directors | March 8, 2019 |
| /s/ CHRISTIAN F. KRAMER Christian F. Kramer | President and Chief Executive Officer (Principal Executive Officer), Director | March 8, 2019 |
| /s/ BILL ROESCHLEIN Bill Roeschlein | Chief Financial Officer (Principal Financial and Accounting Officer) | March 8, 2019 |
| /s/ MARVIN D. BURKETT Marvin D. Burkett | Director | March 8, 2019 |
| /s/ IRWIN FEDERMAN Irwin Federman | Director | March 8, 2019 |
| /s/ GEORGE M. SCALISE George M. Scalise | Director | March 8, 2019 |
| /s/ JONATHAN B. SCHULTZ Jonathan B. Schultz | Director | March 8, 2019 |
| /s/ ADAM SCHEER Adam Scheer | Director | March 8, 2019 |
| /s/ MATTHEW S. FURNAS Matthew S. Furnas | Director | March 8, 2019 |

