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: 001-38273 0

ACM Research, Inc.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	94-3290283
(State or Other Jurisdiction of Incorporation or Organization)	*(I.R.S. Employee Identification No.)*
42307 Osgood Road, Suite I Fremont, California	**94539**
(Address of Principal Executive Offices)	*(Zip Code)*

Registrant's telephone number, including area code: **(510) 445-3700**

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

Title of each class	Name of each exchange on which registered
Class A Common Stock, $0.0001 par value per share	**Nasdaq Global 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, if any, 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, or a smaller reporting company. See definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

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

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

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

The aggregate market value on June 39, 2018 (the last business day of the registrant's most recently completed second quarter), of the voting common equity held by non-affiliates of the registrant, computed by reference to the closing price of the stock on that date, was $10.78. The registrant does not have non-voting common equity outstanding.

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

Class	Number of Shares Outstanding

Class A Common Stock, $0.0001 par value	**14,176,690 shares outstanding as of March 8, 2019**
Class B Common Stock, $0.0001 par value	**1,898,423 shares outstanding as of March 8, 2019**

Documents Incorporated By Reference

The registrant intends to file a proxy statement pursuant to Regulation 14A within 120 days of the end of the fiscal year ended December 31, 2018. Portions of such proxy statement are incorporated by reference into Part III of this Annual Report on Form 10-K.

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We conduct our business operations principally through ACM Research (Shanghai), Inc., or ACM Shanghai, a subsidiary of ACM Research, Inc., or ACM Research. Unless the context requires otherwise, references in this report to "our company," "our," "us," "we" and similar terms refer to ACM Research, Inc. (including its predecessor prior to its redomestication from California to Delaware in November 2016) and its subsidiaries, including ACM Shanghai, collectively.

SAPS, TEBO and ULTRA C are our trademarks. For convenience, these trademarks appear in this report without ™ symbols, but that practice does not mean that we will not assert, to the fullest extent under applicable law, our rights to the trademarks. This report also contains other companies' trademarks, registered marks and trade names, which are the property of those companies.

FORWARD-LOOKING STATEMENTS AND STATISTICAL DATA

This report contains statements reflecting our views about our future performance that constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements are generally identified through the inclusion of words such as "anticipate," "believe," "contemplate," "estimate," "expect," "forecast," "intend," "may," "objective," "outlook," "plan," "potential," "project," "seek," "should," "strategy," "target" or "will" or variations of such words or similar expressions. All statements addressing our future operating performance, and statements addressing events and developments that we expect or anticipate will occur in the future, are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are based upon currently available information, operating plans, and projections about future events and trends. This report also contains statistical data and estimates based on independent industry publications or other publicly available information, as well as other information based on our internal sources. Forward-looking statements and statistical estimates inherently involve risks and uncertainties that could cause actual results to differ materially from those predicted or expressed in this report. These risks and uncertainties include those described below in "Item 1A. Risk Factors." Investors are cautioned not to place undue reliance on any forward-looking statements or statistical estimates, which speak only as of the date they are made. We undertake no obligation to update any forward-looking statement or statistical estimate, whether as a result of new information, future events or otherwise.

PART I

Item 1. Business

Overview

We supply advanced, innovative capital equipment developed for the global semiconductor industry. Fabricators of advanced integrated circuits, or chips, can use our single-wafer wet-cleaning tools in numerous steps to improve product yield, even at increasingly advanced process nodes. We have designed these tools for use in fabricating foundry, logic and memory chips, including dynamic random-access memory (or DRAM) and 3D NAND-flash memory chips. We also develop, manufacture and sell a range of advanced packaging tools to wafer assembly and packaging customers.

Selling prices for our single-wafer wet-cleaning tools range from $2 million to more than $5 million. Revenue from single-wafer wet-cleaning tools totaled $68.5 million, or 92% of total revenue, in 2018 and $27.1 million, or 74% of total revenue, in 2017. Our customers for single-wafer wet-cleaning tools include Semiconductor Manufacturing International Corporation, Shanghai Huali Microelectronics Corporation, SK Hynix Inc. and Yangtze Memory Technologies Co., Ltd.

We focus our selling efforts on establishing a referenceable base of leading foundry, logic and memory chip makers, whose use of our products can influence decisions by other manufacturers. We believe this customer base will help us penetrate the mature chip manufacturing markets and build credibility with additional industry leaders. Using a “demo-to-sales” process, we have placed evaluation equipment, or “first tools,” with a number of selected customers. Since 2009 we have delivered more than 55 single-wafer wet cleaning tools, more than 50 of which have been accepted by customers and thereby generated revenue to us and the balance of which are awaiting customer acceptance should contractual conditions be met.

Since our formation in 1998, we have focused on building a strategic portfolio of intellectual property to support and protect our key innovations. Our wet-cleaning equipment has been developed using our key proprietary technologies:

- *Space Alternated Phase Shift, or SAPS, technology for flat and patterned wafer surfaces.* Introduced in 2009, SAPS technology employs alternating phases of megasonic waves to deliver megasonic energy in a highly uniform manner on a microscopic level. We have shown SAPS technology to be more effective than conventional megasonic and jet spray technologies in removing random defects across an entire wafer as node sizes shrink from 300nm to 20nm and lower.
- *Timely Energized Bubble Oscillation, or TEBO, technology for patterned wafer surfaces at advanced process nodes*. Introduced in March 2016, TEBO technology has been developed to provide effective, damage-free cleaning for 2D and 3D patterned wafers with fine feature sizes. We have demonstrated the damage-free cleaning capabilities of TEBO technology on patterned wafers for feature nodes as small as 1xnm (16nm to 19nm), and we have shown TEBO technology can be applied in manufacturing processes for patterned chips with 3D architectures having aspect ratios as high as 60-to-1.
- *Tahoe technology for cost and environmental savings*. Introduced in August 2018, Tahoe technology delivers high cleaning performance using significantly less sulfuric acid and hydrogen peroxide than is typically consumed by conventional high-temperature single-wafer cleaning tools.

We have been issued more than 220 patents in the United States, the People’s Republic of China or PRC, Japan, Korea, Singapore and Taiwan.

We conduct substantially all of our product development, manufacturing, support and services in the PRC. All of our tools are built to order at our manufacturing facilities in Shanghai, which encompass 86,000 square feet of floor space for production capacity. Our experience has shown that chip manufacturers in the PRC and throughout Asia demand equipment meeting their specific technical requirements and prefer building relationships with local suppliers. We will continue to seek to leverage our local presence to address the growing market for semiconductor manufacturing equipment in the region by working closely with regional chip manufacturers to understand their specific requirements, encourage them to adopt our SAPS, TEBO and Tahoe technologies, and enable us to design innovative products and solutions to address their needs.

Our Technology and Product Offerings

Single Wafer Wet Cleaning Equipment for Front End Production Processes

Chip fabricators can use our single-wafer wet-cleaning tools in numerous steps to improve product yield during the front-end production process, during which individual devices are patterned in the chip prior to being interconnected on the wafer. Based on our review of third-party reports and other information, we estimate that the global market for single wafer wet cleaning tools will increase from $3.1 billion in 2018 to $4.3 billion in 2023, representing a compound annual growth rate of 6.8%. We estimate our Ultra-C SAPS, TEBO and Tahoe product offerings address approximately 50% of this market.

Our wet-cleaning equipment has been developed using our proprietary SAPS, TEBO and Tahoe technologies, which allow our tools to remove random defects from a wafer surface effectively, without damaging a wafer or its features, even at an increasingly advanced process nodes (the minimum line widths on a chip) of 22 nanometers, or nm, or less. We use a modular configuration that enables us to create a wet-cleaning tool meeting the specific requirements of a customer, while using pre-existing designs for chamber, electrical, chemical delivery and other modules. Our modular approach supports a wide range of customer needs and facilitates the adaptation of our model tools for use with the optimal chemicals selected to meet a customer's requirements. Our tools are offered principally for use in manufacturing chips from 300mm silicon wafers, but we also offer solutions for 150mm and 200mm wafers and for nonstandard substrates, including compound semiconductor, quartz, sapphire, glass, and plastics.

SAPS Technology, Applications and Equipment

SAPS Technology

SAPS technology delivers megasonic energy uniformly to every point on an entire wafer by alternating phases of megasonic waves in the gap between a megasonic transducer and the wafer. Radicals for removing random defects are generated in dilute solution, and the radical generation is promoted by megasonic energy. Unlike "stationary" megasonic transducers used by conventional megasonic cleaning methods, SAPS technology moves or tilts a transducer while a wafer rotates, enabling megasonic energy to be delivered uniformly across all points on the wafer, even if the wafer is warped. The mechanical force of cavitations generated by megasonic energy enhances the mass transfer rate of dislodged random defects and improves particle removal efficiency.

By delivering megasonic energy in a highly uniform manner on a microscopic level, SAPS technology can precisely control the intensity of megasonic energy and can effectively remove random defects of all sizes across the entire wafer in less total cleaning time than conventional megasonic cleaning products, without loss of material or roughing of wafer surfaces. We have conducted trials demonstrating SAPS technology to be more effective than conventional megasonic and jet spray cleaning technologies as defect sizes shrink from 300nm to 20nm and below. These trials show that SAPS technology has an even greater relative advantage over conventional jet spray technology for cleaning defects between 50 and 65nm in size, and we expect the relative benefits of SAPS will continue to apply in cleaning even smaller defect sizes.

SAPS Applications

SAPS megasonic cleaning technology can be applied during the chip fabrication process to clean wafer surfaces and interconnects. It also can be used to clean, and lengthen the lifetime of recycled test wafers.

Wafer Surfaces. SAPS technology can enhance removal of random defects following planarization and deposition, which are among the most important, and most repeated, steps in the fabrication process:

- *Post CMP*: Chemical mechanical planarization, or CMP, uses an abrasive chemical slurry following other fabrication processes, such as deposition and etching, in order to achieve a smooth wafer surface in preparation for subsequent processing steps. SAPS technology can be applied following each CMP process to remove residual random defects deposited or formed during CMP.
- *Post Hard Mask Deposition:* As part of the photolithographical patterning process, a mask is applied with each deposition of a material layer to prevent etching of material intended to be retained. Hard masks have been developed to etch high aspect-ratio features of advanced chips that traditional masks cannot tolerate. SAPS technology can be applied following each deposition step involving hard masks that use nitride, oxide or carbon based materials to achieve higher etch selectivity and resolution.

For these purposes, SAPS technology uses environmentally-friendly dilute chemicals, reducing chemical consumption. Chemical types include dilute solutions of chemicals used in RCA cleaning, such as dilute hydrofluoric acid and RCA SC-1 solutions, and, for higher quality wafer cleaning, functional de-ionized water produced by dissolving hydrogen, nitrogen or carbon dioxide in water containing a small amount of chemicals, such as ammonia. Functional water removes random defects by generating radicals, and megasonic excitation can be used in conjunction with functional water to further increase the generation of radicals. Functional water has a lower cost and environmental impact than RCA solutions, and using functional water is more efficient in eliminating random defects than using dilute chemicals or de-ionized water alone. We have shown that SAPS megasonic technology using functional water exhibits high efficiency in removing random defects, especially particles smaller than 65nm, with minimal damage to structures.

Interconnects and Barrier Metals. Each successive advanced process node has led to finer feature sizes of interconnects such as contacts, which form electrical pathways between a transistor and the first metal layer, and vias, which form electrical pathways between two metal layers. Advanced nodes have also resulted in higher aspect ratios for interconnect structures, with thinner, redesigned metal barriers being used to prevent diffusion. SAPS technology can improve the removal of residues and other random defects from interconnects during the chip fabrication process:

- *Post Contact/Via Etch:* Wet etching processes are commonly used to create patterns of high-density contacts and vias. SAPS technology can be applied after each such etching process to remove random defects that could otherwise lead to electrical shorts.
- *Pre Barrier Metal Deposition*: Copper wiring requires metal diffusion barriers at the top of via holes to prevent electrical leakage. SAPS technology can be applied prior to deposition of barrier metal to remove residual oxidized copper, which otherwise would adhere poorly to the barrier and impair performance.

For these applications, SAPS technology uses environmentally friendly dilute chemicals such as dilute hydrofluoric acid, RCA SC-1 solution, ozonated de-ionized water and functional de-ionized water with dissolved hydrogen. These chemical solutions take the place of piranha solution, a high-temperature mixture of sulfuric acid and hydrogen peroxide used by conventional wet wafer cleaning processes. We have shown that SAPS technology exhibits greater efficiency in removing random defects, and lower levels of material loss, than conventional processes, and our chemical solutions are less expensive and more environmentally conscious than piranha solution.

Recycled Test Wafers. In addition to using silicon wafers for chip production, chip manufacturers routinely process wafers through a limited portion of the front-end fabrication steps in order to evaluate the health, performance and reliability of those steps. Manufacturers also use wafers for non-product purposes such as inline monitoring. Wafers used for purposes other than manufacturing revenue products are known as test wafers, and it is typical for twenty to thirty percent of the wafers circulating in a fab to be test wafers. In light of the significant cost of wafers, manufacturers seek to re-use a test wafer for more than one test. As test wafers are recycled, surface roughness and other defects progressively impair the ability of a wafer to complete tests accurately. SAPS technology can be applied to reduce random defect levels of a recycled wafer, enabling the test wafer to be reclaimed for use in additional testing processes. For these purposes, SAPS technology includes improved fan filter units that balances intake and exhaust flows, precise temperature and concentration controls that ensure better handling of concentrated acid processes, and two-chemical recycle capability that reduces chemical consumption.

SAPS Equipment

We currently offer two principal models of wet wafer cleaning equipment based on our SAPS technology, Ultra C SAPS II and Ultra C SAPS V. Each of these models is a single-wafer, serial-processing tool that can be configured to customer specifications and, in conjunction with appropriate dilute chemicals, used to remove random defects from wafer surfaces or interconnects and barrier metals as part of the chip front-end fabrication process or for recycling test wafers. By combining our megasonic and chemical cleaning technologies, we have designed these tools to remove random defects with greater efficacy and efficiency than conventional wafer cleaning processes, with enhanced process flexibility and reduced quantities of chemicals. Each of our SAPS models was initially built to meet specific requirements of a key customer. The sales prices of our SAPS tools generally range between $2.5 million and $5.0 million, although the sales price of a particular tool will vary depending upon the required specifications.

SAPS II (released in 2011). Highlights of our SAPS II equipment include:

- compact design, with footprint of 2.65m x 4.10m x 2.85m (WxDxH), requiring limited clean room floor space;
- up to 8 chambers, providing throughput of up to 225 wafers per hour;
- double-sided cleaning capability, with up to 5 cleaning chemicals for process flexibility;
- 2-chemical recycling capability for reduced chemical consumption;
- image wafer detection method for lowering wafer breakage rates; and
- chemical delivery module for delivery of dilute hydrofluoric acid, RCA SC-1 solution, functional de-ionized water and carbon dioxide to each of the chambers.

*SAPS V (released in 2014)***.** SAPS V includes SAPS II features with the following upgrades:

- compact design, with footprint of 2.55m x 5.1m x 2.85m (WxDxH);
- up to 12 chambers, providing throughput of up to 375 wafers per hour;
- chemical supply system integrated into mainframe;
- inline mixing method replaces tank auto-changing, reducing process time; and
- improved drying technology using hot isopropyl alcohol and de-ionized water.

TEBO Technology, Applications and Equipment

TEBO Technology

We developed TEBO technology for application in wet wafer cleaning during the fabrication of 2D and 3D wafers with fine feature sizes. TEBO technology facilitates effective cleaning even with patterned features too small or fragile to be addressed by conventional jet spray and megasonic cleaning technologies.

TEBO technology solves the problems created by transient cavitation in conventional megasonic cleaning processes. Cavitation is the formation of bubbles in a liquid, and transient cavitation is a process in which a bubble in fluid implodes or collapses. In conventional megasonic cleaning processes, megasonic energy forms bubbles and then causes those bubbles to implode or collapse, blasting destructive high-pressure, high-temperature micro jets toward the wafer surface. Our internal testing has confirmed that at any level of megasonic energy capable of removing random defects, the sonic energy and mechanical force generated by transient cavitation are sufficiently strong to damage fragile patterned structures with features less than 70nm.

TEBO technology provides multi-parameter control of cavitation by using a sequence of rapid changes in pressure to force a bubble in liquid to oscillate at controlled sizes, shapes and temperatures, rather than implode or collapse. As a result, cavitation remains stable during TEBO megasonic cleaning processes, and a chip fabricator can, using TEBO technology, apply the level of megasonic energy needed to remove random defects without incurring the pattern damage created by transient cavitation in conventional megasonic cleaning.

We have demonstrated the damage-free cleaning capabilities of TEBO technology on customers' patterned wafers as small as 1xnm (16nm to 19nm), and we believe TEBO technology will be applicable in even smaller fabrication process nodes. TEBO technology can be applied in manufacturing processes for conventional 2D chips with fine features and advanced chips with 3D structures, including Fin Field Effect Transistors or FinFET, DRAM, 3D NAND and 3D cross point memory, and we expect it will be applicable to other 3D architectures developed in the future, such as carbon nanotubes and quantum devices. As a result of the thorough, controlled nature of TEBO processes, cleaning time for TEBO-based solutions may take longer than conventional megasonic cleaning processes. Conventional processes have proven ineffective, however, for process nodes of 20nm or less, and we believe the increased yield that can be achieved by using TEBO technology for nodes up to 70nm can more than offset the cost of the additional time in utilizing TEBO technology.

TEBO Applications

At process nodes of 28nm and less, chip makers face escalating challenges in eliminating nanometric particles and maintaining the condition of inside pattern surfaces. In order to maintain chip quality and avoid yield loss, cleaning technologies must control random defects of diminishing killer defect sizes, without roughing or otherwise damaging surfaces of transistors, interconnects or other wafer features. TEBO technology can be applied in numerous steps throughout the manufacturing process flow for effective, damage-free cleaning:

- *Memory Chips:* We estimate that TEBO technology can be applied in as many as 50 steps in the fabrication of a DRAM chip, consisting of up to 10 steps in cleaning ISO structures, 20 steps in cleaning buried gates, and 20 steps in cleaning high aspect-ratio storage nodes and stacked films.
- *Logic Chips:* In the fabrication process for a logic chip with a FinFET structure, we estimate that TEBO technology can be used in 15 or more cleaning steps.

For purposes of solving inside pattern surface conditions for memory or logic chips, TEBO technology uses environmentally friendly dilute chemicals such as RCA SC-1 and hydrogen gas doped functional water.

TEBO Equipment

We currently offer two models of wet wafer cleaning equipment based on our TEBO technology, Ultra C TEBO II and Ultra C TEBO V. Each of these models is a single-wafer, serial-processing tool that can be configured to customer specifications and, in conjunction with appropriate dilute chemicals, used at numerous manufacturing processing steps for effective, damage-free cleaning of chips at process nodes 28nm or less. TEBO equipment solves the problem of pattern damage caused by transient cavitation in conventional jet spray and megasonic cleaning processes, providing better particle removal efficiency with limited material loss or roughing. TEBO equipment currently is being evaluated by a select group of leading memory and logic chip customers, some of which recently have indicated an intent to move to production. The sales prices of our TEBO tools generally range between $3.5 million and $6.5 million, although the sales price of a particular tool will vary depending upon the required specifications.

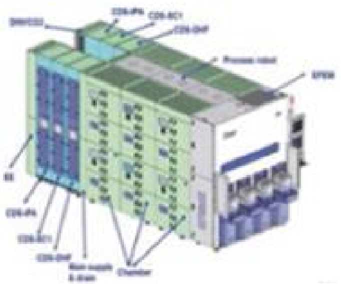
Each model of TEBO equipment includes:

- an equipment front-end module, or EFEM, which moves wafers from chamber to chamber;
- one or more chamber modules, each equipped with a TEBO megasonic generator system;
- an electrical module to provide power for the tool; and
- a chemical delivery module.

Ultra C TEBO II (released in 2016). Highlights:

- compact design, with footprint of 2.25m x 2.25m x 2.85m (WxDxH);
- up to 8 chambers with an upgraded transport system and optimized robotic scheduler, providing throughput of up to 300 wafers per hour;
- EFEM module consisting of 4 load ports, transfer robot and 1 process robot; and
- focus on dilute chemicals contributes to environmental sustainability and lower cost of ownership.

Ultra C TEBO V (released in 2016). Highlights of our Ultra C TEBO V equipment include:



- footprint of 2.45m x 5.30m x 2.85m (WxDxH);
- up to 12 chamber modules, providing throughput of up to 300 wafers per hour;
- EFEM module consisting of 4 load ports, 1 transfer robot and 1 process robot; and
- chemical delivery module for delivery of isopropyl alcohol, dilute hydrofluoric acid, RCA SC-1 solution, functional de-ionized water and carbon dioxide to each of the chambers.

Tahoe Overview

Our Ultra-C Tahoe wafer cleaning tool can deliver high cleaning performance using significantly less sulfuric acid and hydrogen peroxide than is typically consumed by conventional high-temperature single-wafer cleaning tools. During normal single-wafer cleaning processes, only a fraction of the acid reacts with the wafer surface, while the majority is wasted as acid spins off the wafer and cannot be recycled. In addition to providing cost savings resulting from vastly reduced acid consumption, Ultra-C Tahoe meets the needs of customers who face increased environmental regulations and demand new, more environmentally-friendly tools. We announced our first purchase order for an Ultra C Tahoe tool in August 2018, and we delivered the tool to a strategic customer in January of 2019.

Single-Wafer Tools for Back-End Assembly and Packaging

We leverage our technology and expertise to provide a range of single-wafer tools for back-end wafer assembly and packaging factories. We develop, manufacture and sell a wide range of advanced packaging tools, such as coaters, developers, photoresist strippers, scrubbers, wet etchers and copper-plating tools. We focus on providing custom-made, differentiated equipment that incorporates customer-requested features at a competitive price. Selling prices for these tools range from approximately $500,000 to more than $2 million.

For example, our Ultra C Coater is used in applying photoresist, a light-sensitive material used in photolithography to transfer a pattern from a mask onto a wafer. Coaters typically provide input and output elevators, shuttle systems and other devices to handle and transport wafers during the coating process. Unlike most coaters, the Ultra C Coater is fully automated. Based on requests from customers, we developed and incorporated the special function of chamber auto-clean module into the Ultra C Coater, which further differentiates it from other products in the market. The Ultra C Coater is designed to deliver improved throughput and more efficient tool utilization while eliminating particle generation.

Our other advanced packaging tools include: Ultra C Developer, which applies liquid developer to selected parts of photoresist to resolve an image; Ultra C PR Megasonic-Assisted Stripper, which removes photoresist; Ultra C Scrubber, which scrubs and cleans wafers; and Ultra C Thin Wafer Scrubber, which addresses a sub-market of cleaning very thin wafers for certain Asian assembly factories; and Ultra C Wet Etcher, which etches silicon wafers and copper and titanium interconnects.

Our Customers

As of December 31, 2018, chip fabricators had purchased and deployed more than 55 of our single-wafer wet cleaning tools. To date, all of our sales of single-wafer wet cleaning equipment for front-end manufacturing have been to customers located in Asia, and we anticipate that a substantial majority of our revenue from these products will continue to come from customers located in this region for the near future. We have increased our efforts to penetrate the markets in North America and Western Europe, and we believe we are well positioned to begin generating sales in those regions.

We generate most of our revenue from a limited number of customers as the result of our strategy of initially placing single-wafer wet cleaning equipment with a small number of leading chip manufacturers that are driving technology trends and key capability implementation. In 2018, 85.7% of our revenue was derived from three customers: Yangtze Memory Technologies Co., Ltd., a leading PRC memory chip company, together with one of its subsidiaries, accounted for 38.8% of our revenue; Shanghai Huali Microelectronics Corporation, a leading PRC foundry, accounted for 23.6% of our revenue; and SK Hynix Inc., a leading Korean memory chip company, accounted for 23.3% of our revenue. In 2017, 55.2% of our revenue was derived from four customers: SK Hynix Inc. accounted for 18.1% of our revenue; Shanghai Integrated Circuit Research and Development Center Ltd., a public research consortia for the Chinese semiconductor industry, accounted for 14.1% of our revenue; JiangYin ChangDian Advanced Packaging Co. Ltd., a leading PRC foundry, accounted for 12.8% of our revenue; and Yangtze Memory Technologies Co., Ltd., together with one of its subsidiaries, accounted for 10.2% of our revenue.

Based on our market experience, we believe that implementation of our single-wafer wet cleaning equipment by one of our selected chip manufacturers will attract and encourage other manufacturers to evaluate our equipment, because the leading company's implementation will serve as validation of our equipment and could enable the other manufacturers to shorten their evaluation processes. We placed our first SAPS tool in 2009 as a prototype. We worked closely with the customer for two years in debugging and modifying the tool, and the customer then spent two more years of qualification and running pilot production before beginning volume manufacturing. Our revenue in 2015 included sales of SAPS tools following the customer's completion of its qualification process. We believe that the period from new product introduction to high volume manufacturing could range from one to several years.

For our back-end wafer assembly and packaging customers, we focus on providing custom-made, differentiated single wafer wet cleaning equipment that incorporates a customer's requested features at a competitive price. Our primary customers of these products in 2018 included: Deca Technologies, a wafer-level interconnect foundry with headquarters in Arizona and manufacturing in the Phillipines that is a majority-owned, independent subsidiary of Cypress Semiconductor Corp.; JiangYin ChangDian Advanced Packaging Co. Ltd., a leading PRC foundry that is also one of the largest customers of our front end of line equipment; Nantong Tongfu Microelectronics Co., Ltd., a PRC-based chip assembly and testing company that is a subsidiary of Nantong Fujitsu Microelectronics Co., Ltd.; and Wafer Works Corporation, a leading wafer supplier based in the PRC.

Sales and Marketing

We market and sell our products worldwide using a combination of our direct sales force and third-party representatives. We employ direct sales teams in Asia, Europe and North America, and have located these teams near our customers, primarily in the PRC, Korea, Taiwan and the United States. Each sales person has specific local market expertise. We also employ field application engineers, who are typically co-located with our direct sales teams, to provide technical pre- and post-sale support tours and other assistance to existing and potential customers throughout the customers' fab planning and production line qualification and fab expansion phases. Our field application engineers are organized by end markets as well as core competencies in hardware, control system, software and process development to support our customers.

To supplement our direct sales teams, we have contacts with several independent sales representatives in the PRC, Taiwan and Korea. We select these independent representatives based on their ability to provide effective field sales, marketing forecast and technical support for our products. In the case of representatives, our customers place purchase orders with us directly rather than with the representatives.

Our sales have historically been made using purchase orders with agreed technical specifications. Our sales terms and conditions are generally consistent with industry practice, but may vary from customer to customer. We seek to obtain a purchase order two to four months ahead of the customer's desired delivery date. For some customers, we receive a letter of intent three weeks ahead, followed by the corresponding purchase order five weeks ahead, of the customer's desired delivery date. Consistent with industry practice, we allow customers to reschedule or cancel orders on relatively short notice. Because of our relatively short delivery period and our practice of permitting rescheduling or cancellation, we believe that backlog is not a reliable indicator of our future revenue.

Our marketing team focuses on our product strategy and technology road maps, product marketing, new product introduction processes, demand assessment and competitive analysis, customer requirement communication and public relations. Our marketing team also has the responsibility to conduct environmental scans, study industry trends and arrange our participation at major trade shows.

Manufacturing

All of our products are built to order at our Shanghai facilities. Our first manufacturing facility has a total of 36,000 square feet, with 8,000 square feet of class 10,000 clean room space for product assembly and testing, plus 800 square feet of class 1 clean room space for product demonstration purposes. The rest of the area is used for product sub-assembly, component inventory and manufacturing related offices. A class designation for a clean room denotes the number of particles of size 0.5mm or larger permitted per cubic foot of air. Our manufacturing facility is ISO-9000 certified, and we have implemented certain manufacturing science-based factory practices such as constraint management, statistical process control and failure mode and effect analysis methodology.

In September 2018, we began production at our second factory, located ten miles from our Shanghai headquarters. The new facility provides an additional 50,000 square feet of floor space for production capacity. We plan to shift an increasing portion of our future production to this factory based on its modernized capabilities.

We purchase some of the components and assemblies that we include in our products from single source suppliers. We believe that we could obtain and qualify alternative sources to supply these components. Nevertheless, any prolonged inability to obtain these components could have an adverse effect on our operating results and could unfavorably impact our customer relationships. Please see "Item 1A. Risk Factors—Risks Related to Our Business and Our Industry—We depend on a limited number of suppliers, including single source suppliers, for critical components and assemblies, and our business could be disrupted if they are unable to meet our needs."

Research and Development

We believe that our success depends in part on our ability to develop and deliver breakthrough technologies and capabilities to meet our customers' ever-more challenging technical requirements. For this reason, we devote significant financial and personnel resources to research and development. Our research and development team is comprised of highly skilled engineers and technologists with extensive experience in megasonic technology, cleaning processes and chemistry, mechanical design, and control system design. To supplement our internal expertise, we also collaborated with external research and development entities such as International SEMATECH, a global consortium of computer chip manufacturers, on specific areas of interests and retain, as technical advisors, several experts in semiconductor technology.

For the foreseeable future we are focusing on enhancing our Ultra C SAPS, TEBO and Tahoe tools and integrating additional capabilities to meet and anticipate requirements from our existing and potential customers. Our particular areas of focus include development of the following:

- new cleaning steps for Ultra C SAPS cleaners for application in logic chips and for DRAM, 3D NAND and 3D cross point memory technologies;
- new cleaning steps for Ultra C TEBO cleaners for FinFET in logic chips, gates in DRAM, and deep vias in both 3D NAND and 3D cross point memory technologies;
- new hardware, including new system platforms, new and additional chamber structures and new chemical blending systems; and
- new software to integrate new functionalities to improve tool performance.

Longer term, we are working on new proprietary process capabilities based on our existing tool hardware platforms. We are also working to integrate our tools with third-party tools in adjacent process areas in the chip manufacturing flow. Our research and development expense totaled $10.4 million, or 13.9% of revenue in 2018 and $5.1 million, or 14.1% of revenue in 2017. We intend to continue to invest in research and development to support and enhance our existing cleaning products and to develop future product offerings to build and maintain our technology leadership position.

Intellectual Property

Our success and future revenue growth depend, in part, on our ability to protect our intellectual property. We control access to and use of our proprietary technologies, software and other confidential information through the use of internal and external controls, including contractual protections with employees, consultants, advisors, customers, partners and suppliers. We rely primarily on patent, copyright, trademark and trade secret laws, as well as confidentiality procedures, to protect our proprietary technologies and processes. All employees and consultants are required to execute confidentiality agreements in connection with their employment and consulting relationships with us. We also require them to agree to disclose and assign to us all inventions conceived or made in connection with the employment or consulting relationship.

We have aggressively pursued intellectual property since our founding in 1998. We focus our patent efforts in the United States, and, when justified by cost and strategic importance, we file corresponding foreign patent applications in strategic jurisdictions such as the European Union, the PRC, Japan, Korea, Singapore, and Taiwan. Our patent strategy is designed to provide a balance between the need for coverage in our strategic markets and the need to maintain costs at a reasonable level.

As of December 31, 2018, we had 20 issued patents, and 20 patents pending, in the United States. These patents carry expiration dates from 2022 through 2038. Many of the US patents and applications have also been filed internationally, in one or more of the European Union, PRC, Japan, Korea, Singapore and Taiwan. Specifically, we own patents in wafer cleaning, electro-polishing and plating, wafer preparation, and other semiconductor processing technologies. We have been issued more than 220 patents in the United States, the People’s Republic of China or PRC, Japan, Korea, Singapore and Taiwan.

We currently manufacture advanced single-wafer cleaning systems equipped with our SAPS, TEBO and Tahoe technologies. Our wafer cleaning technologies are protected by US Patent Numbers 8580042, 8671961, 9070723 and 9281177, as well as their corresponding international patents. We have 31 patents granted internationally protecting our SAPS technologies. We also have filed 9 international patent applications for key TEBO technologies, and 2 for Tahoe, in accordance with the Patent Cooperation Treaty, in anticipation of filing in the U.S. national phase.

In addition to the above core technologies, we have technologies for stress-free polishing, or SFP, and electrochemical plating, or ECP, that are used in certain of our tools. SFP is an integral part of the electro polishing process. Our technology was a breakthrough in electro-chemical-copper-planarization technology when it was first introduced, because it can polish, stress-free, copper layers used in copper low-K interconnects. Our innovations in SFP and ECP are reflected in US Patent Numbers 6638863 and 8518224, and their corresponding international counterparts.

We also have technologies in other semiconductor processing areas, such as wafer preparation and some specific processing steps. The wafer preparation technology is covered by US Patent Numbers 8383429 and 9295167. The specific processing steps includes US Patent Number 8598039 titled “Barrier layer removal method and apparatus.”

To date we have not granted licenses to third parties under the patents described above. Not all of these patents have been implemented in products. We may enter into licensing or cross-licensing arrangements with other companies in the future.

We cannot assure you that any patents will issue from any of our pending applications. Any rights granted under any of our existing or future patents may not provide meaningful protection or any commercial advantage to us. With respect to our other proprietary rights, it may be possible for third parties to copy or otherwise obtain and use our proprietary technology or marks without authorization or to develop similar technology independently.

The semiconductor equipment industry is characterized by vigorous protection and pursuit of intellectual property rights or positions, which have resulted in often protracted and expensive litigation. We may in the future initiate claims or litigation against third parties to determine the validity and scope of proprietary rights of others. In addition, we may in the future initiate litigation to enforce our intellectual property rights or the rights of our customers or to protect our trade secrets.

Our customers could become the target of litigation relating to the patent or other intellectual property rights of others. This could trigger technical support and indemnification obligations in some of our customer agreements. These obligations could result in substantial expenses, including the payment by us of costs and damages related to claims of patent infringement. In addition to the time and expense required for us to provide support or indemnification to our customers, any such litigation could disrupt the businesses of our customers, which in turn could hurt our relations with our customers and cause the sale of our products to decrease. We do not have any insurance coverage for intellectual property infringement claims for which we may be obligated to provide indemnification.

Additional information about the risks relating to our intellectual property is provided under “Item 1A. Risk Factors—Risks Relating to Our Intellectual Property.”

Competition

The chip equipment industry is characterized by rapid change and is highly competitive throughout the world. We compete with semiconductor equipment companies located around the world, and we may also face competition from new and emerging companies, including new competitors from the PRC. We consider our principal competitors to be those companies that provide single-wafer cleaning products to the market, including Beijing Sevenstar Science & Technology Co., Ltd., DNS Electronics LLC, Lam Research Corp., Mujin Electronics Co., Ltd., SEMES Co. Ltd. and Tokyo Electron Ltd.

Compared to our company, our current and potential competitors may have:

- better established credibility and market reputations, longer operating histories, and broader product offerings;
- significantly greater financial, technical, marketing and other resources, which may allow them to pursue design, development, manufacturing, sales, marketing, distribution and service support of their products;
- more extensive customer and partner relationships, which may position them to identify and respond more successfully to market developments and changes in customer demands; and
- multiple product offerings, which may enable them to offer bundled discounts for customers purchasing multiple products or other incentives that we cannot match or offer.

The principal competitive factors in our market include:

- performance of products, including particle removal efficiency, rate of damage to wafer structures, high temperature chemistry, throughput, tool uptime and reliability, safety, chemical waste treatment, and environmental impact;
- service support capability and spare parts delivery time; innovation and development of functionality and features that are must-haves for advanced fabrication nodes;

- ability to anticipate customer requirements, especially for advanced process nodes of less than 45nm; ability to identify new process applications;
- brand recognition and reputation; and
- skill and capability of personnel, including design engineers, manufacturing engineers and technicians, application engineers, and service engineers.

In addition, semiconductor manufacturers must make a substantial investment to qualify and integrate new equipment into semiconductor production lines. Some manufacturers began fabricating chips for the 10nm node in 2017 and the 7nm node in 2018, and we have one customer that currently is evaluating implementation of our equipment at these nodes. Once a semiconductor manufacturer has selected a particular supplier's equipment and qualified it for production, the manufacturer generally maintains that selection for that specific production application and technology node as long as the supplier's products demonstrate performance to specification in the installed base. Accordingly, we may experience difficulty in selling to a given manufacturer if that manufacturer has qualified a competitor's equipment. If, however, that cleaning equipment constrains chip yield, we expect, based on our experience to date, that the manufacturer will evaluate implementing new equipment that cleans more effectively.

We focus on the high-end fabrication market with advanced nodes, and we believe we compete favorably with respect to the factors described above. Most of our competitors offer single-wafer cleaning products using jet spray technology, which has relatively poor particle removal efficiency for random defects less than 30nm in size and presents increased risk of damage to the fragile patterned architectures of wafers at advanced process nodes. Certain of our competitors offer single-wafer cleaning products with megasonic cleaning capability, but we believe these products, which use conventional megasonic technology, are unable to maintain energy dose uniformity on the entire wafer and often lack the ability to repeat the requisite uniform energy dose wafer to wafer in production, resulting in poor efficiency in removing random defects, longer processing time and greater loss of material. In addition, these conventional megasonic products generate transient cavitation, which results in more incidents of damage to wafer structures with feature sizes of 70nm or less. We design our cleaning tools equipped with our proprietary SAPS, TEBO and Tahoe technologies, which we believe offer better performance, much less chemical consumption, and lower cost of consumables, including at advanced process nodes of 22nm or less.

Employees

As of December 31, 2018, we had 273 full-time equivalent employees, of whom 22 were in administration, 84 were in manufacturing, 96 were in research and development, and 71 were in sales and marketing and customer services. Of these employees, 253 were located in the mainland China and Taiwan, 17 were located in Korea and 3 were based in the United States. We have never had a work stoppage, and none of our employees are represented by a labor organization or subject to any collective bargaining arrangements. We consider our employee relations to be good.

Available Information

We are required to file annual, quarterly and current reports, proxy statements and other information with the SEC. The SEC maintains a website at www.sec.gov that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC.

Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, proxy statements and amendments to those documents filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, or the Exchange Act, are also available free of charge on our website at www.americanrenal.com as soon as reasonably practicable after such reports are electronically filed with or furnished to the SEC.

Investors should note that we currently announce material information to our investors and others using filings with the SEC, press releases, public conference calls, webcasts or our website (www.acmrcsh.com), including news and announcements regarding our financial performance, key personnel, our brands and our business strategy. Information that we post on our corporate website could be deemed material to investors. We encourage investors to review the information we post on these channels. We may from time to time update the list of channels we will use to communicate information that could be deemed material and will post information about any such change on www.acmrcsh.com. The information on our website is not, and shall not be deemed to be, a part hereof or incorporated into this or any of our other filings with the SEC.

Item 1A. Risk Factors

Investing in Class A common stock involves a high degree of risk. You should consider and read carefully all of the risks and uncertainties described below, as well as other information contained in this report, including the consolidated financial statements and related notes set forth in "Item 1. Financial Statements" of Part I above, before making an investment decision. The occurrence of any of the following risks or additional risks and uncertainties not presently known to us or that we currently believe to be immaterial could materially and adversely affect our business, financial condition, results of operations or cash flows. In any such case, the trading price of Class A common stock could decline, and you may lose all or part of your investment. This report also contains forward-looking statements and estimates that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of specific factors, including the risks and uncertainties described below.

Risks Related to Our Business and Our Industry

We have incurred significant losses since our inception and we are uncertain about our future profitability.

We have incurred significant losses since our inception in 1998, and as of December 31, 2018 we had an accumulated deficit of $3.4 million. We may not be able to generate sufficient revenue to achieve and sustain profitability. We expect our costs to increase in future periods, which could negatively affect our future operating results if our revenue does not increase. In particular, we expect to continue to expend substantial financial and other resources on:

- research and development, including continued investments in our research and development team;
- sales and marketing, including a significant expansion of our sales organization, both domestically and internationally, building our brand, and providing our single-wafer wet cleaning equipment and other capital equipment, or tools, for evaluation by customers;
- the cost of goods being manufactured and sold for our installed base;
- expansion of field service; and
- general and administrative expenses, including legal and accounting expenses related to being a public company.

These investments may not result in increased revenue or growth in our business. If we are unable to increase our revenue at a rate sufficient to offset the expected increase in our costs, then our business, financial position and results of operations will be harmed and we may not be able to achieve or maintain profitability over the long term. Additionally, we may encounter unforeseen operating expenses, difficulties, complications, delays and other factors that may result in losses in future periods. If our revenue growth does not meet our expectations in future periods, our financial performance may be harmed and we may not achieve or maintain profitability in the future.

We currently have limited revenue and may not be able to regain or maintain profitability.

To date we have only generated limited revenue from sales of our products. Our revenue totaled $74.6 million in 2018 and $36.5 million in 2017. In 2018 we generated net income of $6.6 million, as compared to an operating loss of $872,000 in 2017. Our ability to generate significant revenue and operate profitably depends upon our ability to commercialize our Ultra C single-wafer wet cleaning equipment. Our ability to generate significant product revenue from our current tools or future tool candidates also depends on a number of additional factors, including our ability to:

- achieve market acceptance of Ultra C equipment based on SAPS, TEBO and Tahoe technology;
- increase our customer base, including the establishment of relationships with companies in the United States;
- continue to expand our supplier relationships with third parties; and
- establish and maintain our reputation for providing efficient on-time delivery of high quality products.

If we fail to regain and sustain profitability on a continuing basis, we may be unable to continue our operations at planned levels and be forced to reduce our operations or even shut down.

We may require additional capital in the future and we cannot give any assurance that such capital will be available at all or available on terms acceptable to us and, if it is available, additional capital raised by us may dilute holders of Class A common stock.

We may need to raise funds in the future, depending on many factors, including:

- our sales growth;
- the costs of applying our existing technologies to new or enhanced products;
- the costs of developing new technologies and introducing new products;
- the costs associated with protecting our intellectual property;
- the costs associated with our expansion, including capital expenditures, increasing our sales and marketing and service and support efforts, and expanding our geographic operations;
- our ability to continue to obtain governmental subsidies for developmental projects in the future;
- future debt repayment obligations; and
- the number and timing of any future acquisitions.

To the extent that our existing sources of cash, together with any cash generated from operations, are insufficient to fund our activities, we may need to raise additional funds through public or private financings, strategic relationships, or other arrangements. Additional funding may not be available to us on acceptable terms or at all. If adequate funding is not available, we may be required to reduce expenditures, including curtailing our growth strategies and reducing our product development efforts, or to forego acquisition opportunities.

If we succeed in raising additional funds through the issuance of equity or convertible securities, then the issuance could result in substantial dilution to existing stockholders. Furthermore, the holders of these new securities or debt may have rights, preferences and privileges senior to those of the holders of Class A common stock. In addition, any preferred equity issuance or debt financing that we may obtain in the future could have restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities, including potential acquisitions.

Our quarterly operating results can be difficult to predict and can fluctuate substantially, which could result in volatility in the price of Class A common stock.

Our quarterly revenue and other operating results have varied in the past and are likely to continue to vary significantly from quarter to quarter. Accordingly, you should not rely upon our past quarterly financial results as indicators of future performance. Any variations in our quarter-to-quarter performance may cause our stock price to fluctuate. Our financial results in any given quarter can be influenced by a variety of factors, including:

- the cyclicality of the semiconductor industry and the related impact on the purchase of equipment used in the manufacture of integrated circuits, or chips;
- the timing of purchases of our tools by chip fabricators, which order types of tools based on multi-year capital plans under which the number and dollar amount of tool purchases can vary significantly from year to year;
- the relatively high average selling price of our tools and our dependence on a limited number of customers for a substantial portion of our revenue in any period, whereby the timing and volume of purchase orders or cancellations from our customers could significantly reduce our revenue for that period;
- the significant expenditures required to customize our products often exceed the deposits received from our customers;
- the lead time required to manufacture our tools;
- the timing of recognizing revenue due to the timing of shipment and acceptance of our tools;
- our ability to sell additional tools to existing customers;
- the changes in customer specifications or requirements;
- the length of our product sales cycle;
- changes in our product mix, including the mix of systems, upgrades, spare parts and service;
- the timing of our product releases or upgrades or announcements of product releases or upgrades by us or our competitors, including changes in customer orders in anticipation of new products or product enhancements;

- our ability to enhance our tools with new and better functionality that meet customer requirements and changing industry trends;
- constraints on our suppliers' capacity;
- the timing of investments in research and development related to releasing new applications of our technologies and new products;
- delays in the development and manufacture of our new products and upgraded versions of our products and the market acceptance of these products when introduced;
- our ability to control costs, including operating expenses and the costs of the components and subassemblies used in our products;
- the costs related to the acquisition and integration of product lines, technologies or businesses; and
- the costs associated with protecting our intellectual property, including defending our intellectual property against third-party claims or litigation.

Seasonality has played an increasingly important role in the market for chip manufacturing tools. The period of November through February has been a particularly weak period historically for manufacturers of chip tools, in part because capital equipment needed to support manufacturing of chips for the December holidays usually needs to be in the supply chain by no later than October and chip makers in Asia often wait until after Chinese New Year, which occurs in January or February, before implementing their capital acquisition plans. The timing of new product releases also has an impact on seasonality, with the acquisition of manufacturing equipment occurring six to nine months before a new release.

Many of these factors are beyond our control, and the occurrence of one or more of them could cause our operating results to vary widely. As a result, it is difficult for us to forecast our quarterly revenue accurately. Our results of operations for any quarter may not be indicative of results for future quarters and quarter-to-quarter comparisons of our operating results are not necessarily meaningful. Variability in our periodic operating results could lead to volatility in our stock price. Because a substantial proportion of our expenses are relatively fixed in the short term, our results of operations will suffer if revenue falls below our expectations in a particular quarter, which could cause the price of Class A common stock to decline. Moreover, as a result of any of the foregoing factors, our operating results might not meet our announced guidance or expectations of public market analysts or investors, in which case the price of Class A common stock could decrease significantly.

Cyclicality in the semiconductor industry is likely to lead to substantial variations in demand for our products, and as a result our operating results could be adversely affected.

The chip industry has historically been cyclic and is characterized by wide fluctuations in product supply and demand. From time to time, this industry has experienced significant downturns, often in connection with, or in anticipation of, maturing product and technology cycles, excess inventories and declines in general economic conditions. This cyclicality could cause our operating results to decline dramatically from one period to the next.

Our business depends upon the capital spending of chip manufacturers, which, in turn, depends upon the current and anticipated market demand for chips. During industry downturns, chip manufacturers often have excess manufacturing capacity and may experience reductions in profitability due to lower sales and increased pricing pressure for their products. As a result, chip manufacturers generally sharply curtail their spending during industry downturns and historically have lowered their spending more than the decline in their revenues. If we are unable to control our expenses adequately in response to lower revenue from our customers, our operating results will suffer and we could experience operating losses.

Conversely, during industry upturns we must successfully increase production output to meet expected customer demand. This may require us or our suppliers, including third-party contractors, to order additional inventory, hire additional employees and expand manufacturing capacity. If we are unable to respond to a rapid increase in demand for our tools on a timely basis, or if we misjudge the timing, duration or magnitude of such an increase in demand, we may lose business to our competitors or incur increased costs disproportionate to any gains in revenue, which could have a material adverse effect on our business, results of operations, financial condition or cash flows.

The PRC government is implementing focused policies, including state-led investment initiatives, that aim to create and support an independent domestic semiconductor supply chain spanning from design to final system production. If these policies, which include loans and subsidies, result in lower demand for equipment than is expected by equipment manufacturers, the resulting overcapacity in the chip manufacturing equipment market could lead to excess inventory and price discounting that could have a material adverse effect on our business and operating results.

Our success will depend on industry chip manufacturers adopting our SAPS, TEBO and Tahoe technologies.

To date our strategy for commercializing our tools has been to place them with selected industry leaders in the manufacturing of memory and logic chips, the two largest chip categories, to enable those leading manufacturers to evaluate our technologies, and then leverage our reputation to gain broader market acceptance. In order for these industry leaders to adopt our tools, we need to establish our credibility by demonstrating the differentiated, innovative nature of our SAPS, TEBO and Tahoe technologies. Our SAPS technology has been tested and purchased by industry leaders, but has not achieved, and may never achieve, widespread market acceptance. We have initiated a similar commercialization process for our TEBO technology with a selected group of industry leaders. If these leading manufacturers do not agree that our technologies add significant value over conventional technologies or do not otherwise accept and use our tools, we may need to spend a significant amount of time and resources to enhance our technologies or develop new technologies. Even if these leading manufacturers adopt our technologies, other manufacturers may not choose to accept and adopt our tools and our products may not achieve widespread adoption. Any of the above factors would have a material adverse effect on our business, results of operations and financial condition.

If our SAPS, TEBO and Tahoe technologies do not achieve widespread market acceptance, we will not be able to compete effectively.

The commercial success of our tools will depend, in part, on gaining substantial market acceptance by chip manufacturers. Our ability to gain acceptance for our products will depend upon a number of factors, including:

- our ability to demonstrate the differentiated, innovative nature of our SAPS, TEBO and Tahoe technologies and the advantages of our tools over those of our competitors;
- compatibility of our tools with existing or potential customers' manufacturing processes and products;
- the level of customer service available to support our products; and
- the experiences our customers have with our products.

In addition, obtaining orders from new customers may be difficult because many chip manufacturers have pre-existing relationships with our competitors. Chip manufacturers must make a substantial investment to qualify and integrate wet processing equipment into a chip production line. Due, in part, to the cost of manufacturing equipment and the investment necessary to integrate a particular manufacturing process, a chip manufacturer that has selected a particular supplier's equipment and qualified that equipment for production typically continues to use that equipment for the specific production application and process node, which is the minimum line width on a chip, as long as that equipment continues to meet performance specifications. Some of our potential and existing customers may prefer larger, more established vendors from which they can purchase equipment for a wider variety of process steps than our tools address. Further, because the cleaning process with our TEBO equipment can be up to five times longer than cleaning processes based on other technologies, we must convince chip manufacturers of the innovative, differentiated nature of our technologies and the benefits associated with using our tools. If we are unable to obtain new customers and continue to achieve widespread market acceptance of our tools, then our business, operations, financial results and growth prospects will be materially and adversely affected.

If we do not continue to enhance our existing single-wafer wet cleaning tools and achieve market acceptance, we will not be able to compete effectively.

We operate in an industry that is subject to evolving standards, rapid technological changes and changes in customer demands. Additionally, if process nodes continue to shrink to ever-smaller dimensions and conventional two-dimensional chips reach their critical performance limitations, the technology associated with manufacturing chips may advance to a point where our Ultra C equipment based on SAPS, TEBO and Tahoe technologies becomes obsolete. Accordingly, the future of our business will depend in large part upon the continuing relevance of our technological capabilities, our ability to interpret customer and market requirements in advance of tool deliveries, and our ability to introduce in a timely manner new tools that address chip makers' requirements for cost-effective cleaning solutions. We expect to spend a significant amount of time and resources developing new tools and enhancing existing tools. Our ability to introduce and market successfully any new or enhanced cleaning equipment is subject to a wide variety of challenges during the tool's development, including the following:

- accurate anticipation of market requirements, changes in technology and evolving standards;
- the availability of qualified product designers and technologies needed to solve difficult design challenges in a cost-effective, reliable manner;
- our ability to design products that meet chip manufacturers' cost, size, acceptance and specification criteria, and performance requirements;
- the ability and availability of suppliers and third-party manufacturers to manufacture and deliver the critical components and subassemblies of our tools in a timely manner;
- market acceptance of our customers' products, and the lifecycle of those products; and
- our ability to deliver products in a timely manner within our customers' product planning and deployment cycle.

Certain enhancements to our Ultra C equipment in future periods may reduce demand for our pre-existing tools. As we introduce new or enhanced cleaning tools, we must manage the transition from older tools in order to minimize disruptions in customers' ordering patterns, avoid excessive levels of older tool inventories and ensure timely delivery of sufficient supplies of new tools to meet customer demand. Furthermore, product introductions could delay purchases by customers awaiting arrival of our new products, which could cause us to fail to meet our expected level of production orders for pre-existing tools.

Our success will depend on our ability to identify and enter new product markets.

We expect to spend a significant amount of time and resources identifying new product markets in addition to the market for cleaning solutions and in developing new products for entry into these markets. Our TEBO technology took eight years to develop, and development of any new technology could require a similar, or even longer, period of time. Product development requires significant investments in engineering hours, third-party development costs, prototypes and sample materials, as well as sales and marketing expenses, which will not be recouped if the product launch is unsuccessful. We may fail to predict the needs of other markets accurately or develop new, innovative technologies to address those needs. Further, we may not be able to design and introduce new products in a timely or cost-efficient manner, and our new products may be more costly to develop, may fail to meet the requirements of the market, or may be adopted slower than we expect. If we are not able to introduce new products successfully, our inability to gain market share in new product markets could adversely affect our ability to sustain our revenue growth or maintain our current revenue levels.

If we fail to establish and maintain a reputation for credibility and product quality, our ability to expand our customer base will be impaired and our operating results may suffer.

We must develop and maintain a market reputation for innovative, differentiated technologies and high quality, reliable products in order to attract new customers and achieve widespread market acceptance of our products. Our market reputation is critical because we compete against several larger, more established competitors, many of which supply equipment for a larger number of process steps than we do to a broader customer base in an industry with a limited number of customers. In these circumstances, traditional marketing and branding efforts are of limited value, and our success depends on our ability to provide customers with reliable and technically sophisticated products. If the limited customer base does not perceive our products and services to be of high quality and effectiveness, our reputation could be harmed, which could adversely impact our ability to achieve our targeted growth.

We operate in a highly competitive industry and many of our competitors are larger, better-established, and have significantly greater operating and financial resources than we have.

The chip equipment industry is highly competitive, and we face substantial competition throughout the world in each of the markets we serve. Many of our current and potential competitors have, among other things:

- greater financial, technical, sales and marketing, manufacturing, distribution and other resources;
- established credibility and market reputations;
- longer operating histories;
- broader product offerings;
- more extensive service offerings, including the ability to have large inventories of spare parts available near, or even at, customer locations;
- local sales forces; and
- more extensive geographic coverage.

These competitors may also have the ability to offer their products at lower prices by subsidizing their losses in wet cleaning with profits from other lines of business in order to retain current or obtain new customers. Among other things, some competitors have the ability to offer bundled discounts for customers purchasing multiple products. Many of our competitors have more extensive customer and partner relationships than we do and may therefore be in a better position to identify and respond to market developments and changes in customer demands. Potential customers may prefer to purchase from their existing suppliers rather than a new supplier, regardless of product performance or features. If we are not able to compete successfully against existing or new competitors, our business, operating results and financial condition will be negatively affected.

We depend on a small number of customers for a substantial portion of our revenue, and the loss of, or a significant reduction in orders from, one of our major customers could have a material adverse effect on our revenue and operating results. There are also a limited number of potential customers for our products.

The chip manufacturing industry is highly concentrated, and we derive most of our revenue from a limited number of customers. In 2018, 85.7% of our revenue was derived from three customers: Yangtze Memory Technologies Co., Ltd., a leading PRC memory chip company, together with one of its subsidiaries, accounted for 38.8% of our revenue; Shanghai Huali Microelectronics Corporation, a leading PRC foundry, accounted for 23.6% of our revenue; and SK Hynix Inc., a leading Korean memory chip company, accounted for 23.3% of our revenue. In 2017, 55.2% of our revenue was derived from four customers: SK Hynix Inc. accounted for 18.1% of our revenue; Shanghai Integrated Circuit Research and Development Center Ltd., a public research consortia for the Chinese semiconductor industry, accounted for 14.1% of our revenue; JiangYin ChangDian Advanced Packaging Co. Ltd., a leading PRC foundry, accounted for 12.8% of our revenue; and Yangtze Memory Technologies Co., Ltd., together with one of its subsidiaries, accounted for 10.2% of our revenue.

As a consequence of the concentrated nature of our customer base, our revenue and results of operations may fluctuate from quarter to quarter and are difficult to estimate, and any cancellation of orders or any acceleration or delay in anticipated product purchases or the acceptance of shipped products by our larger customers could materially affect our revenue and results of operations in any quarterly period.

We may be unable to sustain or increase our revenue from our larger customers or offset the discontinuation of concentrated purchases by our larger customers with purchases by new or existing customers. We expect a small number of customers will continue to account for a high percentage of our revenue for the foreseeable future and that our results of operations may fluctuate materially as a result of such larger customers' buying patterns. Thus, our business success depends on our ability to maintain strong relationships with our customers. The loss of any of our key customers for any reason, or a change in our relationship with any of our key customers, including a significant delay or reduction in their purchases, may cause a significant decrease in our revenue, which we may not be able to recapture due to the limited number of potential customers.

We have seen, and may see in the future, consolidation of our customer base. Industry consolidation generally has negative implications for equipment suppliers, including a reduction in the number of potential customers, a decrease in aggregate capital spending and greater pricing leverage on the part of consumers over equipment suppliers. Continued consolidation of the chip industry could make it more difficult for us to grow our customer base, increase sales of our products and maintain adequate gross margins.

Our customers do not enter into long-term purchase commitments, and they may decrease, cancel or delay their projected purchases at any time.

In accordance with industry practice, our sales are on a purchase order basis, which we seek to obtain three to four months in advance of the expected product delivery date. Until a purchase order is received, we do not have a binding purchase commitment. Our SAPS and TEBO customers to date have provided us with non-binding one- to two-year forecasts of their anticipated demands, but those forecasts can be changed at any time, without any required notice to us. Because the lead-time needed to produce a tool customized to a customer’s specifications can extend up to six months, we may need to begin production of tools based on non-binding forecasts, rather than waiting to receive a binding purchase order. No assurance can be made that a customer’s forecast will result in a firm purchase order within the time period we expect, or at all.

If we do not accurately predict the amount and timing of a customer’s future purchases, we risk expending time and resources on producing a customized tool that is not purchased by a particular customer, which may result in excess or unwanted inventory, or we may be unable to fulfill an order on the schedule required by a purchase order, which would result in foregone sales. Customers may place purchase orders that exceed forecasted amounts, which could result in delays in our delivery time and harm our reputation. In the future a customer may decide not to purchase our tools at all, may purchase fewer tools than it did in the past or may otherwise alter its purchasing patterns, and the impact of any such actions may be intensified given our dependence on a small number of large customers. Our customers make major purchases periodically as they add capacity or otherwise implement technology upgrades. If any significant customers cancel, delay or reduce orders, our operating results could suffer.

We may incur significant expenses long before we can recognize revenue from new products, if at all, due to the costs and length of research, development, manufacturing and customer evaluation process cycles.

We often incur significant research and development costs for products that are purchased by our customers only after much, or all, of the cost has been incurred or that may never be purchased. We allow some new customers, or existing customers considering new products, to evaluate products without any payment becoming due unless the product is ultimately accepted, which means we may invest $1.0 to $4.0 million in manufacturing a tool that may never be accepted and purchased or may be purchased months or even years after production. In the past we have borrowed money in order to fund first-time purchase order equipment and next-generation evaluation equipment. When we deliver evaluation equipment, or a “first tool,” we may not recognize revenue or receive payment for the tool for 24 months or longer. Even returning customers may take as long as six months to make any payments. If our sales efforts are unsuccessful after expending significant resources, or if we experience delays in completing sales, our future cash flow, revenue and profitability may fluctuate or be materially adversely affected.

Our sales cycle is long and unpredictable, which results in variability of our financial performance and may require us to incur high sales and marketing expenses with no assurance that a sale will result, all of which could adversely affect our profitability.

Our results of operations may fluctuate, in part, because of the resource-intensive nature of our sales efforts and the length and variability of our sales cycle. A sales cycle is the period between initial contact with a prospective customer and any sale of our tools. Our sales process involves educating customers about our tools, participating in extended tool evaluations and configuring our tools to customer-specific needs, after which customers may evaluate the tools. The length of our sales cycle, from initial contact with a customer to the execution of a purchase order, is generally 6 to 24 months. During the sales cycle, we expend significant time and money on sales and marketing activities and make investments in evaluation equipment, all of which lower our operating margins, particularly if no sale occurs or if the sale is delayed as a result of extended qualification processes or delays from our customers’ customers.

The duration or ultimate success of our sales cycle depends on factors such as:

- efforts by our sales force;
- the complexity of our customers’ manufacturing processes and the compatibility of our tools with those processes;
- our customers’ internal technical capabilities and sophistication; and

- our customers' capital spending plans and processes, including budgetary constraints, internal approvals, extended negotiations or administrative delays.

It is difficult to predict exactly when, or even if, we will make a sale to a potential customer or if we can increase sales to our existing customers. As a result, we may not recognize revenue from our sales efforts for extended periods of time, or at all. The loss or delay of one or more large transactions in a quarter could impact our results of operations for that quarter and any future quarters for which revenue from that transaction is lost or delayed. In addition, we believe that the length of the sales cycle and intensity of the evaluation process may increase for those current and potential customers that centralize their purchasing decisions.

Difficulties in forecasting demand for our tools may lead to periodic inventory shortages or excess spending on inventory items that may not be used.

We need to manage our inventory of components and production of tools effectively to meet changing customer requirements. Accurately forecasting customers' needs is difficult. Our tool demand forecasts are based on multiple assumptions, including non-binding forecasts received from our customers years in advance, each of which may introduce error into our estimates. Inventory levels for components necessary to build our tools in excess of customer demand may result in inventory write-downs and could have an adverse effect on our operating results and financial condition. Conversely, if we underestimate demand for our tools or if our manufacturing partners fail to supply components we require at the time we need them, we may experience inventory shortages. Such shortages might delay production or shipments to customers and may cause us to lose sales. These shortages may also harm our credibility, diminish the loyalty of our channel partners or customers.

A failure to prevent inventory shortages or accurately predict customers' needs could result in decreased revenue and gross margins and harm our business.

Some of our products and supplies may become obsolete or be deemed excess while in inventory due to rapidly changing customer specifications, changes in product structure, components or bills of material as a result of engineering changes, or a decrease in customer demand. We also have exposure to contractual liabilities to our contract manufacturers for inventories purchased by them on our behalf, based on our forecasted requirements, which may become excess or obsolete. Our inventory balances also represent an investment of cash. To the extent our inventory turns are slower than we anticipate based on historical practice, our cash conversion cycle extends and more of our cash remains invested in working capital. If we are not able to manage our inventory effectively, we may need to write down the value of some of our existing inventory or write off non-saleable or obsolete inventory. Any such charges we incur in future periods could materially and adversely affect our results of operations.

The difficulty in forecasting demand also makes it difficult to estimate our future results of operations and financial condition from period to period. A failure to accurately predict the level of demand for our products could adversely affect our net revenue and net income, and we are unlikely to forecast such effects with any certainty in advance.

If our tools contain defects or do not meet customer specifications, we could lose customers and revenue.

Highly complex tools such as our may develop defects during the manufacturing and assembly process. We may also experience difficulties in customizing our tools to meet customer specifications or detecting defects during the development and manufacturing of our tools. Some of these failures may not be discovered until we have expended significant resources in customizing our tools, or until our tools have been installed in our customers' production facilities. These quality problems could harm our reputation as well as our customer relationships in the following ways:

- our customers may delay or reject acceptance of our tools that contain defects or fail to meet their specifications;
- we may suffer customer dissatisfaction, negative publicity and reputational damage, resulting in reduced orders or otherwise damaging our ability to retain existing customers and attract new customers;
- we may incur substantial costs as a result of warranty claims or service obligations or in order to enhance the reliability of our tools;

- the attention of our technical and management resources may be diverted;
- we may be required to replace defective systems or invest significant capital to resolve these problems; and
- we may be required to write off inventory and other assets related to our tools.

In addition, defects in our tools or our inability to meet the needs of our customers could cause damage to our customers' products or manufacturing facilities, which could result in claims for product liability, tort or breach of warranty, including claims from our customers. The cost of defending such a lawsuit, regardless of its merit, could be substantial and could divert management's attention from our ongoing operations. In addition, if our business liability insurance coverage proves inadequate with respect to a claim or future coverage is unavailable on acceptable terms or at all, we may be liable for payment of substantial damages. Any or all of these potential consequences could have an adverse impact on our operating results and financial condition.

Warranty claims in excess of our estimates could adversely affect our business.

We have provided warranties against manufacturing defects of our tools that range from 12 to 36 months in duration. Our product warranty requires us to provide labor and parts necessary to repair defects. As of December 31, 2018, we had accrued $1.7 million in liability contingency for potential warranty claims. Warranty claims substantially in excess of our expectations, or significant unexpected costs associated with warranty claims, could harm our reputation and could cause customers to decline to place new or additional orders, which could have a material adverse effect on our business, results of operations and financial condition.

We rely on third parties to manufacture significant portions of our tools and our failure to manage our relationships with these parties could harm our relationships with our customers, increase our costs, decrease our sales and limit our growth.

Our tools are complex and require components and subassemblies having a high degree of reliability, accuracy and performance. We rely on third parties to manufacture most of the subassemblies and supply most of the components used in our tools. Accordingly, we cannot directly control our delivery schedules and quality assurance. This lack of control could result in shortages or quality assurance problems. These issues could delay shipments of our tools, increase our testing costs or lead to costly failure claims.

We do not have long-term supply contracts with some of our suppliers, and those suppliers are not obligated to perform services or supply products to us for any specific period, in any specific quantities or at any specific price, except as may be provided in a particular purchase order. In addition, we attempt to maintain relatively low inventories and acquire subassemblies and components only as needed. There are significant risks associated with our reliance on these third-party suppliers, including:

- potential price increases;
- capacity shortages or other inability to meet any increase in demand for our products;
- reduced control over manufacturing process for components and subassemblies and delivery schedules;
- limited ability of some suppliers to manufacture and sell subassemblies or parts in the volumes we require and at acceptable quality levels and prices, due to the suppliers' relatively small operations and limited manufacturing resources;
- increased exposure to potential misappropriation of our intellectual property; and
- limited warranties on subassemblies and components supplied to us.

Any delays in the shipment of our products due to our reliance on third-party suppliers could harm our relationships with our customers. In addition, any increase in costs due to our suppliers increasing the price they charge us for subassemblies and components or arising from our need to replace our current suppliers that we are unable to pass on to our customers could negatively affect our operating results.

Any shortage of components or subassemblies could result in delayed delivery of products to us or in increased costs to us, which could harm our business.

The ability of our manufacturers to supply our tools is dependent, in part, upon the availability certain components and subassemblies. Our manufacturers may experience shortages in the availability of such components or subassemblies, which could result in delayed delivery of products to us or in increased costs to us. Any shortage of components or subassemblies or any inability to control costs associated with manufacturing could increase the costs for our products or impair our ability to ship orders in a timely cost-efficient manner. As a result, we could experience cancellation of orders, refusal to accept deliveries or a reduction in our prices and margins, any of which could harm our financial performance and results of operations.

We depend on a limited number of suppliers, including single source suppliers, for critical components and subassemblies, and our business could be disrupted if they are unable to meet our needs.

We depend on a limited number of suppliers for components and subassemblies used in our tools. Certain components and subassemblies of our tools have only been purchased from our current suppliers to date and changing the source of those components and subassemblies may result in disruptions during the transition process and entail significant delay and expense. We rely on Product Systems, Inc., or ProSys, as the sole supplier of megasonic transducers, a key subassembly used in our single-wafer cleaning equipment. We also rely on Ninebell Co., Ltd., or Ninebell, which is the principal supplier of robotic delivery system subassemblies used in our single-wafer cleaning equipment. An adverse change to our relationship with ProSys or Ninebell would disrupt our production of single-wafer cleaning equipment and could cause substantial harm to our business.

With some of these suppliers, we do not have long-term agreements and instead purchase components and subassemblies through a purchase order process. As a result, these suppliers may stop supplying us components and subassemblies, limit the allocation of supply and equipment to us due to increased industry demand or significantly increase their prices at any time with little or no advance notice. Our reliance on a limited number of suppliers could also result in delivery problems, reduced control over product pricing and quality, and our inability to identify and qualify another supplier in a timely manner.

Moreover, some of our suppliers may experience financial difficulties that could prevent them from supplying us with components or subassemblies used in the design and manufacture of our products. In addition, our suppliers, including our sole supplier ProSys, may experience manufacturing delays or shut downs due to circumstances beyond their control, such as labor issues, political unrest or natural disasters. Any supply deficiencies could materially and adversely affect our ability to fulfill customer orders and our results of operations. We have in the past and may in the future, experience delays or reductions in supply shipments, which could reduce our revenue and profitability. If key components or materials are unavailable, our costs would increase and our revenue would decline.

We have depended on PRC governmental subsidies to help fund our technology development since 2008, and our failure to obtain additional subsidies may impede our development of new technologies and may increase our cost of capital, either of which could make it difficult for us to expand our product base.

We received subsidies from local and central governmental authorities in the PRC in 2008, 2009, 2014 and 2018. These grants have provided a majority of the funding for our development and commercialization of stress-free polishing and electro copper-plating technologies. If we are unable to obtain similar governmental subsidies for development projects in the future, we may need to raise additional funds through public or private financings, strategic relationships, or other arrangements, which could force us to reduce our efforts to develop technologies beyond SAPS, TEBO and Tahoe. To the extent that we receive a lower level of, or no, governmental subsidies in the future, we may need to raise additional funds through public or private financings, strategic relationships, or other arrangements.

The success of our business will depend on our ability to manage any future growth.

We have experienced rapid growth in our business recently due, in part, to an expansion of our product offerings and an increase in the number of customers that we serve. For example, our headcount grew by 28% during 2017 and by an additional 35% during 2018. We will seek to continue to expand our operations in the future, including by adding new offices, locations and employees. Managing our growth has placed and could continue to place a significant strain on our management, other personnel and our infrastructure. If we are unable to manage our growth effectively, we may not be able to take advantage of market opportunities, develop new products, enhance our technological capabilities, satisfy customer requirements, respond to competitive pressures or otherwise execute our business plan. In addition, any inability to manage our growth effectively could result in operating inefficiencies that could impair our competitive position and increase our costs disproportionately to the amount of growth we achieve. To manage our growth, we believe we must effectively:

- hire, train, integrate and manage additional qualified engineers for research and development activities, sales and marketing personnel, service and support personnel and financial and information technology personnel;
- manage multiple relationships with our customers, suppliers and other third parties; and
- continue to enhance our information technology infrastructure, systems and controls.

Our organizational structure has become more complex, and we will need to continue to scale and adapt our operational, financial and management controls, as well as our reporting systems and procedures. The continued expansion of our infrastructure will require us to commit substantial financial, operational and management resources before our revenue increases and without any assurances that our revenue will increase.

We are highly dependent on our Chief Executive Officer and President and other senior management and key employees, and we currently do not have a permanent Chief Financial Officer.

Our success largely depends on the skills, experience and continued efforts of our management, technical and sales personnel, including in particular Dr. David H. Wang, our Chair of the Board, Chief Executive Officer, President and founder. In January 2018 we notified our former Chief Financial Officer of the termination of his employment effective January 24, 2018. Our Chief Accounting Officer, who joined us effective January 24, 2018, currently is serving as our interim Chief Financial Officer. We are uncertain as to when we will be able to identify and hire a successor Chief Financial Officer, and we may incur significant expense in recruiting and hiring such a successor. If one or more of our other senior management were unable or unwilling to continue their employment with us, we may not be able to replace them in a timely manner. We may incur additional expenses to recruit and retain qualified replacements. We do not currently maintain key person life insurance policies on any of our employees. Our business may be severely disrupted and our financial condition and results of operations may be materially and adversely affected. In addition, our senior management may join a competitor or form a competing company. All of our senior management are at-will employees, which means either we or the employee may terminate their employment at any time. The loss of Dr. Wang or other key management personnel, including our former Chief Financial Officer, could significantly delay or prevent the achievement of our business objectives.

Failure to attract and retain qualified personnel could put us at a competitive disadvantage and prevent us from effectively growing our business.

Our future success depends, in part, on our ability to continue to attract and retain highly skilled personnel. There is substantial competition for experienced management, technical and sales personnel in the chip equipment industry. If qualified personnel become scarce or difficult to attract or retain for compensation-related or other reasons, we could experience higher labor, recruiting or training costs. New hires may require significant training and time before they achieve full productivity and may not become as productive as we expect. If we are unable to retain and motivate our existing employees and attract qualified personnel to fill key positions, we may experience inadequate levels of staffing to develop and market our products and perform services for our customers, which could have a negative effect on our operating results.

Our ability to utilize certain U.S. and state net operating loss carryforwards may be limited under applicable tax laws.

As of December 31, 2018, we had net operating loss carryforward amounts, or NOLs, of $17 million for U.S. federal income tax purposes and $714,000 for U.S. state income tax purposes. The federal and state NOLs will expire at various dates beginning in 2019.

Utilization of these NOLs could be subject to a substantial annual limitation if the ownership change limitations under U.S. Internal Revenue Code Sections 382 and 383 and similar U.S. state provisions are triggered by changes in the ownership of our capital stock. Such an annual limitation would result in the expiration of the NOLs before utilization. Our existing NOLs may be subject to limitations arising from previous ownership changes, including in connection with our initial public offering and concurrent private placement in November 2017 and any future follow-on public offerings. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change. Regulatory changes, such as suspensions on the use of NOLs, or other unforeseen reasons, may cause our existing NOLs to expire or otherwise become unavailable to offset future income tax liabilities. Additionally, U.S. state NOLs generated in one state cannot be used to offset income generated in another U.S. state. For these reasons, we may be limited in our ability to realize tax benefits from the use of our NOLs, even if our profitability would otherwise allow for it.

Acquisitions that we pursue in the future, whether or not consummated, could result in other operating and financial difficulties.

In the future we may seek to acquire additional product lines, technologies or businesses in an effort to increase our growth, enhance our ability to compete, complement our product offerings, enter new and adjacent markets, obtain access to additional technical resources, enhance our intellectual property rights or pursue other competitive opportunities. We may also make investments in certain key suppliers to align our interests with such suppliers. If we seek acquisitions, we may not be able to identify suitable acquisition candidates at prices we consider appropriate. We cannot readily predict the timing or size of our future acquisitions, or the success of any future acquisitions.

To the extent that we consummate acquisitions or investments, we may face financial risks as a result, including increased costs associated with merged or acquired operations, increased indebtedness, economic dilution to gross and operating profit and earnings per share, or unanticipated costs and liabilities. Acquisitions may involve additional risks, including:

- the acquired product lines, technologies or businesses may not improve our financial and strategic position as planned;
- we may determine we have overpaid for the product lines, technologies or businesses, or that the economic conditions underlying our acquisition have changed;
- we may have difficulty integrating the operations and personnel of the acquired company;
- we may have difficulty retaining the employees with the technical skills needed to enhance and provide services with respect to the acquired product lines or technologies;
- the acquisition may be viewed negatively by customers, employees, suppliers, financial markets or investors;
- we may have difficulty incorporating the acquired product lines or technologies with our existing technologies;
- we may encounter a competitive response, including price competition or intellectual property litigation;
- we may become a party to product liability or intellectual property infringement claims as a result of our sale of the acquired company’s products;
- we may incur one-time write-offs, such as acquired in-process research and development costs, and restructuring charges;
- we may acquire goodwill and other intangible assets that are subject to impairment tests, which could result in future impairment charges;
- our ongoing business and management’s attention may be disrupted or diverted by transition or integration issues and the complexity of managing geographically or culturally diverse enterprises; and
- our due diligence process may fail to identify significant existing issues with the target business.

From time to time, we may enter into negotiations for acquisitions or investments that are not ultimately consummated. These negotiations could result in significant diversion of management time, as well as substantial out-of-pocket costs, any of which could have a material adverse effect on our business, operating results and financial condition.

Future declines in the semiconductor industry, and the overall world economic conditions on which the industry is significantly dependent, could have a material adverse impact on our results of operations and financial condition.

Our business depends on the capital equipment expenditures of chip manufacturers, which in turn depend on the current and anticipated market demand for integrated circuits. With the consolidation of customers within the industry, the chip capital equipment market may experience rapid changes in demand driven both by changes in the market generally and the plans and requirements of particular customers. Global economic and business conditions, which are often unpredictable, have historically impacted customer demand for our products and normal commercial relationships with our customers, suppliers and creditors. Additionally, in times of economic uncertainty our customers' budgets for our tools, or their ability to access credit to purchase them, could be adversely affected. This would limit their ability to purchase our products and services. As a result, economic downturns could cause material adverse changes to our results of operations and financial condition including:

- a decline in demand for our products;
- an increase in reserves on accounts receivable due to our customers' inability to pay us;
- an increase in reserves on inventory balances due to excess or obsolete inventory as a result of our inability to sell such inventory;
- valuation allowances on deferred tax assets;
- restructuring charges;
- asset impairments including the potential impairment of goodwill and other intangible assets;
- a decline in the value of our investments;
- exposure to claims from our suppliers for payment on inventory that is ordered in anticipation of customer purchases that do not come to fruition;
- a decline in the value of certain facilities we lease to less than our residual value guarantee with the lessor; and
- challenges maintaining reliable and uninterrupted sources of supply.

Fluctuating levels of investment by chip manufacturers may materially affect our aggregate shipments, revenue, operating results and earnings. Where appropriate, we will attempt to respond to these fluctuations with cost management programs aimed at aligning our expenditures with anticipated revenue streams, which could result in restructuring charges. Even during periods of reduced revenues, we must continue to invest in research and development and maintain extensive ongoing worldwide customer service and support capabilities to remain competitive, which may temporarily harm our profitability and other financial results.

We conduct substantially all of our operations outside the United States and face risks associated with conducting business in foreign markets.

All of our sales in 2017 and 2018 were made to customers outside the United States. Our manufacturing center has been located in Shanghai since 2006 and substantially all of our operations are located in the PRC. We expect that all of our significant activities will remain outside the United States in the future. We are subject to a number of risks associated with our international business activities, including:

- imposition of, or adverse changes in, foreign laws or regulatory requirements;
- the need to comply with the import laws and regulations of various foreign jurisdictions, including a range of U.S. import laws;
- potentially adverse tax consequences, including withholding tax rules that may limit the repatriation of our earnings, and higher effective income tax rates in foreign countries where we conduct business;
- competition from local suppliers with which potential customers may prefer to do business;
- seasonal reduction in business activity, such as during Chinese, or Lunar, New Year in parts of Asia and in other periods in various individual countries;
- increased exposure to foreign currency exchange rates;
- reduced protection for intellectual property;

- longer sales cycles and reliance on indirect sales in certain regions;
- increased length of time for shipping and acceptance of our products;
- greater difficulty in responding to customer requests for maintenance and spare parts on a timely basis;
- greater difficulty in enforcing contracts and accounts receivable collection and longer collection periods;
- difficulties in staffing and managing foreign operations and the increased travel, infrastructure and legal and compliance costs associated with multiple international locations;
- heightened risk of unfair or corrupt business practices in certain geographies and of improper or fraudulent sales arrangements that may impact financial results and result in restatements of, or irregularities in, our consolidated financial statements; and
- general economic conditions, geopolitical events or natural disasters in countries where we conduct our operations or where our customers are located, including political unrest, war, acts of terrorism or responses to such events.

In particular, the Asian market is extremely competitive, and chip manufacturers may be aggressive in seeking price concessions from suppliers, including chip equipment manufacturers.

We may not be successful in developing and implementing policies and strategies that will be effective in managing these risks in each country in which we do business. Our failure to manage these risks successfully could adversely affect our business, operating results and financial condition.

Fluctuation in foreign currency exchange rates may adversely affect our results of operations and financial position.

Our results of operations and financial position could be adversely affected as a result of fluctuations in foreign currency exchange rates. Although our financial statements are denominated in U.S. dollars, a sizable portion of our costs are denominated in other currencies, principally the Chinese Renminbi and, to a lesser extent, the Korean Won. Because many of our raw material purchases are denominated in Renminbi while the majority of the purchase orders we receive are denominated in U.S. dollars, exchange rates have a significant effect on our gross margin. We have not engaged in any foreign currency exchange hedging transactions to date, and any strategies that we may use in the future to reduce the adverse impact of fluctuations in foreign currency exchange rates may not be successful. Our foreign currency exposure with respect to assets and liabilities for which we do not have hedging arrangements could have a material impact on our results of operations in periods when the U.S. dollar significantly fluctuates in relation to unhedged non-U.S. currencies in which we transact business.

Changes in government trade policies could limit the demand for our tools and increase the cost of our tools or adversely impact our supply chain.

General trade tensions between the U.S. and PRC escalated in 2018. In each of July, August and September 2018, the U.S. government imposed a round of new or higher tariffs on specified imported products originating from the PRC in response to what the U.S. government characterizes as unfair trade practices. The PRC government responded to each of these three rounds of U.S. tariff changes by imposing new or higher tariffs on specified products imported from the United States. Higher duties on existing tariffs and further rounds of tariffs have been announced or threatened by U.S. and PRC leaders.

The imposition of tariffs by the U.S. and PRC governments and the surrounding economic uncertainty may negatively impact the semiconductor industry, including reducing the demand of fabricators for capital equipment such as our tools. Further changes in trade policy, tariffs, additional taxes, restrictions on exports or other trade barriers, or restrictions on supplies, equipment, and raw materials including rare earth minerals, may limit the ability of our customers to manufacture or sell semiconductors or to make the manufacture or sale of semiconductors more expensive and less profitable, which could lead those customers to fabricate fewer semiconductors and to invest less in capital equipment such as our tools. In addition, if the PRC were to impose additional tariffs on raw materials, subsystems or other supplies that we source from the United States, our cost for those supplies would increase. As a result of any of the foregoing events, the imposition or new or additional tariffs may limit our ability to manufacture tools, increase our selling and/or manufacturing costs, decrease margins, or inhibit our ability to sell tools or to purchase necessary equipment and supplies, which could have a material adverse effect on our business, results of operations, or financial conditions.

Changes in political and economic policies of the PRC government may materially and adversely affect our business, financial condition and results of operations and may result in our inability to sustain our growth and expansion strategies.

Substantially all of our operations are conducted in the PRC, and a substantial majority of our revenue is sourced from the PRC. Accordingly, our financial condition and results of operations are affected to a significant extent by economics, political and legal developments in the PRC.

The Chinese economy differs from the economies of most developed countries in many respects, including the extent of government involvement, level of development, growth rate, and control of foreign exchange and allocation of resources. Although the PRC government has implemented measures emphasizing the utilization of market forces for economic reform, the reduction of state ownership of productive assets and the establishment of improved corporate governance in business enterprises, a substantial portion of productive assets in the PRC are still owned by the government. In addition, the PRC government continues to play a significant role in regulating industry development by imposing industrial policies. The PRC government also exercises significant control over economic growth in the PRC by allocating resources, controlling payment of foreign currency-denominated obligations, setting monetary policy, regulating financial services and institutions, and providing preferential treatment to particular industries or companies.

While the PRC economy has experienced significant growth in the past three decades, growth has been uneven, both geographically and among various sectors of the economy. The PRC government has implemented various measures to encourage economic growth and guide the allocation of resources. Some of these measures may benefit the overall PRC economy, but may also have a negative effect on us. Our financial condition and results of operation could be materially and adversely affected by government control over capital investments or changes in tax regulations that are applicable to us. In the past the PRC government has implemented measures to control the pace of economic growth, and similar measures in the future may cause decreased economic activity, which in turn could lead to a reduction in demand for our products and consequently have a material adverse effect on our businesses, financial condition and results of operations.

Although the PRC government has been implementing policies to develop an independent domestic semiconductor industry supply chain, there is no guaranteed time frame in which these initiatives will be implemented. We cannot guarantee that the implementation of these policies will result in additional revenue to us or that our presence in the PRC will result in support from the PRC government. To the extent that any capital investment or other assistance from the PRC government is not provided to us, it could be used to promote the products and technologies of our competitors, which could adversely affect our business, operating results and financial condition.

We are subject to government regulation, including import, export, economic sanctions, and anti-corruption laws and regulations, that may limit our sales opportunities, expose us to liability and increase our costs.

Our products are subject to import and export controls in jurisdictions in which we distribute or sell our products. Import and exports control and economic sanctions laws and regulations include restrictions and prohibitions on the sale or supply of certain products and on our transfer of parts, components, and related technical information and know-how to certain countries, regions, governments, persons and entities.

Various countries regulate the importation of certain products through import permitting and licensing requirements and have enacted laws that could limit our ability to distribute our products. The exportation, re-exportation, transfers within foreign countries and importation of our products, including by our partners, must comply with these laws and regulations, and any violations may result in reputational harm, government investigations and penalties, and a denial or curtailment of exporting. Complying with export control and sanctions laws for a particular sale may be time consuming, may increase our costs, and may result in the delay or loss of sales opportunities. If we are found to be in violation of U.S. sanctions or export control laws, or similar laws in other jurisdictions, we and the individuals working for us could incur substantial fines and penalties. Changes in export, sanctions or import laws or regulations may delay the introduction and sale of our products in international markets, require us to spend resources to seek necessary government authorizations or to develop different versions of our products, or, in some cases, prevent the export or import of our products to certain countries, regions, governments, persons or entities, which could adversely affect our business, financial condition and operating results.

We are subject to various domestic and international anti-corruption laws, such as the U.S. Foreign Corrupt Practices Act, as well as similar anti-bribery and anti-kickback laws and regulations. These laws and regulations generally prohibit companies and their intermediaries from offering or making improper payments to non-U.S. officials for the purpose of obtaining, retaining or directing business. Our exposure for violating these laws and regulations increases as our international presence expands and as we increase sales and operations in foreign jurisdictions.

Breaches of our cybersecurity systems could degrade our ability to conduct our business operations and deliver products to our customers, result in data losses and the theft of our intellectual property, damage our reputation, and require us to incur significant additional costs to maintain the security of our networks and data.

We increasingly depend upon our information technology systems to conduct our business operations, ranging from our internal operations and product development and manufacturing activities to our marketing and sales efforts and communications with our customers and business partners. Computer programmers may attempt to penetrate our network security, or that of our website, and misappropriate our proprietary information or cause interruptions of our service. Because the techniques used by such computer programmers to access or sabotage networks change frequently and may not be recognized until launched against a target, we may be unable to anticipate these techniques. We have also outsourced a number of our business functions to third-party contractors, including our manufacturers, and our business operations also depend, in part, on the success of our contractors' own cybersecurity measures. Accordingly, if our cybersecurity systems and those of our contractors fail to protect against unauthorized access, sophisticated cyberattacks and the mishandling of data by our employees and contractors, our ability to conduct our business effectively could be damaged in a number of ways, including sensitive data regarding our employees or business, including intellectual property and other proprietary data, could be stolen. Should this occur, we could be subject to significant claims for liability from our customers and regulatory actions from governmental agencies. In addition, our ability to protect our intellectual property rights could be compromised and our reputation and competitive position could be significantly harmed. Consequently, our financial performance and results of operations could be adversely affected.

Our production facilities could be damaged or disrupted by a natural disaster, war, terrorist attacks or other catastrophic events.

Our manufacturing facilities are subject to risks associated with natural disasters, such as earthquakes, fires, floods tsunami, typhoons and volcanic activity, environmental disasters, health epidemics, and other events beyond our control such as power loss, telecommunications failures, and uncertainties arising out of armed conflicts or terrorist attacks. A substantial majority of our facilities as well as our research and development personnel are located in the PRC. Any catastrophic loss or significant damage to any of our facilities would likely disrupt our operations, delay production, and adversely affect our product development schedules, shipments and revenue. In addition, any such catastrophic loss or significant damage could result in significant expense to repair or replace the facility and could significantly curtail our research and development efforts in a particular product area or primary market, which could have a material adverse effect on our operations and operating results.

In connection with the audit of our consolidated financial statements for 2017, our management and auditors identified a material weakness in our internal control over financial reporting that, even after remediation, could cause investors to lose confidence in our reported financial information and have a negative effect on the trading price of our stock.

Neither we nor BDO China Shu Lun Pan Certified Public Accountants LLP, or BDO China, our independent registered public accounting firm, has performed a comprehensive assessment of our internal control over financial reporting, as defined by the American Institute of Certified Public Accountants, for purposes of identifying and reporting material weaknesses and other control deficiencies. We are not currently required to comply with Section 404 of the Sarbanes-Oxley Act and therefore are not required to assess the effectiveness of our internal control over financial reporting. Further, BDO China has not been engaged to express, nor has it expressed, an opinion on the effectiveness of our internal control over financial reporting.

In connection with its audit of our consolidated financial statements as of, and for the year ended, December 31, 2016, BDO China informed us that it had identified a material weakness in our internal control over financial reporting relating to our lack of sufficient qualified financial reporting and accounting personnel with an appropriate level of expertise to properly address complex accounting issues under accounting principles generally accepted in the United States, or GAAP, and to prepare and review our consolidated financial statements and related disclosures to fulfill GAAP and SEC financial reporting requirements. During the nine months ended September 30, 2018, we took remedial measures to improve the effectiveness of our controls, including by hiring additional accounting and finance personnel and by engaging outside consulting firms, which our management considered, as of September 30, 2018, to have fully remediated the identified material weakness.

The existence of material weaknesses is an indication that there is a more than remote likelihood that a material misstatement of our financial statements will not be prevented or detected in a future period, and the process of designing and implementing effective internal controls and procedures will be a continual effort that may require us to expend significant resources to establish and maintain a system of controls that is adequate to satisfy our reporting obligations as a public company. We cannot assure you that we will implement and maintain adequate controls over our financial processes and reporting in the future in order to avoid additional material weaknesses or controlled deficiencies in our internal control over financing reporting. If other material weaknesses or control deficiencies occur in the future, we may be unable to report our financial results accurately or on a timely basis, which could cause our reported financial results to be materially misstated and result in the loss of investor confidence and cause the trading price of Class A common stock to decline. Moreover, ineffective controls could significantly hinder our ability to prevent fraud.

Our auditor, as a registered public accounting firm operating in the PRC, is not permitted to be inspected by the Public Company Accounting Oversight Board, and consequently investors may be deprived of the benefits of such inspections.

BDO China is the independent registered public accounting firm that issued the audit report included in this report in connection with our consolidated financial statements as of, and for the years ended, December 31, 2018 and 2017. BDO China, as an auditor of companies that are traded publicly in the United States and a firm registered with the U.S. Public Company Accounting Oversight Board, or PCAOB, is required by the laws of the United States to undergo regular inspections by the PCAOB to assess its compliance with the laws of the United States and applicable professional standards. BDO China is located in the PRC. The PCAOB is currently unable to conduct inspections on auditors in the PRC without the approval of PRC authorities, and therefore BDO China, like other independent registered public accounting firms operating in the PRC, is currently not inspected by the PCAOB.

In May 2013 the PCAOB announced that it had entered into a Memorandum of Understanding on Enforcement Cooperation with the China Securities Regulatory Commission and the Ministry of Finance of China pursuant to which the Ministry of Finance established a cooperative framework between the parties for the production and exchange of audit documents relevant to investigations in both the PRC and the United States. More specifically, the Memorandum of Understanding provides a mechanism for the parties to request and receive from each other assistance in obtaining documents and information in furtherance of their investigative duties. In addition the PCAOB is engaged in continuing discussions with the China Securities Regulatory Commission and the Ministry of Finance to permit joint inspections in the PRC of audit firms that are registered with the PCAOB and to audit PRC companies whose securities are listed on U.S. stock exchanges.

The PCAOB’s inspections of firms outside of the PRC have identified deficiencies in audit procedures and quality control procedures, and such deficiencies may be addressed as part of the inspection process to improve future audit quality. The inability of the PCAOB to conduct inspections of BDO China with respect to its audit of our consolidated financial statements may make it more difficult for investors to evaluate BDO China’s audit procedures and quality control procedures by depriving investors of potential benefits from improvements that could have been facilitated by PCAOB inspections.

Risks Relating to Our Intellectual Property

Our success depends on our ability to protect our intellectual property, including our SAPS, TEBO and Tahoe technologies.

Our commercial success depends in part on our ability to obtain and maintain patent and trade secret protection for our intellectual property, including our SAPS, TEBO and Tahoe technologies and the design of our Ultra C equipment, as well as our ability to operate without infringing upon the proprietary rights of others. There can be no assurance that our patent applications will result in additional patents being issued or that issued patents will afford sufficient protection against competitors with similar technology, nor can there be any assurance that the patents issued will not be infringed, designed around, or invalidated by third parties. Even issued patents may later be found unenforceable or may be modified or revoked in proceedings instituted by third parties before various patent offices or in courts. The degree of future protection for our intellectual property is uncertain. Only limited protection may be available and may not adequately protect our rights or permit us to gain or keep any competitive advantage. This failure to properly protect the intellectual property rights relating to our products and technologies could have a material adverse effect on our financial condition and results of operations.

The patent application process is subject to numerous risks and uncertainties, and there can be no assurance that we or any of our future development partners will be successful in protecting our product candidates by obtaining and defending patents. These risks and uncertainties include the following:

- The U.S. Patent and Trademark Office and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other provisions during the patent process. There are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case.
- Patent applications may not result in any patents being issued.
- Patents that may be issued may be challenged, invalidated, modified, revoked, circumvented, found to be unenforceable or otherwise may not provide any competitive advantage.
- Our competitors may seek or may have already obtained patents that will limit, interfere with, or eliminate our ability to make, use and sell our potential product candidates.
- The PRC and other countries other than the United States may have patent laws less favorable to patentees than those upheld by U.S. courts, allowing foreign competitors a better opportunity to create, develop and market competing product candidates.

In addition, we rely on the protection of our trade secrets and know-how. Although we have taken steps to protect our trade secrets and unpatented know-how, including entering into confidentiality and non-disclosure agreements with third parties and confidential information and inventions agreements with key employees, customers and suppliers, other parties may still obtain this information or may come upon this information independently. If any of these events occurs or if we otherwise lose protection for our trade secrets or proprietary know-how, the value of this information may be greatly reduced.

We may be involved in lawsuits to protect or enforce our patents, which could be expensive, time consuming and unsuccessful.

Competitors may infringe upon our patents. If our technologies are adopted, we believe that competitors may try to match our technologies and tools in order to compete. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming. An adverse result in any litigation or defense proceedings, including our current suits, could put one or more of our patents at risk of being invalidated, found to be unenforceable or interpreted narrowly and could put our patent applications at risk of not issuing. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during litigation. In addition, any future patent litigation, interference or other administrative proceedings will result in additional expense and distraction of our personnel. Most of our competitors are larger than we are and have substantially greater resources, and they therefore are likely to be able to sustain the costs of complex patent litigation longer than we could. An adverse outcome in such litigation or proceedings may expose us to loss of our proprietary position.

We may not be able to protect our intellectual property rights throughout the world, which could materially, negatively affect our business.

Filing, prosecuting and defending patents on our products or proprietary technologies in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States, including the PRC, can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and may export otherwise infringing products to territories where we have patent protection but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property protection, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license and may adversely affect our business.

If we are sued for infringing intellectual property rights of third parties, it will be costly and time consuming, and an unfavorable outcome in that litigation could have a material adverse effect on our business.

Our success depends on our ability to develop, manufacture, market and sell our products without infringing upon the proprietary rights of third parties. Numerous U.S. and foreign-issued patents and pending patent applications owned by third parties exist in the fields in which we are developing products, some of which may contain claims that overlap with the subject matter of our intellectual property. A third party has claimed in the past, and others may claim in the future, that our technology or products infringe their intellectual property. In some instances third parties may initiate litigation against us in an effort to prevent us from using our technology in alleged violation of their intellectual property rights. The risk of such a lawsuit will likely increase as our size and the number and scope of our products increase and as our geographic presence and market share expand.

Any potential intellectual property claims or litigation commenced against us could:

- be time consuming and expensive to defend, whether or not meritorious;
- force us to stop selling products or using technology that allegedly infringes the third party’s intellectual property rights;
- delay shipments of our products;
- require us to pay damages or settlement fees to the party claiming infringement;
- require us to attempt to obtain a license to the relevant intellectual property, which may not be available on reasonable terms or at all;
- force us to attempt to redesign products that contain the allegedly infringing technology, which could be expensive or which we may be unable to do;
- require us to indemnify our customers, suppliers or other third parties for any loss caused by their use of our technology that allegedly infringes the third party’s intellectual property rights; or
- divert the attention of our technical and managerial resources.

Because patent applications can take many years to issue, there may be currently pending applications, unknown to us, that may later result in issued patents upon which our products or technologies may infringe. Similarly, there may be issued patents relevant to our products of which we are not aware.

Risks Related to Ownership of Class A Common Stock

The market price of Class A common stock has been and may continue to be volatile, which could result in substantial losses for investors purchasing our shares

Class A common stock only commenced trading on the Nasdaq Global Market, or Nasdaq, on November 3, 2017, and the market price of Class A common stock has been, and could continue to be, subject to significant fluctuations. The market price of Class A common stock may fluctuate significantly in response to numerous factors, many of which are beyond our control, including:

- actual or anticipated fluctuations in our revenue and other operating results;
- the financial projections we may provide to the public, any changes in these projections or our failure to meet these projections;
- actions of securities analysts who initiate or maintain coverage of us, changes in financial estimates by any securities analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- changes in projections for the chips or chip equipment industries or in the operating performance or expectations and stock market valuations of chip companies, chip equipment companies or technology companies in general;
- changes in operating results;
- any changes in the financial projections we may provide to the public, our failure to meet these projections, or changes in recommendations by any securities analysts that elect to follow Class A common stock;
- additional shares of Class A common stock being sold into the market by us or our existing stockholders or the anticipation of such sales;
- price and volume fluctuations in the overall stock market, including as a result of trends in the economy as a whole;
- lawsuits threatened or filed against us;
- litigation and other developments relating to our patents or other proprietary rights or those of our competitors;
- developments in new legislation and pending lawsuits or regulatory actions, including interim or final rulings by judicial or regulatory bodies; and
- general economic trends, including changes in the demand for electronics or information technology or geopolitical events such as war or acts of terrorism, or any responses to such events.

In recent years, the stock market in general, and Nasdaq in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to changes in the operating performance of the companies whose stock is experiencing those price and volume fluctuations.

As a newly public company, our stock price may be volatile, and securities class action litigation has often been instituted against companies following periods of volatility of their stock price. Any such litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

In the past, following periods of volatility in the overall market and the market price of a particular company's securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

An active trading market for Class A common stock may not be sustained.

Class A common stock has been listed on Nasdaq only since November 3, 2017, and we cannot assure you that an active trading market for Class A common stock will be sustained or maintained. The lack of an active market may impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the fair market value of your shares. There can be no assurance that we will be able to successfully develop or maintain a liquid market for Class A common stock.

If securities or industry analysts do not publish research or reports about us, our business or our market, or if they publish negative evaluations of Class A common stock or the stock of other companies in our industry, the price of our stock and trading volume could decline.

The trading market for Class A common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. If one or more of the analysts who cover us downgrade the Class A common stock or publish inaccurate or unfavorable research about our business, the Class A common stock price would likely decline. In addition, if one or more of these analysts ceases coverage of the Class A common stock or fails to publish reports about the Class A common stock on a regular basis, we could lose visibility in the financial markets, which in turn could cause the Class A common stock price or trading volume to decline.

Requirements associated with being a public reporting company involve significant ongoing costs and can divert significant company resources and management attention.

We are subject to the reporting requirements of the Securities Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of Nasdaq, and other rules and regulations of the SEC. We are working with our legal, independent accounting and financial advisors to identify those areas in which changes should be made to our financial and management control systems to manage our growth and our obligations as a public reporting company. These areas include corporate governance, corporate control, disclosure controls and procedures, and financial reporting and accounting systems. We have made, and will continue to make, changes in these and other areas. Compliance with the various reporting and other requirements applicable to public reporting companies will require considerable time, attention of management and financial resources. In addition, the changes we make may not be sufficient to allow us to satisfy our obligations as a public reporting company on a timely basis.

The listing requirements of Nasdaq require that we satisfy certain corporate governance requirements relating to director independence, distributing annual and interim reports, stockholder meetings, approvals and voting, soliciting proxies, conflicts of interest and a code of conduct. Our management and other personnel will need to devote a substantial amount of time to ensure that we comply with all of these requirements. The reporting requirements, rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. These reporting requirements, rules and regulations, coupled with the increase in potential litigation exposure associated with being a public company, could also make it more difficult for us to attract and retain qualified persons to serve as our directors or executive officers, or to obtain certain types of insurance, including director and officer liability insurance, on acceptable terms.

We have never paid and do not intend to pay cash dividends and, consequently, your ability to achieve a return on your investment will depend on appreciation in the price of Class A common stock.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain any future earnings to finance the operation and expansion of our business, and we do not expect to declare or pay any dividends in the foreseeable future. Accordingly, you may only receive a return on your investment in Class A common stock if the market price of Class A common stock increases.

Our ability to pay dividends on Class A common stock depends significantly on our receiving distributions of funds from our subsidiaries in the PRC. PRC statutory laws and regulations permit payments of dividends by those subsidiaries only out of their retained earnings, which are determined in accordance with PRC accounting standards and regulations that differ from U.S. generally accepted accounting principles. The PRC regulations and our subsidiaries' articles of association require annual appropriations of 10% of net after-tax profits to be set aside, prior to payment of dividends, as a reserve or surplus fund, which restricts our subsidiaries' ability to transfer a portion of their net assets to us. In addition, our subsidiaries' short-term bank loans restrict their ability to pay dividends to us.

The dual class structure of Class A common stock has the effect of concentrating voting control with our executive officers and directors, including our Chief Executive Officer and President, which will limit or preclude your ability to influence corporate matters.

Class B common stock has twenty votes per share and Class A common stock has one vote per share. As of March 8, 2019, stockholders who hold shares of Class B common stock, who consist principally of our executive officers, employees, directors and their respective affiliates, collectively held 72.8% of the voting power of our outstanding capital stock. Because of the twenty-to-one voting ratio between Class B and Class A common stock, holders of Class B common stock collectively will continue to control a majority of the combined voting power of Class A common stock and therefore be able to control all matters submitted to our stockholders for approval so long as the shares of Class B common stock represent at least 4.8% of all outstanding shares of Class A and Class B common stock. This concentrated control will limit or preclude your ability to influence corporate matters for the foreseeable future. This concentrated control could also discourage a potential investor from acquiring Class A common stock due to the limited voting power of such stock relative to the Class B common stock and might harm the market price of Class A common stock.

Future transfers by holders of Class B common stock will result in those shares converting to Class A common stock, subject to limited exceptions. The conversion of Class B common stock to Class A common stock will have the effect, over time, of increasing the relative voting power of those holders of Class B common stock who retain their shares in the long term.

Delaware law and provisions in our charter and bylaws could make a merger, tender offer or proxy contest difficult, thereby depressing the trading price of Class A common stock.

Our status as a Delaware corporation and the anti-takeover provisions of the Delaware General Corporation Law may discourage, delay, or prevent a change in control by prohibiting us from engaging in a business combination with an interested stockholder for a period of three years after the person becomes an interested stockholder, even if a change of control would be beneficial to our existing stockholders. Our charter and bylaws contain provisions that may make the acquisition of our company more difficult, including the following:

- our dual class common stock structure provides holders of Class B common stock with the ability to control the outcome of matters requiring stockholder approval, even if they own significantly less than a majority of the total number of outstanding shares of Class A and Class B common stock;
- when the outstanding shares of Class B common stock represent less than a majority of the combined voting power of common stock;
- amendments to our charter or bylaws will require the approval of two-thirds of the combined vote of our then-outstanding shares of Class A and Class B common stock;
- vacancies on the board of directors will be able to be filled only by the board and not by stockholders;
- the board, which currently is not staggered, will be automatically separated into three classes with staggered three-year terms;
- directors will only be able to be removed from office for cause; and
- our stockholders will only be able to take action at a meeting and not by written consent;
- only our chair, our chief executive officer or a majority of our directors is authorized to call a special meeting of stockholders;
- advance notice procedures apply for stockholders to nominate candidates for election as directors or to bring matters before an annual meeting of stockholders;
- our charter authorizes undesignated preferred stock, the terms of which may be established, and shares of which may be issued, without stockholder approval; and
- cumulative voting in the election of directors is prohibited.

As a Delaware corporation, we are also subject to provisions of Delaware law, including Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders holding more than 15% of our outstanding voting stock from engaging in certain business combinations with us. Any provision of our charter or bylaws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of Class A common stock, and could also affect the price that some investors are willing to pay for Class A common stock.

Our charter designates the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain litigation that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or stockholders.

Our charter provides that the Court of Chancery of the State of Delaware will, to the fullest extent permitted by law, be the sole and exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of a fiduciary duty owed to us, our stockholders, creditors or other constituents by any of our directors, officers, other employees, agents or stockholders;
- any action asserting a claim arising under the Delaware General Corporation Law, our charter or bylaws, or as to which the Delaware General Corporation Law confers jurisdiction on the Court of Chancery of the State of Delaware; or
- any action asserting a claim that is governed by the internal affairs doctrine.

By becoming a stockholder in our company, you will be deemed to have notice of and have consented to the provisions of our charter related to choice of forum. The choice of forum provision in our charter may limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or any of our directors, officers, other employees, agents or stockholders, which may discourage lawsuits with respect to such claims. Alternatively, if a court were to find the choice of forum provision contained in our charter to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business, results of operations and financial condition.

Our management team has limited experience managing a public company.

The experience of the current members of our management team in managing a publicly traded company, interacting with public company investors and complying with the increasingly complex laws pertaining to public companies is limited to their experience with our company since our initial public offering in November 2017. Our management team may not successfully or efficiently manage our transition to being a public company subject to significant regulatory oversight and reporting obligations under the federal securities laws and the scrutiny of securities analysts and investors. These new obligations and constituents will require significant attention from our management team and could divert their attention away from the day-to-day management of our business, which could materially adversely affect our business, financial condition and operating results.

We are currently an "emerging growth company," and the reduced disclosure requirements applicable to emerging growth companies may make Class A common stock less attractive to investors.

We are currently an "emerging growth company," as defined in the Jumpstart Our Business Startups Act. For so long as we remain an emerging growth company, we are permitted, and intend, to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include reduced disclosure obligations regarding executive compensation and exemptions from the requirements of holding a non-binding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act and not being required to comply with any requirement that may be adopted by the PCAOB regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements. We cannot predict whether investors will find the Class A common stock less attractive if we rely on these exemptions. If some investors find the Class A common stock less attractive as a result, there may be a less active trading market, and more volatile trading price, for Class A common stock.

We will incur increased costs and demands upon management as a result of complying with the laws and regulations affecting public companies, particularly after we are no longer an "emerging growth company," which could adversely affect our business, operating results and financial condition.

As a public company, and particularly after we cease to be an "emerging growth company," we will continue to incur significant legal, accounting and other expenses. We are subject to the reporting requirements of the Securities and Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, and the rules and regulations of Nasdaq. These requirements have increased and will continue to increase our legal, accounting and financial compliance costs and have made and will continue to make some activities more time consuming and costly. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to maintain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified individuals to serve as our executive officers or on the board of directors, particularly to serve on the audit and compensation committees.

The Sarbanes-Oxley Act requires, among other things, that we assess the effectiveness of our internal control over financial reporting annually and the effectiveness of our disclosure controls and procedures quarterly. In particular, beginning with respect to the year ending December 31, 2018, Section 404 of the Sarbanes-Oxley Act, or Section 404, will require our management to perform system and process evaluation and testing to allow it to report on the effectiveness of our internal control over financial reporting.

We are currently evaluating our internal controls, identifying and remediating deficiencies in those internal controls and documenting the results of our evaluation, testing and remediation. Please see "—Our management and auditors identified a material weakness in our internal control over financial reporting that, if not properly remediated, could result in material misstatements in our consolidated financial statements that could cause investors to lose confidence in our reported financial information and have a negative effect on the trading price of our stock."

Investor perceptions of our company may suffer if deficiencies are found, which could cause a decline in the market price of our stock. Irrespective of compliance with Section 404, any failure of our internal control over financial reporting could have a material adverse effect on our stated operating results and harm our reputation. If we are unable to implement these requirements effectively or efficiently, it could harm our operations, financial reporting, or financial results and could result in an adverse opinion on our internal controls from our independent registered public accounting firm.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expense and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

Item 2: Properties

We have occupied our current corporate headquarters in Fremont, California, since February 2008, under a lease that, as amended in February 2019, extends through March 2021.

We conduct research and development, service support operations, and a portion of manufacturing in our ACM Shanghai headquarters. This facility consists of 60,000 square feet, of which 36,000 square feet are allocated for manufacturing, and is located in the Zhangjiang Hi Tech Park in Shanghai. We have leased this facility since 2007. The lease terms and its payment terms are subject to modification and extension with Zhangjiang Group from time to time. We extended the lease for a 60-month term from January 1, 2018 until January 1, 2022.

In January 2018, ACM Shanghai entered into an operating lease for a second manufacturing space located in Shanghai, ten miles from its headquarters. The lease covers a total of 103,318 square feet, of which 50,000 square feet are allocated for production. The lease term is five years and expires on January 15, 2022.

In addition, we provide sales support and customer service operations from leased office space in Jiangying and Wuxi in the PRC, and Icheon in Korea.

Item 3: Legal Proceedings

From time to time we may become involved in legal proceedings or may be subject to claims arising in the ordinary course of our business. Although the results of litigation and claims cannot be predicted with certainty, we currently believe that the final outcome of these ordinary course matters will not have a material adverse effect on our business, operating results, financial condition or cash flows. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

PART II

Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Information Regarding the Trading of Common Stock

The Class A common stock has traded on NASDAQ Global Market under the symbol “ACMR” since November 3, 2017. Prior to that time, there was no public market for the Class A common stock. The Class B common stock is not listed or traded on any stock exchange.

Holders of Common Stock

As of March 8, 2019, there were 14,176,690 holders of record of shares of Class A common stock and 1,898,423 holders of record of shares of Class B common stock. The actual number of holders of Class A common stock is substantially greater and includes stockholders who are beneficial owners and whose shares are held of record by banks, brokers, and other financial institutions.

Securities Authorized for Issuance Under Equity Compensation Plans

The information required by this item will be set forth in the definitive proxy statement we will file in connection with our 2019 Annual Meeting of Stockholders and is incorporated by reference herein.

Sales of Unregistered Securities

Set forth below is information regarding shares of capital stock we issued in 2018 that were not registered under the Securities Act of 1933:

(1) We issued an aggregate of 94,694 shares of Class A common stock pursuant to the exercise of stock options at per share exercise prices ranging from $0.75 to $3.00 per share.
(2) In March 2018 we issued 397,502 shares of Class A common stock pursuant to an exercise of a warrant issued in March 2017 in exchange for a senior secured promissory note in the principal amount of approximately $3 million.

The offer, sale and issuance of the securities described in paragraph (1) were exempt from registration under the Securities Act of 1933 by virtue of Section 4(a)(2) thereof (or Regulation D promulgated thereunder) because the issuance of securities to the recipients did not involve a public offering, or in reliance on Rule 701 because the transaction was pursuant to a contract relating to compensation as provided under such rule. The offer, sale and issuance of the security described in paragraph (2) was deemed to be exempt from registration under the Securities Act in reliance on Section 4(a)(2) of the Securities Act in that the issuance of the securities to the accredited investors did not involve a public offering. The recipients of the securities in the transactions under paragraphs (1) and (2) acquired the securities for investment only and not with a view to or for sale in connection with any distribution thereof, and appropriate legends were affixed to the securities issued in these transactions. The recipients of the securities in these transactions were accredited investors under Rule 501 of Regulation D.

Transfer Agent

The transfer agent and registrar for the Class A common stock and the Class B common stock is Computershare Trust Company, N.A.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis should be read in conjunction with the audited consolidated financial statements and related notes included in this report. In addition to historical information, the following discussion contains forward-looking statements that involves risks, uncertainties and assumptions. See "Forward-Looking Statements and Statistical Data" at page 2 of this report. Please read "Item1A. Risk Factors" for a discussion of factors that could cause our actual results to differ materially from our expectations

Overview

We supply advanced, innovative capital equipment developed for the global semiconductor industry. Fabricators of advanced integrated circuits, or chips, can use our single-wafer wet-cleaning tools in numerous steps to improve product yield, even at increasingly advanced process nodes. We have designed these tools for use in fabricating foundry, logic and memory chips, including dynamic random-access memory (or DRAM) and 3D NAND-flash memory chips. We also develop, manufacture and sell a range of advanced packaging tools to wafer assembly and packaging customers.

Selling prices for our single-wafer wet-cleaning tools range from $2 million to more than $5 million. Revenue from single-wafer wet-cleaning tools totaled $68.5 million, or 92% of total revenue, in 2018 and $27.1 million, or 74% of total revenue, in 2017. Our customers for single-wafer wet-cleaning tools include Semiconductor Manufacturing International Corporation, Shanghai Huali Microelectronics Corporation, SK Hynix Inc. and Yangtze Memory Technologies Co., Ltd.

We focus our selling efforts on establishing a referenceable base of leading foundry, logic and memory chip makers, whose use of our products can influence decisions by other manufacturers. We believe this customer base will help us penetrate the mature chip manufacturing markets and build credibility with additional industry leaders. Using a "demo-to-sales" process, we have placed evaluation equipment, or "first tools," with a number of selected customers. Since 2009 we have delivered more than 55 single-wafer wet cleaning tools, more than 50 of which have been accepted by customers and thereby generated revenue to us and the balance of which are awaiting customer acceptance should contractual conditions be met.

Since our formation in 1998, we have focused on building a strategic portfolio of intellectual property to support and protect our key innovations. Our wet-cleaning equipment has been developed using our key proprietary technologies:

- Space Alternated Phase Shift, or SAPS, technology for flat and patterned wafer surfaces, which employs alternating phases of megasonic waves to deliver megasonic energy in a highly uniform manner on a microscopic level;
- Timely Energized Bubble Oscillation, or TEBO, technology for patterned wafer surfaces at advanced process nodes, which provides effective, damage-free cleaning for 2D and 3D patterned wafers with fine feature sizes; and
- Tahoe technology for cost and environmental savings, which delivers high cleaning performance using significantly less sulfuric acid and hydrogen peroxide than is typically consumed by conventional high-temperature single-wafer cleaning tools.

We have been issued more than 220 patents in the United States, the People's Republic of China or PRC, Japan, Korea, Singapore and Taiwan.

We conduct substantially all of our product development, manufacturing, support and services in the PRC. All of our tools are built to order at our manufacturing facilities in Shanghai, which encompass 86,000 square feet of floor space for production capacity. Our experience has shown that chip manufacturers in the PRC and throughout Asia demand equipment meeting their specific technical requirements and prefer building relationships with local suppliers. We will continue to seek to leverage our local presence to address the growing market for semiconductor manufacturing equipment in the region by working closely with regional chip manufacturers to understand their specific requirements, encourage them to adopt our SAPS, TEBO and Tahoe technologies, and enable us to design innovative products and solutions to address their needs.

Corporate Background

ACM Research was incorporated in California in 1998 and redomesticated in Delaware in 2016. We perform strategic planning, marketing, and financial activities at our global corporate headquarters in Fremont, California.

Initially we focused on developing tools for chip manufacturing process steps involving the integration of ultra-low-K materials and copper. In the early 2000s we sold tools based on stress-free copper polishing technology.

To help us establish and build relationships with chip manufacturers in the PRC, in 2006 we moved our operational center to Shanghai and began to conduct our business through our subsidiary ACM Shanghai. In 2007 we began to focus our development efforts on single-wafer wet-cleaning solutions for the front-end chip fabrication process.

In 2009 we introduced SAPS megasonic technology, which can be applied in wet wafer cleaning at numerous steps during the chip fabrication process. In 2016 we introduced TEBO technology, which can be applied at numerous steps during the fabrication of small node conventional two-dimensional and three-dimensional patterned wafers. In August 2018, we introduced the Ultra-C Tahoe wafer cleaning tool, which delivers high cleaning performance with significantly less sulfuric acid than typically consumed by conventional high temperature single-wafer cleaning tools.

In December 2017 we formed a wholly owned subsidiary in the Republic of Korea, ACM Research Korea CO., LTD., to serve our customers based in the Republic of Korea and perform sales, marketing, and research and development activities. We currently conduct the majority of our product development, support and services, and substantially all of our manufacturing at ACM Shanghai. Our Shanghai operations position us to be near many of our current and potential new customers in the PR (including Taiwan), Korea and throughout Asia, providing convenient access and reduced shipping and manufacturing costs.

In 2011 ACM Shanghai formed a wholly owned subsidiary in the PRC, ACM Research (Wuxi), Inc., to manage sales and service operations. In June 2017 we formed a wholly owned subsidiary in Hong Kong, CleanChip Technologies Limited, to act on our behalf in Asian markets outside the PRC by, for example, serving as a trading partner between ACM Shanghai and its customers, procuring raw materials and components, performing sales and marketing activities, and making strategic investments.

In September 2018, we announced the opening of a second factory in the Pudong region of Shanghai. The new facility has a total of 50,000 square feet of available floor space for production capacity. This is in addition to our first factory in the Pudong Region of Shanghai, which has a total of 36,000 square feet of available floor space.

Recent Equity Transactions

Issuance and Subsequent Exercise of Warrant

In December 2016 Shengxin (Shanghai) Management Consulting Limited Partnership, or SMC, paid 20,123,500 RMB ($3.0 million as of the date of funding) to ACM Shanghai for investment pursuant to terms to be subsequently negotiated. SMC is a PRC limited partnership owned by Jian Wang and other employees of our subsidiary ACM Shanghai. Jian Wang, who is the general partner of SMC, is our Vice President, Research and Development and the brother of David H. Wang, who is our Chief Executive Officer, President and Chair of the Board. In connection with that investment, we issued to SMC in March 2017 a warrant exercisable to purchase 397,502 shares of Class A common stock at a price of $7.50 per share, for a total exercise price of $3.0 million. The warrant was exercisable for cash or on a cashless basis, at the option of SMC, at any time on or before May 17, 2023 to acquire all, but not less than all, of the shares of Class A common stock subject to the warrant. In March 2018 we entered into a warrant exercise agreement with ACM Shanghai and SMC pursuant to which SMC exercised the SMC warrant in full by issuance to us of a senior secured promissory note in the principal amount of $3.0 million. We transferred the SMC note to ACM Shanghai, in exchange for an intercompany promissory note issued by ACM Shanghai to us in the principal amount of $3.0 million. Each of the two notes bears interest at a rate of 3.01% per annum and matures on August 17, 2023. As security for its performance of its obligations under its note, SMC granted to ACM Shanghai a security interest in the 397,502 shares of Class A common stock issued to SMC upon its exercise of the warrant.

Strategic Investment in Key Supplier

Ninebell Co., Ltd., or Ninebell, which is located in Seoul, Korea, is the principal supplier of robotic delivery system subassemblies used in our single-wafer cleaning equipment. On September 6, 2017 we and Ninebell entered into:

- an ordinary share purchase agreement, effective as of September 11, 2017, pursuant to which, contemporaneously with signing, Ninebell issued to us, for a purchase price of $1.2 million, ordinary shares representing 20% of Ninebell's post-closing equity; and
- a common stock purchase agreement, effective as of September 11, 2017, pursuant to which, contemporaneously with signing, we issued 133,334 shares of Class A common stock to Ninebell for a purchase price of $7.50 per share, or an aggregate purchase price of $1.0 million.

In addition, under the ordinary share purchase agreement, Ninebell granted us a preemptive right for all future issuances of equity-related securities by Ninebell and the founder of Ninebell, who is the only other equity holder of Ninebell, granted us a right of first refusal with respect to any future sales of his equity securities.

IPO and Concurrent Private Placements

In November 2017 we issued 2,233,000 shares of Class A common stock and received net proceeds of $11.7 million from our initial public offering, or the IPO, and concurrently we issued an additional 1,333,334 shares of Class A common stock through a private placement for net proceeds of $7.1 million.

Acquisition of Outstanding Minority Interests in ACM Shanghai

Until August 31, 2017, ACM Research owned 62.87% of the outstanding equity interests in ACM Shanghai and three PRC-based third-party investors held the remaining 37.13% of equity interests, which were reflected as "non-controlling interests" in our consolidated balance sheets and related notes. In 2017 we took the following actions in order to enable ACM Research to acquire, consistent with requirements of arrangements previously entered into in connection with the investors' acquisition of ACM Shanghai equity interests, the outstanding non-controlling interests in ACM Shanghai:

- In March 2017 we entered into a securities purchase agreement with Shanghai Science and Technology Venture Capital Co., Ltd., or SSTVC, which held 18.77% of the ACM Shanghai equity interests. Pursuant to that agreement, effective as of August 31, 2017, we (a) acquired, for a purchase price of $5.8 million, SSTVC's equity interests in ACM Shanghai and (b) issued to SSTVC, for a purchase price of $5.8 million, shares of Series E preferred stock that has converted, upon the closing of the IPO, into 1,666,170 shares of Class A common stock, at an effective purchase price of $3.48 per share.
- In August 2017 we entered into a securities purchase agreement with Shanghai Pudong High-Tech Investment Co., Ltd., or PDHTI, and its subsidiary Pudong Science and Technology (Cayman) Co., Ltd., or PST, pursuant to which we (a) submitted the winning bid, in an auction process mandated by PRC regulations, to purchase PDHTI's 10.78% equity interests in ACM Shanghai, which we completed on November 8, 2017, and (b) issued to PST, on September 8, 2017, 1,119,576 shares of Class A common stock for a purchase price of $7.50 per share, representing an aggregate purchase price of $8.4 million.
- In August 2017 we entered into a securities purchase agreement with Shanghai Zhangjiang Science & Technology Venture Capital Co., Ltd., or ZSTVC, and its subsidiary Zhangjiang AJ Company Limited, or ZJAJ, pursuant to which we (a) submitted the winning bid, in an auction process mandated by PRC regulations, to purchase ZSTVC's 7.58% equity interests in ACM Shanghai, which we completed on November 8, 2017, and (b) issued to ZJAJ, on September 8, 2017, 787,098 shares of Class A common stock for a purchase price of $7.50 per share, or an aggregate purchase price of $5.9 million.

Since November 8, 2017, ACM Research has owned all of the outstanding equity interests in ACM Shanghai.

Key Components of Results of Operations

Revenue

We develop, manufacture and sell single-wafer wet cleaning equipment and custom-made wafer assembly and packaging equipment. Because we currently sell tools to a small number of customers and we customize those tools to fulfill the customers' specific requirements, our revenue generation fluctuates, depending on the length of the sales, development and evaluation phases:

- *Sales and Development.* During the sale process we may, depending on a prospective customer's specifications and requirements, need to perform additional research, development and testing to establish that a tool can meet the prospective customer's requirements. We then host an in-house demonstration of the customized tool prototype. Sales cycles for orders that require limited customization and do not require that we develop new technology usually take from 6 to 12 months, while the product life cycle, including the initial design, demonstration and final assembly phases, for orders requiring development and testing of new technologies can take as long as 2 to 4 years. As we expand our customer base, we expect to gain more repeat purchase orders for tools that we have already developed and tested, which will eliminate the need for a demonstration phase and shorten the development cycle.
- *Evaluation Periods.* When a chip manufacturer proposes to purchase a particular type of tool from us for the first time, we offer the manufacturer an opportunity to evaluate the tool for a period that can extend for 24 months or longer. We do not receive any payment on first-time purchases until the tool is accepted. As a result, we may spend between $1.0 and $2.0 million to produce a tool without receiving payment for more than 24 months or, if the tool is not accepted, without receiving any payment. Please see "Item 1A. Risk Factors—Risks Related to Our Business and Our Industry—We may incur significant expenses long before we can recognize revenue from new products, if at all, due to the costs and length of research, development, manufacturing and customer evaluation process cycles."
- *Purchase Orders.* In accordance with industry practice, sales of our tools are made pursuant to purchase orders. Each purchase order from a customer for one of our tools contains specific technical requirements intended to ensure, among other things, that the tool will be compatible with the customer's manufacturing process line. Until a purchase order is received, we do not have a binding purchase commitment. Our SAPS and TEBO customers to date have provided us with non-binding one- to two-year forecasts of their anticipated demands, and we expect future customers to furnish similar non-binding forecasts for planning purposes. Any of those forecasts would be subject to change, however, by the customer at any time, without notice to us.
- *Fulfillment.* We seek to obtain a purchase order for a tool from three to four months in advance of the expected delivery date. Depending upon the nature of a customer's specifications, the lead time for production of a tool generally will extend from two to four months. The lead-time can be as long as six months, however, and in some cases we may need to begin producing a tool based on a customer's non-binding forecast, rather than waiting to receive a binding purchase order.

We expect our sales prices generally to range from $2 million to more than $5 million for our single-wafer wet cleaning tools. The sales price of a particular tool will vary depending upon the required specifications. We have designed equipment models using a modular configuration that we customize to meet customers' technical specifications. For example, our Ultra C models for SAPS, TEBO and Tahoe solutions use common modular configurations that enable us to create a wet-cleaning tool meeting a customer's specific requirements, while using pre-existing designs for chamber, electrical, chemical delivery and other modules.

Because of the relatively large purchase prices of our tools, customers generally pay in installments. For a customer's repeat purchase of a particular type of tool, the specific payment terms are negotiated in connection with acceptance milestones of a purchase order. Based on our limited experience with repeat sales of our tools, we expect that we will receive an initial payment upon delivery of a tool in connection with a repeat purchase, with the balance being paid once the tool has been tested and accepted by the customer. Our sales arrangements for repeat purchases do not include a general right of return.

Based on our market experience, we believe that implementation of our equipment by one of our selected leading companies will attract and encourage other manufacturers to evaluate our equipment, because the leading company's implementation will serve as validation of our equipment and will enable the other manufacturers to shorten their evaluation processes. We placed our first SAPS-based tool in 2009 as a prototype. We worked closely with the customer for two years in debugging and modifying the tool, and the customer then spent two more years of qualification and running pilot production before beginning volume manufacturing. We expect that the period from new product introduction to high volume manufacturing will be three years or less in the future. Please see "Item 1A. Risk Factors—Business—We depend on a small number of customers for a substantial portion of our revenue, and the loss of, or a significant reduction in orders from, one or more of our major customers could have a material adverse effect on our revenue and operating results. There are also a limited number of potential customers for our products."

All of our sales in 2018 and 2017 were to customers located in Asia, and we anticipate that a substantial majority of our revenue will continue to come from customers located in this region for the near future. We have increased our sales efforts to penetrate the markets in North America and Western Europe.

We utilize the guidance set forth in Accounting Standards Update, or ASU, No. 2014-09, *Revenue from Contracts with Customers (Topic 606)*, of the Financial Accounting Standards Board, or FASB, regarding the recognition, presentation and disclosure of revenue in our financial statements as described below under "—Critical Accounting Policies and Significant Judgments and Estimates—Revenue Recognition."

We offer extended maintenance service contracts to provide services such as trouble-shooting or fine-tuning tools, and installing spare parts, following expiration of applicable initial warranty coverage periods, which for sales to date have extended from 12 to 36 months as described under "—Critical Accounting Policies and Significant Judgments and Estimates—Warranty." A limited number of the single-wafer wet cleaning tools we have sold to date are no longer covered by their initial warranties. In 2018 and 2017, we received payments for parts and labor for service activities provided from time to time, but as of December 31, 2018 we had not yet entered into extended maintenance service contracts with respect to any of the tools for which initial warranty coverage had expired. We expect to enter into extended maintenance service contracts with customers as additional initial warranties expire, but we do not expect revenue from extended maintenance service contracts to represent a material portion of our revenue in the future.

The loss or delay of one or more large sale transactions in a quarter could impact our results of operations for that quarter and any future quarters for which revenue from that transaction is lost or delayed, as described under "Item 1A. Risk Factors—Risks Related to Our Business and Our Industry—Our quarterly operating results can be difficult to predict and can fluctuate substantially, which could result in volatility in the price of Class A common stock." It is difficult to predict accurately when, or even if, we can complete a sale of a tool to a potential customer or to increase sales to any existing customer. Our tool demand forecasts are based on multiple assumptions, including non-binding forecasts received from customers years in advance, each of which may introduce error into our estimates. Difficulties in forecasting demand for our tools make it difficult for us to project future operating results and may lead to periodic inventory shortages or excess spending on inventory or on tools that may not be purchased, as further described in "Item 1A. Risk Factors—Risks Related to Our Business and Our Industry—Difficulties in forecasting demand for our tools may lead to periodic inventory shortages or excess spending on inventory items that may not be used."

Cost of Revenue

Cost of revenue for capital equipment consists primarily of:

- direct costs, which consist principally of costs of tool components and subassemblies purchased from third-party vendors;
- compensation of personnel associated with our manufacturing operations, including stock-based compensation;
- depreciation of manufacturing equipment;
- amortization of costs of software used for manufacturing purposes;
- other expenses attributable to our manufacturing department; and
- allocated overhead for rent and utilities.

We are not party to any long-term purchasing agreements with suppliers. Please see "Item 1A. Risk Factors—Risks Related to Our Business and Our Industry—Our customers do not enter into long-term purchase commitments, and they may decrease, cancel or delay their projected purchases at any time."

As our customer base and tool installations continue to grow, we will need to hire additional manufacturing personnel. The rates at which we add customers and install tools will affect the level and time of this spending. In addition, because we often import components and spare parts from the United States, we have experienced, and expect to continue to experience, the effect of the dollar's growth on our cost of revenue.

Gross Margin

Our gross margin was 46.2% in 2018 and 47.2% in 2017. Gross margin may vary from period to period, primarily related to the level of utilization and the timing and mix of purchase orders. We expect gross margin to range between 40% and 45% for the foreseeable future, with direct manufacturing costs approximating 50% to 55% of revenue and overhead costs totaling approximately 5% of revenue.

We seek to maintain our gross margin by continuing to develop proprietary technologies that avoid pricing pressure for our wet cleaning equipment. We actively manage our operations through principles of operational excellence designed to ensure continuing improvement in the efficiency and quality of our manufacturing operations by, for example, implementing factory constraint management and change control and inventory management systems. In addition, our purchasing department actively seeks to identify and negotiate supply contracts with improved pricing to reduce cost of revenue.

A significant portion of our raw materials are denominated in Renminbi, or RMB, while the majority of our purchase orders are denominated in U.S. dollars. As a result, currency exchange rates may have a significant effect on our gross margin.

Operating Expenses

We have experienced, and expect to continue to experience, growth in the dollar amount of our operating expenses, as we make investments to support the anticipated growth of our customer base and the continued development of proprietary technologies. As we continue to grow our business, we expect operating expenses to increase in absolute dollars.

Sales and Marketing

Sales and marketing expense accounted for 12.9% of our revenue in 2018 and 15.1% of our revenue in 2017. Sales and marketing expense consists primarily of:

- compensation of personnel associated with pre- and after-sales support and other sales and marketing activities, including stock-based compensation;
- sales commissions paid to independent sales representatives;
- fees paid to sales consultants;
- shipping and handling costs for transportation of products to customers;
- cost of trade shows;
- travel and entertainment; and
- allocated overhead for rent and utilities.

Sales and marketing expense can be significant and may fluctuate, in part because of the resource-intensive nature of our sales efforts and the length and variability of our sales cycle. The length of our sales cycle, from initial contact with a customer to the execution of a purchase order, is generally 6 to 24 months.

During the sales cycle, we expend significant time and money on sales and marketing activities, including educating customers about our tools, participating in extended tool evaluations and configuring our tools to customer-specific needs. Sales and marketing expense in a given period can be particularly affected by the increase in travel and entertainment expenses associated with the finalization of purchase orders or the installation of tools.

We expect that, for the foreseeable future, sales and marketing expense will increase in absolute dollars, as we continue to invest in sales and marketing by hiring additional employees and expanding marketing programs in existing or new markets. We must invest in sales and marketing processes in order to develop and maintain close relationships with customers. We are making dollar-based investments in dollars in order to support growth of our customer base in the United States, and the relative strength of the dollar could have a significant effect on our sales and marketing expense.

Research and Development

Research and development expense accounted for 13.9% of our revenue in 2018 and 14.1% of our revenue in 2017. Research and development expense relates to the development of new products and processes and encompasses our research, development and customer support activities. Research and development expense consists primarily of:

- compensation of personnel associated with our research and development activities, including stock-based compensation;
- costs of components and other research and development supplies;
- travel expense associated with customer support;
- amortization of costs of software used for research and development purposes; and
- allocated overhead for rent and utilities.

Some of our research and development has been funded by grants from the PRC government, as described in "—PRC Government Research and Development Funding" below.

We expect that, for the foreseeable future, research and development expense will increase in absolute dollars and will range between 18% and 22% of revenue, as we continue to invest in research and development to advance our technologies. We intend to continue to invest in research and development to support and enhance our existing single-wafer wet cleaning products and to develop future product offerings to build and maintain our technology leadership position.

General and Administrative

General and administrative expense accounted for 10.7% of our revenue in 2018 and 16.1% of our revenue in 2017. General and administrative expense consists primarily of:

- compensation of executive, accounting and finance, human resources, information technology, and other administrative personnel, including stock-based compensation;
- professional fees, including accounting and legal fees;
- other corporate expenses; and
- allocated overhead for rent and utilities.

We expect that, for the foreseeable future, general and administrative expense will increase in absolute dollars, as we incur additional costs associated with growing our business and operating as a public company, but will continue to decrease as a percentage of our total revenue.

Stock-Based Compensation Expense

We grant stock options to employees and non-employee consultants and directors, and we accounts for those stock-based awards in accordance with Accounting Standards Codification, or ASC, Topic 718, *Compensation—Stock Compensation* and ASC Subtopic 505-50, *Equity-Based Payments to Non-Employees*, each as adopted by the FASB.

- Stock-based awards granted to employees are measured at the fair value of the awards on the grant date and are recognized as expenses either (a) immediately on grant, if no vesting conditions are required, or (b) using the graded vesting method, net of estimated forfeitures, over the requisite service period. The fair value of stock options is determined using the Black-Scholes valuation model. Stock-based compensation expense, when recognized, is charged to cost of revenue or to the category of operating expense corresponding to the employee's service function.
- Stock-based awards granted to non-employees are accounted for at the fair value of the awards at the earlier of (a) the date at which a commitment for performance by the non-employee to earn the awards is reached and (b) the date at which the non-employee's performance is complete. The fair value of such non-employee awards is re-measured at each reporting date using the fair value at each period end until the vesting date. Changes in fair value between the reporting dates are recognized by the graded vesting method.

Cost of revenue and operating expenses during the periods presented below have included stock-based compensation as follows:

	Year Ended December 31,	
	2018	2017
	(in thousands)	
Stock-Based Compensation Expense:		
Cost of revenue	$ 71	$ 21
Sales and marketing expense	120	53
Research and development expense	255	50
General and administrative expense	2,917	1,499
	$ 3,363	$ 1,623

We recognized stock-based compensation expense to employees of $0.7 million in 2018 and $0.3 million in 2017. As of December 31, 2018 and 2017, we had $2.4 million and $0.7 million of total unrecognized employee share-based compensation expense, net of estimated forfeitures, related to unvested share-based awards. These are expected to be recognized over a weighted-average period of 1.62 years and 1.77 years, respectively.

We recognized stock-based compensation expense to non-employees of $2.7 million in 2018 and $1.4 million in 2017. The fair value of each option granted to a non-employee is re-measured at each period end until the vesting date.

PRC Government Research and Development Funding

ACM Shanghai has received four grants from local and central governmental authorities in the PRC. The first grant, which was awarded in 2008, relates to the development and commercialization of 65nm to 45nm stress-free polishing technology. The second grant was awarded in 2009 to fund interest expense on short-term borrowings. The third grant was made in 2014 and relates to the development of electro copper-plating technology. The fourth grant was made in June 2018 and related to development of polytetrafluoroethylene. PRC governmental authorities provide the majority of the funding, although ACM Shanghai is also required to invest certain amounts in the projects.

The PRC governmental grants contain certain operating conditions, and we are required to go through a government due diligence process once the project is complete. The grants therefore are recorded as long-term liabilities upon receipt, although we are not required to return any funds we receive. Grant amounts are recognized in our statements of operations and comprehensive income as follows:

- Government subsidies relating to current expenses are reflected as reductions of those expenses in the periods in which they are reported. Those reductions totaled $1.5 million in 2018 and $3.4 million in 2017.
- Government grants used to acquire depreciable assets are transferred from long-term liabilities to property, plant and equipment when the assets are acquired and then the recorded amounts of the assets are credited to other income over the useful lives of the assets. Related government subsidies recognized as other income totaled $0.1 million in 2018 and in 2017.

Net Income Attributable to Non-Controlling Interests

From January 1, 2015 to August 31, 2017, ACM Research owned 62.87% of the equity interests of ACM Shanghai, with three non-controlling, unrelated investors holding the remainder. ACM Research acquired all of the non-controlling interests from minority investors in several transactions during 2017. Following these transactions, ACM Research owned 100% of the ACM Shanghai subsidiary.

How We Evaluate Our Operations

We present information below with respect to four measures of financial performance:

- We define "shipments" of tools to include (a) a "repeat" delivery to a customer of a type of tool that the customer has previously accepted, for which we recognize revenue upon delivery, and (b) a "first-time" delivery of a "first tool" to a customer on an approval basis, for which we may recognize revenue in the future if contractual conditions are met and customer acceptance is received.
- We define "adjusted EBITDA" as our net income excluding interest expense (net), income tax benefit (expense), depreciation and amortization, and stock-based compensation. We define adjusted EBITDA to also exclude restructuring costs, although we have not incurred any such costs to date.
- We define "free cash flow" as net cash provided by operating activities less purchases of property and equipment (net of proceeds from disposals) and of intangible assets.
- We define "adjusted operating income (loss)" as our income (loss) from operations excluding stock-based compensation.

These financial measures are not based on any standardized methodologies prescribed by accounting principles generally accepted in the United States, or GAAP, and are not necessarily comparable to similarly titled measures presented by other companies.

We have presented shipments, adjusted EBITDA, free cash flow and adjusted operating income (loss) because they are key measures used by our management and board of directors to understand and evaluate our operating performance, to establish budgets and to develop operational goals for managing our business. We believe that these financial measures help identify underlying trends in our business that could otherwise be masked by the effect of the expenses that we exclude. In particular, we believe that the exclusion of the expenses eliminated in calculating adjusted EBITDA and adjusted operating income (loss) can provide useful measures for period-to-period comparisons of our core operating performance and that the exclusion of property and equipment purchases from operating cash flow can provide a usual means to gauge our capability to generate cash. Accordingly, we believe that these financial measures provide useful information to investors and others in understanding and evaluating our operating results, enhancing the overall understanding of our past performance and future prospects, and allowing for greater transparency with respect to key financial metrics used by our management in its financial and operational decision-making.

Shipments, adjusted EBITDA, free cash flow and adjusted operating income (loss) are not prepared in accordance with GAAP, and should not be considered in isolation of, or as an alternative to, measures prepared in accordance with GAAP.

Shipments

Shipments consist of two components:

- a shipment to a customer of a type of tool that the customer has previously-accepted, for which we recognize revenue when the tool is delivered; and
- a shipment to a customer of a type of tool that the customer is receiving and evaluating for the first time, in each case a "first tool," for which we may recognize revenue at a later date, subject to the customer's acceptance of the tool upon the tool's satisfaction of applicable contractual requirements.

"First tool" shipments can be made to either an existing customer that not previously accepted that specific type of tool in the past ─ for example, a delivery of SAPS V tool to a customer that previously had received only SAPS II tools ─ or to a new customer that has never purchased any tool from us.

Shipments for the year ended December 31, 2018 totaled $95.1 million, as compared to $40.1 million of shipments in the year ended December 31, 2017.

The dollar amount attributed to a “first tool” shipment is equal to the consideration we expect to receive if any and all contractual requirements are satisfied and the customer accepts the tool. There are a number of limitations related to the use of shipments in evaluating our business, including that customers have significant discretion in determining whether to accept our tools and their decision not to accept delivered tools is likely to result in our inability to recognize revenue from the delivered tools.

Adjusted EBITDA

There are a number of limitations related to the use of adjusted EBITDA rather than net income (loss), which is the nearest GAAP equivalent. Some of these limitations are:

- adjusted EBITDA excludes depreciation and amortization and, although these are non-cash expenses, the assets being depreciated or amortized may have to be replaced in the future;
- we exclude stock-based compensation expense from adjusted EBITDA and adjusted operating income (loss), although (a) it has been, and will continue to be for the foreseeable future, a significant recurring expense for our business and an important part of our compensation strategy and (b) if we did not pay out a portion of our compensation in the form of stock-based compensation, the cash salary expense included in operating expenses would be higher, which would affect our cash position;
- the expenses and other items that we exclude in our calculation of adjusted EBITDA may differ from the expenses and other items, if any, that other companies may exclude from adjusted EBITDA when they report their operating results;
- adjusted EBITDA does not reflect changes in, or cash requirements for, working capital needs;
- adjusted EBITDA does not reflect interest expense, or the requirements necessary to service interest or principal payments on debt;
- adjusted EBITDA does not reflect income tax expense (benefit) or the cash requirements to pay taxes;
- adjusted EBITDA does not reflect historical cash expenditures or future requirements for capital expenditures or contractual commitments;
- although depreciation and amortization charges are non-cash charges, the assets being depreciated and amortized will often have to be replaced in the future, and adjusted EBITDA does not reflect any cash requirements for such replacements; and
- adjusted EBITDA includes expense reductions and non-operating other income attributable to PRC governmental grants, which may mask the effect of underlying developments in net income (loss), including trends in current expenses and interest expense, and free cash flow includes the PRC governmental grants, the amount and timing of which can be difficult to predict and are outside our control.

The following table reconciles net income (loss), the most directly comparable GAAP financial measure, to adjusted EBITDA:

	Year Ended December 31, 2018	2017
	(in thousands)	
Adjusted EBITDA Data:		
Net income (loss) attributable to ACM Research, Inc.	$ 6,574	$ (318)
Interest expense, net	469	268
Income tax expense	806	547
Depreciation and amortization	417	271
Stock-based compensation	3,363	1,622
Adjusted EBITDA	$ 11,629	$ 2,390

Adjusted EBITDA in 2018, as compared to $2.4 million in 2017 reflected principally an increase of $6.9 million in net income and $1.7 million increase in stock-based compensation. We do not exclude from adjusted EBITDA expense reductions and non-operating other income attributable to PRC governmental grants because we consider and incorporate the expected amounts and timing of those grants in incurring expenses and capital expenditures. If we did not receive the grants, our cash expenses therefore would be lower, and our cash position would not be affected, to the extent we have accurately anticipated the amounts of the grants. For additional information regarding our PRC grants, please see “—Key Components of Results of Operations—PRC Government Research and Development Funding.”

Free Cash Flow

The following table reconciles net cash provided by operating activities, the most directly comparable GAAP financial measure, to free cash flow:

	Year Ended December 31, 2018	Year Ended December 31, 2017
	(in thousands)	
Free Cash Flow Data:		
Net cash provided by (used in) operating activities	$ 6,909	$ (8,101)
Purchase of property and equipment	(1,830)	(651)
Purchase of intangible assets	(241)	(115)
Free cash flow	$ 4,839	$ (8,867)

Free cash flow in 2018, as compared to 2017, reflected the factors driving net cash provided by (used in) operating activities, principally increase in net income, accounts payable, advance from customers, and offset by increase in inventories, prepaid expenses. Consistent with our methodology for calculating adjusted EBITDA, we do not adjust free cash flow for the effects of PRC government subsidies, because we take those subsidies into account in incurring expenses and capital expenditures.

Adjusted Operating Income

Adjusted operating income excludes stock-based compensation from income (loss) from operations. Although stock-based compensation is an important aspect of the compensation of our employees and executives, determining the fair value of certain of the stock-based instruments we utilize involves a high degree of judgment and estimation and the expense recorded may bear little resemblance to the actual value realized upon the vesting or future exercise of the related stock-based awards. Furthermore, unlike cash compensation, the value of stock options, which is an element of our ongoing stock-based compensation expense, is determined using a complex formula that incorporates factors, such as market volatility, that are beyond our control. Management believes it is useful to exclude stock-based compensation in order to better understand the long-term performance of our core business and to facilitate comparison of our results to those of peer companies. The use of non-GAAP financial measures excluding stock-based compensation has limitations, however. If we did not pay out a portion of our compensation in the form of stock-based compensation, the cash salary expense included in operating expenses would be higher and our cash holdings would be less. The following tables reflect the exclusion of stock-based compensation, or SBC, from line items comprising income (loss) from operations:

	Year Ended December 31,					
	2018			2017		
	Actual (GAAP)	SBC	Adjusted (Non-GAAP)	Actual (GAAP)	SBC	Adjusted (Non-GAAP)
	(in thousands)					
Adjusted Operating Income:						
Revenue	$ 74,643	$ -	$ 74,643	$ 36,506	$ -	$ 36,506
Cost of revenue	(40,194)	(71)	(40,123)	(19,281)	(21)	(19,260)
Gross profit	34,449	(71)	34,520	17,225	(21)	17,246
Operating expenses:						
Sales and marketing	(9,611)	(120)	(9,491)	(5,500)	(53)	(5,447)
Research and development	(10,380)	(255)	(10,125)	(5,138)	(50)	(5,088)
General and administrative	(7,987)	(2,917)	(5,070)	(5,887)	(1,499)	(4,388)
Income (loss) from operations	$ 6,471	$ (3,363)	$ 9,834	$ 700	$ (1,623)	$ 2,323

Adjusted operating income in 2018, as compared to 2017 reflected increases in operating income of $5.8 million and stock-based compensation of $1.7 million.

Critical Accounting Policies and Significant Judgments and Estimates

The preparation of our consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions in applying our accounting policies that affect the reported amounts of assets, liabilities, revenue and expenses, and related disclosures of contingent assets and liabilities. We base these estimates and assumptions on historical experience, and evaluate them on an on-going basis to ensure that they remain reasonable under current conditions. Actual results could differ from those estimates. The accounting policies that reflect our more significant estimates, judgments and assumptions and that we believe are the most critical to aid in fully understanding and evaluating our reported financial results include the following:

Revenue Recognition

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)*, or ASU 2014-09, which amended the existing accounting standards for revenue recognition. ASU 2014-09 establishes principles for recognizing revenue upon the transfer of promised goods or services to customers, in an amount that reflects the expected consideration received in exchange for those goods or services. ASU 2014-09 and its related clarifying ASUs are effective for annual reporting periods beginning after December 15, 2017 and interim periods within those annual periods.

On January 1, 2018, we adopted ASC Topic 606, Revenue from Contracts with Customers, and all the related amendments, or the New Revenue Standard, to all contracts that were not completed as of January 1, 2018 using the modified retrospective method. We do not have open contracts that may result in any changes to revenues applying the New Revenue Standard.

We derive revenue principally from the sale of single-wafer wet cleaning equipment. Revenue from contracts with customers is recognized using the following five steps pursuant to the New Revenue Standard:

1. identify the contract(s) with a customer;
2. identify the performance obligations in the contract;
3. determine the transaction price;
4. allocate the transaction price to the performance obligations in the contract; and
5. recognize revenue when (or as) the entity 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 we identify a bundle of goods or services that is distinct. Promises in contracts which do not result in the transfer of a good or service are not performance obligations, as well as those promises that are administrative in nature, or are immaterial in the context of the contract. We have addressed whether various goods and services promised to the customer represent distinct performance obligations. We applied the guidance of ASC Topic 606-10-25-16 through 18 in order to verify which promises should be assessed for classification as distinct performance obligations. Our contracts with customers include more than one performance obligation. For example, the delivery of a piece of equipment generally includes the promise to install the equipment in the customer’s facility. Our performance obligations in connection with a sale of equipment generally include production, delivery and installation, together with the provision of a warranty.

The transaction price is allocated to all the separate performance obligations in an arrangement. It reflects the amount of consideration to which we expect 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 our experience with similar arrangements. The transaction price excludes amounts collected on behalf of third parties, such as sales taxes. This is done on a relative selling price basis using standalone selling prices, or SSP. The SSP represents the price at which we would sell that good or service on a standalone basis at the inception of the contract. Given the requirement for establishing SSP for all performance obligations, if the SSP is directly observable through standalone sales, then such sales should be considered in the establishment of the SSP for the performance obligation. All of our products were sold in stand-alone arrangements, we do not have observable SSPs for most performance obligations as they are not regularly sold on a standalone basis. Production, delivery and installation of a product, together with provision of a warranty, are a single unit of accounting.

We recognize revenue when we satisfy 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 (upon the acceptance of the products or upon the arrival at the destination as stipulated in the shipment terms) in a sale arrangement. In general, we recognize revenue when a tool has been demonstrated to meet the customer's predetermined specifications and is accepted by the customer. If terms of the sale provide for a lapsing customer acceptance period, we recognize revenue as of the earlier of the expiration of the lapsing acceptance period and customer acceptance. In the following circumstances, however, we recognize revenue upon shipment or delivery, when legal title to the tool is passed to a customer as follows:

- when the customer has previously accepted the same tool with the same specifications and we can objectively demonstrate that the tool meets all of the required acceptance criteria;
- when the sales contract or purchase order contains no acceptance agreement or lapsing acceptance provision and we can objectively demonstrate that the tool meets all of the required acceptance criteria;
- when the customer withholds acceptance due to issues unrelated to product performance, in which case revenue is recognized when the system is performing as intended and meets predetermined specifications; or
- when our sales arrangements do not include a general right of return.

We offer post-warranty period services, which consist principally of the installation and replacement of parts and small-scale modifications to the equipment. The related revenue and costs of revenue are recognized when parts have been delivered and installed, risk of loss has passed to the customer, and collection is probable. We do not expect revenue from extended maintenance service contracts to represent a material portion of its revenue in the future. As such, we have concluded that its revenue recognition under the adoption of the New Revenue Standard will remain the same as previously reported and will not have material impacts to its consolidated financial statements.

We incur costs related to the acquisition of its contracts with customers in the form of sales commissions. Sales commissions are paid to third party representatives and distributors. Contractual agreements with these parties outline commission structures and rates to be paid. Generally speaking, the contracts are all individual procurement decisions by the customers and are not for significant periods of time, nor do they include renewal provisions. As such, all contracts have an economic life of significantly less than a year. Accordingly, we expense sales commissions when incurred in accordance with the practical expedient in the New Revenue Standard when the underlying contract asset is less than one year. These costs are recorded within sales and marketing expenses.

Generally, all contracts have expected durations of one year or less. Accordingly, we apply the practical expedient allowed in the New Revenue Standard and does not disclose information about remaining performance obligations that have original expected durations of one year or less.

We do not incur any costs to fulfill the contracts with customers that are not already reported in compliance with another applicable standard (for example, inventory or plant, property and equipment).

Stock-Based Compensation

We account for grants of stock options based on their grant date fair value and recognize compensation expense over the vesting periods. We estimate the fair value of stock options as of the date of grant using the Black-Scholes option pricing model. Stock options granted to non-employees are subject to periodic revaluation over their vesting terms.

Stock-based compensation expense represents the cost of the grant date fair value of employee stock option grants recognized over the requisite service period of the awards (usually the vesting period) on a straight-line basis, net of estimated forfeitures. We estimate the fair value of stock option grants using the Black-Scholes option pricing model, which requires the input of highly subjective assumptions, including (a) the risk-free interest rate, (b) the expected volatility of our stock, (c) the expected term of the award and (d) the expected dividend yield.

- Prior to our initial public offering in November 2017, or the IPO, the board of directors considered a number of objective and subjective factors to determine the best estimate of the fair value of our common stock. The factors included: contemporaneous third-party valuations of our common stock; the prices, rights, preferences and privileges of our preferred stock relative to the common stock; the prices of convertible preferred stock sold by us to third-party investors; our operating and financial results; the lack of marketability of our common stock; the U.S. and global economic and capital market conditions and outlook; and the likelihood of achieving a liquidity event for the shares of common stock underlying these stock options, such as an initial public offering or sale of our company, given prevailing market conditions. Since the IPO, we have used the market closing price for the Class A common stock as reported on the Nasdaq Global Market to determine the fair value of the Class A common stock.
- The risk-free interest rates for periods within the expected life of the option are based on the yields of zero-coupon U.S. Treasury securities.
- Due to a lack of company-specific historical and implied volatility data, we have based our estimate of expected volatility on the historical volatility of a group of similar companies that are publicly traded. For these analyses, we have selected companies with comparable characteristics to ours including enterprise value, risk profile, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. We compute the historical volatility data using the daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of our stock-based awards. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available.
- The expected term represents the period of time that options are expected to be outstanding. The expected term of stock options is based on the average between the vesting period and the contractual term for each grant according to Staff Accounting Bulletin No. 110.
- The expected dividend yield is assumed to be 0%, based on the fact that we have never paid cash dividends and have no present intention to pay cash dividends.

For employee stock option grants made during the years ended December 31, 2018 and 2017, the weighted-average assumptions used in the Black-Scholes option pricing model to determine the fair value of those grants were as follows:

	Year Ended December 31,	
	2018	**2017**
Risk-free interest rate	2.55%-2.96%	2.21%-2.22%
Expected volatility	39.14%-43.00%	28.62%-29.18%
Expected term (in years)	6.25	6.25
Expected dividend yield	0%	0%

For non-employee stock option grants made during the years ended December 31, 2018 and 2017, the weighted-average assumptions used in the Black-Scholes option pricing model to determine the fair value of those grants were as follows:

	Year Ended December 31,	
	2018	2017
Risk-free interest rate	2.39%-2.94%	1.62%-2.43%
Expected volatility	40.24%-45.48%	28.71% - 29.41%
Expected term (in years)	2.58-5.36	3.58-6.25
Expected dividend yield	0%	0%

The following table summarizes by grant date the number of shares of common stock underlying stock options granted since January 1, 2017, as well as the associated per share exercise price and the estimated fair value per share of common stock on the grant date:

Grant Dates	Number of Common Shares Underlying Options Granted	Exercise Price per Common Share	Estimated Fair Value per Common Share
May 1, 2015	783,338	$ 1.50	$ 1.50
September 8, 2015	263,335	1.50	1.50
December 28, 2016	1,424,596	3.00	2.28
March 9, 2017	33,334	7.50	7.50
May 9, 2017	183,335	7.50	7.50
November 2, 2017	120,002	5.60	5.60
January 25, 2018	500,000	5.31	5.31
August 1, 2018	245,700	13.85	13.85

As of December 31, 2018, the unrecognized compensation cost related to outstanding options was $2.4 million and is expected to be recognized as expense over a weighted-average of 1.62 years. As of December 31, 2017, the unrecognized compensation cost related to outstanding options was $729,000 and is expected to be recognized as expense over a weighted-average of 1.77 years.

As of December 31, 2018, we had outstanding stock options to acquire an aggregate of 3,715,779 shares of Class A common stock with an intrinsic value of $27.1 million. Of those outstanding options, (a) 2,273,880 shares had vested as of December 31, 2018, representing an intrinsic value of $20.0 million and (b) 1,441,899 shares were unvested, representing an intrinsic value of $7.1 million.

Inventory

Inventories consist of finished goods, raw materials, work-in-process and consumable materials. Finished goods are comprised of direct materials, direct labor, depreciation and manufacturing overhead. Inventory is stated at the lower of cost and net recognizable value of the inventory at December 31, 2018 and 2017. The cost of a general inventory item is determined using the weighted average method. The cost of an inventory item purchased specifically for a customized tool is determined using the specific identification method. Market value is determined as the lower of replacement cost and net realizable value, which is the estimated selling price, in the ordinary course of business, less estimated costs to complete or dispose.

We assess the recoverability of all inventories quarterly to determine if any adjustments are required. We write down excess or obsolete tool-related inventory based on management’s analysis of inventory levels and forecasted 12-month demand and technological obsolescence and spare parts inventory based on forecasted usage. These factors are affected by market and economic conditions, technology changes, new product introductions and changes in strategic direction, and they require estimates that may include uncertain elements. Actual demand may differ from forecasted demand, and those differences may have a material effect on recorded inventory values.

Our manufacturing overhead standards for product costs are calculated assuming full absorption of forecasted spending over projected volumes, adjusted for excess capacity. Abnormal inventory costs such as costs of idle facilities, excess freight and handling costs, and spoilage are recognized as current period charges.

Allowance for Doubtful Accounts

Accounts receivable are reflected in our consolidated balance sheets at their estimated collectible amounts. A substantial majority of our accounts receivable are derived from sales to large multinational semiconductor manufacturers in Asia. We follow the allowance method of recognizing uncollectible accounts receivable, pursuant to which we regularly assess our ability to collect outstanding customer invoices and make estimates of the collectability of accounts receivable. We provide an allowance for doubtful accounts when we determine that the collection of an outstanding customer receivable is not probable. The allowance for doubtful accounts is reviewed on a quarterly basis to assess the adequacy of the allowance. We take into consideration (a) accounts receivable and historical bad debts experience, (b) any circumstances of which we are aware of a customer’s inability to meet its financial obligations, (c) changes in our customer payment history, and (d) our judgments as to prevailing economic conditions in the industry and the impact of those conditions on our customers. If circumstances change, such that the financial conditions of our customers are adversely affected and they are unable to meet their financial obligations to us, we may need to record additional allowances, which would result in a reduction of our net income.

Property, Plant and Equipment

Assets comprising property, plant and equipment are recorded at cost. Depreciation is recorded on a straight-line basis over the estimated useful lives of the assets and begins when the assets are placed in service. Betterments or renewals are capitalized when incurred. Maintenance and repairs with respect to an asset are expensed as incurred if they neither materially add to the value of the asset nor appreciably prolong its life. Assets comprising plant, property and equipment are reviewed each year to determine whether any events or circumstances indicate that the carrying amount of the asset may not be recoverable.

Intangible Assets

Intangible assets represent the fair value of separately recognizable intangible assets acquired in connection with our business operations. We evaluate intangibles for impairment on an annual basis or whenever events or circumstances indicate that an impairment may have occurred.

Valuation of Long-Lived Assets

Long-lived assets are evaluated for impairment whenever events or changes in circumstance indicate that the carrying value of an asset may not be fully recoverable or that the useful life is shorter than we had originally estimated. When these events or changes occur, we evaluate the impairment of the long-lived assets by comparing the carrying value of the assets to an estimate of future undiscounted cash flows expected to be generated from the use of the assets and their eventual disposition. If the sum of the expected future undiscounted cash flow is less than the carrying value of the assets, we recognize an impairment loss based on the excess of the carrying value over the fair value. No impairment charge was recognized in 2018 and 2017.

Income Taxes

Income taxes are accounted for using the liability method. Under this method, deferred income tax assets and liabilities are recognized for the future tax consequences attributable to temporary differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred income tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which these temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. A valuation allowance would be provided for the deferred tax assets if it is more likely than not that the related benefit will not be realized.

On a quarterly basis, we provide income tax provisions based upon an estimated annual effective income tax rate. The effective tax rate is highly dependent upon the geographic composition of worldwide earnings, tax regulations governing each region, availability of tax credits and the effectiveness of our tax planning strategies. We carefully monitor the changes in many factors and adjust our effective income tax rate on a timely basis. If actual results differ from these estimates, this could have a material effect on our financial condition and results of operations.

We maintained a partial valuation allowance as of December 31, 2018 with respect to certain net deferred tax assets based on our estimates of recoverability. We determined that the partial valuation allowance was appropriate given our historical operating losses and uncertainty with respect to our ability to generate profits from our business model sufficient to take advantage of the deferred tax assets in all applicable tax jurisdictions.

The calculation of our tax liabilities involves dealing with uncertainties in the application of complex tax regulations. In accordance with the authoritative guidance on accounting for uncertainty in income taxes, we recognize liabilities for uncertain tax positions based on the two-step process. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained in audit, including resolution of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than fifty-percent likely of being realized upon ultimate settlement. We reevaluate these uncertain tax positions on a quarterly basis. This evaluation is based on factors including changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

Interest and penalties related to uncertain tax positions are recorded in the provision for income tax expense on the consolidated statements of operations.

Foreign Currency Translation

Our consolidated financial statements are presented in U.S. dollars, which is our reporting currency, while the functional currency of our subsidiaries in the PRC is RMB, and the functional currency of our subsidiary in Korea is the Korean Won. Transactions in foreign currencies are initially recorded at the functional currency rate prevailing at the date of the transactions. Any difference between the initially recorded amount and the settlement amount is recorded as a gain or loss on foreign currency transaction in our consolidated statements of operations. Monetary assets and liabilities denominated in a foreign currency are translated at the functional currency rate of exchange as of the date of a consolidated balance sheet. Any difference is recorded as a gain or loss on foreign currency translation in the appropriate consolidated statement of operations. In accordance with the FASB's ASC Topic 830, *Foreign Currency Matters*, we translate the assets and liabilities into U.S. dollars from RMB using the rate of exchange prevailing at the applicable balance sheet date and the consolidated statements of operations and cash flows are translated at an average rate during the reporting period. Adjustments resulting from the translation are recorded in stockholders' equity as part of accumulated other comprehensive income.

The PRC government imposes significant exchange restrictions on fund transfers out of the PRC that are not related to business operations. To date these restrictions have not had a material impact on us because we have not engaged in any significant transactions that are subject to the restrictions.

Warranty

We have provided warranty coverage on our tools for 12 to 36 months, covering labor and parts necessary to repair a tool during the warranty period. We account for the estimated warranty cost as sales and marketing expense at the time revenue is recognized. Warranty obligations are affected by historical failure rates and associated replacement costs. Utilizing historical warranty cost records, we calculate a rate of warranty expenses to revenue to determine the estimated warranty charge. We update these estimated charges on a regular basis. The actual product performance and field expense profiles may differ, and in those cases we adjust our warranty accruals accordingly.

Recent Accounting Pronouncements

For a discussion of recent accounting pronouncements impacting our company, see Note 2 in the Notes to Consolidated Financial Statements include herein under "Item 8. Financial Statements and Supplementary Data."

Results of Operations

The following table sets forth our results of operations for the periods presented, as percentages of revenue.

	Year Ended December 31,	
	2018	2017
Revenue	100.0%	100.0%
Cost of revenue	53.8	52.8
Gross margin	46.2	47.2
Operating expenses:		
Sales and marketing	12.9	15.1
Research and development	13.9	14.1
General and administrative	10.7	16.1
Total operating expenses, net	37.5	45.3
Income (loss) from operations	8.7	1.9
Interest expense, net	(0.6)	(0.7)
Other income (expense), net	1.7	(2.4)
Equity income in net income of affiliates	0.2	-
Income (loss) before income taxes	9.9	(1.1)
Income tax expense	(1.1)	(1.5)
Net income (loss)	8.8	(2.6)
Less: Net income (loss) attributable to noncontrolling interests	-	(1.5)
Net income(loss) attributable to ACM Research, Inc.	8.8%	(1.1)%

Comparison of Year Ended December 31, 2018 and 2017

Revenue

	Year Ended December 31,		% Change
	2018	2017	2018 v 2017
	(in thousands)		
Revenue	$ 74,643	$ 36,506	104%

Revenue for the year ended December 31, 2018 compared to the year ended December 31, 2017 increased by $38.1 million. The increase was due to a $41.4 million increase in revenue from single-wafer wet cleaning tools to our front-end customers, offset in part by a $3.2 million decline in revenue of tools to our back-end customers. Our revenue for 2018 compared to 2017 reflected significant growth for three of our large front-end customers, partly offset by a decline at one front-end and one back-end customer.

Cost of Revenue and Gross Margin

	Year Ended December 31,		% Change
	2018	2017	2018 v 2017
	(in thousands)		
Cost of revenue	$ 40,194	$ 19,281	108%
Gross profit	$ 34,449	$ 17,225	100
Gross margin	46.2%	47.2%	(1.0)%

Cost of revenue increased $20.9 million, and gross profit increased $17.2 million, for the year ended December 31, 2018 compared to 2017, reflecting the growth in sales. Gross margin decreased by 100 basis points primarily due to sales of relatively lower-margin tools to new customers for the year ended December 31, 2018. The higher margin in 2017 was primarily due to one system manufactured under the government subsidies (see "—Key Components of Results of Operations—PRC Government Research and Development Funding"), which were sold for the amounts of $1.6 million for the years ended December 31, 2017. Costs associated with these systems were recorded as research and development expenses as the relevant product development on these systems was applied to future systems.

Operating Expenses

	Year Ended December 31,		% Change
	2018	2017	2018 v 2017
	(in thousands)		
Sales and marketing expense	$ 9,611	$ 5,500	75%
Research and development expense	10,380	5,138	102
General and administrative expense	7,987	5,887	36
Total operating expenses, net	$ 27,978	$ 16,525	69%

Sales and marketing expense increased $4.1 million for the year ended December 31, 2018 as compared in 2017, primarily due to an increase in employee count, salaries and sales commissions.

Research and development expense increased $5.2 million for the year ended December 31, 2018 as compared to 2017, primarily due to an increase in employee count, salaries and research and development parts. Research and development expense represented 13.9% and 14.1% of our revenue in 2018 and 2017, respectively. Without reduction by grant amounts received from PRC governmental authorities (see "—Key Components of Results of Operations—PRC Government Research and Development Funding"), gross research and development expense totaled $11.9 million, or 15.9% of revenue, in 2018 and $8.6 million, or 23.4% of revenue, in 2017.

General and administrative expense increased $2.1 million for the year ended December 31, 2018 as compared to 2017, principally resulting from increases of $1.4 million in stock-based compensation expense and $523,000 in personnel-related costs.

Other Income and Expenses

	Year Ended December 31, 2018	Year Ended December 31, 2017	% Change 2018 v 2017
	(in thousands)		
Interest expense, net	$ (469)	$ (268)	75%
Other income (expense), net	1,255	(794)	(258)%

Interest expense consists of interest incurred from outstanding short-term borrowings. Interest expense increased to $469,000 in 2018 from $268,000 in 2017, principally as a result of increased borrowings under short-term bank loans. We earn interest income from depositary accounts. Interest income was nominal in 2018 and 2017.

Other income (expense), net primarily reflects (a) gains or losses recognized from the effect of exchange rates on our foreign currency-denominated asset and liability balances and (b) depreciation of assets acquired with government subsidies, as described under "—Key Components of Results of Operations—PRC Government Research and Development Funding" above. Our other income was $1.3 million in 2018 due primarily to a weaker RMB to U.S. dollar exchange rate, compared to a $794,000 loss in 2017 due to a stronger RMB to U.S. dollar exchange rate.

Income Tax Expense Benefit

The following presents components of income tax (expense) for the indicated periods:

	Year Ended December 31, 2018	Year Ended December 31, 2017
	(in thousands)	
Current:		
U.S. federal	$ -	$ -
U.S. state		-
Foreign	(1,149)	-
Total current income tax expense	(1,149)	-
Deferred:		
U.S. federal	-	-
U.S. state		
Foreign	343	(547)
Total deferred income (expense) benefit	343	(547)
Total current income tax expense	$ (806)	$ (547)

On December 22, 2017, the Tax Cuts and Jobs Act, or the Tax Act, was enacted into law. The new legislation contains several key tax provisions that affect us, including a one-time mandatory transition tax on accumulated foreign earnings and a reduction of the corporate income tax rate to 21% effective January 1, 2018. Due to the timing of the enactment and the complexity involved in applying the provisions of the Tax Act, we made reasonable estimates of the effects and recorded provisional amounts in our financial statements as of December 31, 2017.

As we collect and prepare necessary data, and interpret the Tax Act and any additional guidance issued by the U.S. Treasury Department, the Internal Revenue Service, and other standard-setting bodies, we may make adjustments to the provisional amounts. Those adjustments may materially affect our provision for income taxes and effective tax rate in the period in which the adjustments are made. There were no adjustments made in 2018.

Our effective tax rate differs from statutory rates of 21% for U.S. federal income tax purposes and 15% to 25% for PRC income tax purposes due to the effects of the valuation allowance and certain permanent differences as it pertains to book-tax differences in the value of client equity securities received for services. Our two PRC subsidiaries, ACM Shanghai and ACM Wuxi, are liable for PRC corporate income taxes at the rates of 15% and 25%, respectively. Pursuant to the Corporate Income Tax Law of the PRC, our PRC subsidiaries generally would be liable for PRC corporate income taxes as a rate of 25%. According to Guoshuihan 2009 No. 203, an entity certified as an "advanced and new technology enterprise" is entitled to a preferential income tax rate of 15%. ACM Shanghai was certified as an "advanced and new technology enterprise" in 2012 and again in 2016, with an effective period of three years.

We file income tax returns in the United States and state and foreign jurisdictions. Those federal, state and foreign income tax returns are under the statute of limitations subject to tax examinations for 2009 through 2016. To the extent we have tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by the Internal Revenue Service or state or foreign tax authorities to the extent utilized in a future period.

Liquidity and Capital Resources

During the year ended December 31, 2018, we funded our technology development and operations principally through issuance of an additional series of convertible preferred stock, short-term borrowings by ACM Shanghai from local financial institutions, and application of proceeds of the IPO and concurrent private placements in November 2017. During the year ended December 31, 2018, we funded our technology development and operations principally through application of proceeds of the IPO and concurrent private placements, operating cash flow, and short-term borrowings by ACM Shanghai from local financial institutions.

We believe our existing cash and cash equivalents, our cash flow from operating activities, and short-term bank borrowings by ACM Shanghai will be sufficient to meet our anticipated cash needs for at least the next twelve months from the issuance date of financial statement. We do not expect that our anticipated cash needs for the next twelve months will require our receipt of any PRC government subsidies. Our future working capital needs will depend on many factors, including the rate of our business and revenue growth, the payment schedules of our customers, and the timing of investment in our research and development as well as sales and marketing. To the extent our cash and cash equivalents, cash flow from operating activities and short-term bank borrowings are insufficient to fund our future activities in accordance with our strategic plan, we may determine to raise additional funds through public or private debt or equity financings or additional bank credit arrangements. We also may need to raise additional funds in the event we determine in the future to effect one or more acquisitions of businesses, technologies and products. If additional funding is necessary or desirable, we may not be able to obtain bank credit arrangements or to affect an equity or debt financing on terms acceptable to us or at all.

Sources of Funds

Cash Flow from Operating Activities. Our operations provided cash flow of $6.9 million in 2018. Our cash flow from operating activities is influenced by (a) the amount of cash we invest in personnel and technology development to support anticipated future growth in our business, (b) increases in the number of customers using our products, and (c) the amount and timing of payments by customers.

Lender	Agreement Date	Maturity Date	Annual Interest Rate	Maximum Borrowing Amount(1)	Amount Outstanding at December 31, 2018
				(in thousands)	
Bank of China Pudong Branch	August 2018	August 2019	5.22%	RMB30,000	RMB30,000
				$4,372	$4,372
Bank of Shanghai Pudong Branch	February 2018	January 2019	5.15%	RMB50,000	RMB24,836
				$7,800	$3,618
Shanghai Rural Commercial Bank	January 2018	January 2019	5.44%	RMB10,000	RMB10,000
				$1,457	$1,457
				RMB90,000	RMB64,836
				$13,629	$9,447

Equity and Equity-Related Securities. During year ended on December 31, 2018, we received proceeds of $528,000 from sales of common stock pursuant to option exercises.

(1) Converted from RMB to dollars as of December 31, 2018

All of the amounts owing under the line of credit with Bank of China Pudong Branch are secured by ACM Shanghai's intellectual property and guaranteed by Dr. David Wang ("Dr. Wang"), our Chair of the Board, Chief Executive Officer, President and Chair of the Board. All of the amounts owing under the lines of credit with Bank of Shanghai Pudong Branch are guaranteed by Dr. Wang. All of the amounts owing under the line of credit with Shanghai Rural Commercial Bank are secured by accounts receivable and guaranteed by Dr. Wang.

Government Research and Development Grants. As described under "—Key Components of Results of Operations—PRC Government Research and Development Funding," ACM Shanghai has received research and development grants from local and central PRC governmental authorities. ACM Shanghai received $200,000 of such grants in 2018 as compared to $2.5 million of such grants in 2017. Not all grant amounts are received in the year in which a grant is awarded. Because of the nature and terms of the grants, the amounts and timing of payments under the grants are difficult to predict and vary from period to period. In addition, we expect to apply for additional grants when available in the future, but the grant application process can extend for a significant period of time and we cannot predict whether, or when, we will determine to apply for any such grants.

Working Capital

The following table sets forth selected working capital information:

	December 31, 2018
	(in thousands)
Cash and cash equivalents	$ 27,124
Accounts receivable, less allowance for doubtful amounts	24,608
Inventory	38,764
Total	$ 90,496

Our cash and cash equivalents at December 31, 2018 were unrestricted and held for working capital purposes. ACM Shanghai, our only direct PRC subsidiary, is, however, subject to PRC restrictions on distributions to equity holders. We currently intend for ACM Shanghai to retain all available funds any future earnings for use in the operation of its business and do not anticipate its paying any cash dividends. We have not entered into, and do not expect to enter into, investments for trading or speculative purposes. Our accounts receivable balance fluctuates from period to period, which affects our cash flow from operating activities. Fluctuations vary depending on cash collections, client mix, and the timing of shipment and acceptance of our tools.

We have never declared or paid cash dividends on our capital stock. We intend to retain all available funds and any future earnings to support the operation of and to finance the growth and development of our business and do not anticipate paying any cash dividends in the foreseeable future.

Uses of Funds

Capital Expenditures. We incurred $2.1 million capital expenditures in 2018.

Effects of Inflation

Inflation and changing prices have not had a material effect on our business, and we do not expect that they will materially affect our business in the foreseeable future. Any impact of inflation on cost of revenue and operating expenses, especially employee compensation costs, may not be readily recoverable in the price of our product offerings.

Off-Balance Sheet Arrangements

As of December 31, 2018 and 2017, we did not have any significant off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of Regulation S-K of the Securities and Exchange Commission, except the lease commitment described in above "Contractual Obligations and Requirements."

Emerging Growth Company Status

We are an “emerging growth company” as defined in the Jumpstart Our Business Startups Act, or JOBS Act, and may take advantage of provisions that reduce our reporting and other obligations from those otherwise generally applicable to public companies. We may take advantage of these provisions until the earliest of December 31, 2022 or such time that we have annual revenue greater than $1.0 billion, the market value of our capital stock held by non-affiliates exceeds $700 million or we have issued more than $1.0 billion of non-convertible debt in a three-year period. We have chosen to take advantage of some of these provisions, and as a result we may not provide stockholders with all of the information that is provided by other public companies. We have, however, irrevocably elected not to avail ourselves, as would have been permitted by Section 107 of the JOBS Act, of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act of 1933 for complying with new or revised accounting standards, and we therefore will be subject to the same new or revised accounting standards as public companies that are not emerging growth companies.

Item 8. Financial Statements

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
ACM Research, Inc.

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of ACM Research, Inc. (the "Company") and subsidiaries as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive income (loss), changes in redeemable convertible preferred stock and stockholders' equity (deficit), 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 financial position of the Company and subsidiaries at December 31, 2018 and 2017, and the results of their operations and their cash flows for each of the two years in the period ended December 31, 2018**,** in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated 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 consolidated 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 consolidated 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 consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

BDO China Shu Lun Pan Certified Public Accountants LLP

We have served as the Company's auditor since 2015.

Shenzhen, The People’s Republic of China

March 14, 2019

ACM RESEARCH, INC.
Consolidated Balance Sheets

	December 31, 2018	December 31, 2017
	(in thousands, except share and per share data)	
Assets		
Current assets:		
Cash and cash equivalents	$ 27,124	$ 17,681
Accounts receivable, less allowance for doubtful accounts of $0 and $0 as of December 31, 2018 and 2017, respectively (note 3)	24,608	26,762
Other receivables	3,547	2,491
Inventories (note 4)	38,764	15,388
Prepaid expenses	1,985	546
Other current assets	-	46
Total current assets	96,028	62,914
Property, plant and equipment, net (note 5)	3,708	2,340
Intangible assets, net	274	106
Deferred tax assets (note 15)	1,637	1,294
Investment in affiliates, equity method (note 10)	1,360	1,237
Other long-term assets	40	-
Total assets	103,047	67,891
Liabilities and Stockholders' Equity		
Current liabilities:		
Short-term borrowings (note 6)	9,447	5,095
Warrant liability (note 8)	-	3,079
Accounts payable	16,673	7,419
Advances from customers	8,417	143
Income taxes payable	1,193	44
Other payables and accrued expenses (note 7)	10,410	6,037
Total current liabilities	46,140	21,817
Other long-term liabilities (note 9)	4,583	6,217
Total liabilities	50,723	28,034
Commitments and contingencies (note 16)		
Stockholders' equity:		
Common stock – Class A, par value $0.0001: 100,000,000 shares authorized as of December 31, 2018 and 2017. 14,110,315 shares issued and outstanding as of December 31, 2018 and 12,935,546 shares issued and outstanding as of December 31, 2017 (note 13)	1	1
Common stock–Class B, par value $0.0001: 7,303,533 shares authorized as of December 31, 2018 and 2017. 1,898,423 shares issued and outstanding as of December 31, 2018 and 2,409,738 shares issued and outstanding as of December 31, 2017 (note 13)	-	-
Additional paid in capital	56,567	49,695
Accumulated deficit	(3,387)	(9,961)
Accumulated other comprehensive income (loss)	(857)	122
Total stockholders' equity	52,324	39,857
Total liabilities and stockholders' equity	$ 103,047	$ 67,891

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

ACM RESEARCH, INC.
Consolidated Statements of Operations and Comprehensive Income (Loss)

	Year Ended December 31,	
	2018	2017
	(In thousands, except share and per share data)	
Revenue	$ 74,643	$ 36,506
Cost of revenue	40,194	19,281
Gross profit	34,449	17,225
Operating expenses:		
Sales and marketing	9,611	5,500
Research and development	10,380	5,138
General and administrative	7,987	5,887
Total operating expenses, net	27,978	16,525
Income from operations	6,471	700
Interest income	29	9
Interest expense	(498)	(277)
Other income (expense), net	1,255	(794)
Equity income in net income of affiliates	123	37
Income (Loss) before income taxes	7,380	(325)
Income tax expense (note 15)	(806)	(547)
Net income (loss)	6,574	(872)
Less: Net loss attributable to non-controlling interests	-	(554)
Net income (loss) attributable to ACM Research, Inc.	$ 6,574	$ (318)
Comprehensive income (loss)		
Net income (loss)	6,574	(872)
Foreign currency translation adjustment	(979)	472
Comprehensive income (loss)	5,595	(400)
Less: Comprehensive loss attributable to non-controlling interests	-	(369)
Total comprehensive income (loss) attributable to ACM Research, Inc. (note 2)	$ 5,595	$ (31)
Net income (loss) attributable to ACM, Inc. per common share (note 2):		
Basic	$ 0.42	(0.05)
Diluted	$ 0.37	$ (0.05)
Weighted average common shares outstanding used in computing per share amounts (note 2):		
Basic	15,788,460	6,865,390
Diluted	17,912,105	6,865,390

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

ACM RESEARCH, INC.
Consolidated Statement of Changes in Redeemable Convertible Preferred Stock and Stockholders’ Equity (Deficit)

	Redeemable Convertible Preferred Stock																					
	Series A		Series B		Series C		Series D		Series E		Series F			Common Stock Class A		Common Stock Class B						
	shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Total Amount	Shares	Amount	Shares	Amount	Additional Paid-in Capital	Accumulated Income (Deficit)	Accumulated Other Comprehensive Income (Loss)	Non-controlling Interest	Total Stockholders’ Equity (Deficit)
Balance at December 31, 2016	385,000	$ 288	1,572,000	$ 1,572	1,360,962	$ 2,041	1,326,642	$ 4,975	—	$ —	3,663,254	$ 9,158	$ 18,034	2,228,740	$ 1	2,409,738	$ 1	$ 7,620	$ (9,643)	$ (413)	$ 4,919	$ 2,485
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(318)	—	(554)	(872)
Foreign currency translation adjustment	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	535	185	720
Exercise of stock option	—	—	—	—	—	—	—	—	—	—	—	—	—	472,887	—	—	—	396	—	—	—	396
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,622	—	—	—	1,622
Purchase of non-controlling interest	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(16,258)	—	—	(4,550)	(20,808)
Issuance of Series E Preferred Stock	—	—	—	—	—	—	—	—	4,998,508	$ 5,800	—	—	5,800	—	—	—	—	—	—	—	—	—
Issuance of Common Stock to Ninebell	—	—	—	—	—	—	—	—	—	—	—	—	—	133,334	—	—	—	1,000	—	—	—	1,000
Issuance of Common Stock to Shanghai and Pudong VC	—	—	—	—	—	—	—	—	—	—	—	—	—	1,906,674	—	—	—	14,299	—	—	—	14,299
Convertible preferred shares converted to common shares in connection with initial public offering	(385,000)	(288)	(1,572,000)	(1,572)	(1,360,962)	(2,041)	(1,326,642)	(4,975)	(4,998,508)	(5,800)	(3,663,254)	(9,158)	(23,834)	4,627,577	—	—	—	23,834	—	—	—	23,834
Proceeds from initial public, net of capitalized IPO cost and issuance costs of $2,791	—	—	—	—	—	—	—	—	—	—	—	—	—	3,566,334	—	—	—	17,181	—	—	—	17,181
Reclassification of reverse split par value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(1)	1	—	—	—	—
Balance at December 31, 2017	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	$ -	12,935,546	$ 1	2,409,738	$ -	$ 49,695	$ (9,961)	$ 122	$ -	$ 39,857
Net income	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6,574	—	—	6,574
Foreign currency translation adjustment	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(979)	—	(979)
Exercise of stock option	—	—	—	—	—	—	—	—	—	—	—	—	—	265,952	—	—	—	528	—	—	—	528
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,363	—	—	—	3,363
Conversion of class B common shares to Class A common shares	—	—	—	—	—	—	—	—	—	—	—	—	—	511,315	—	(511,315)	—	—	—	—	—	—
Exercise of common stock warrant issued to SMC	—	—	—	—	—	—	—	—	—	—	—	—	—	397,502	—	—	—	2,981	—	—	—	2,981
Balance at December 31, 2018	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	$ -	14,110,315	$ 1	1,898,423	$ -	$ 56,567	$ (3,387)	$ (857)	$ -	$ 52,324

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

ACM RESEARCH, INC.
Consolidated Statements of Cash Flows

	Year Ended December 31,	
	2018	2017
	(in thousands)	
Cash flows from operating activities:		
Net income (loss)	$ 6,574	$ (872)
Adjustments to reconcile net loss from operations to net cash provided by operating activities		
Depreciation and amortization	417	271
Equity income in net income of affiliates	(123)	(37)
Deferred income taxes	(405)	659
Stock-based compensation	3,363	1,622
Loss on disposals of fixed assets, intangible assets and other long-term assets	-	1
Net changes in operating assets and liabilities:		
Accounts receivable	883	(9,757)
Other receivables	(1,171)	332
Inventory	(24,083)	(3,073)
Prepaid expenses	(1,494)	256
Other current assets	44	8
Accounts payable	9,825	1,905
Advances from customers	8,316	(127)
Income tax payable	1,149	-
Other payables and accrued expenses	4,954	1,789
Other long-term liabilities	(1,340)	(1,078)
Net cash provided by (used in) operating activities	6,909	(8,101)
Cash flows from investing activities:		
Purchase of property and equipment	(1,830)	(651)
Purchase of intangible assets	(241)	(115)
Loan to related party	-	(946)
Purchase of non-controlling interest	-	(20,808)
Investments in unconsolidated equity method affiliates	-	(1,200)
Net cash used in investing activities	(2,071)	(23,720)
Cash flows from financing activities:		
Proceeds from short-term borrowings	17,726	11,154
Repayments of short-term borrowings	(13,131)	(11,110)
Proceeds from stock option exercise to common stock	528	396
Proceeds from issuance of Series E convertible preferred stock	-	5,800
Proceeds from issuance of common stock in connection with initial public offering and concurrent private placement	-	18,717
Payment of initial public offering expenses	-	(1,537)
Investment in affiliates	-	1,000
Proceeds from issuance of common stock for non-controlling interest purchase	-	14,300
Net cash provided by financing activities	5,123	38,720
Effect of exchange rate changes on cash and cash equivalent	$ (518)	$ 663
Net increase in cash and cash equivalent	$ 9,443	$ 7,562
Cash and cash equivalents at beginning of period	17,681	10,119
Cash and cash equivalents at end of period	$ 27,124	$ 17,681
Supplemental disclosure of cash flow information:		
Interest paid	$ 498	$ 277
Non-cash financing activities:		
Preferred stock conversion to common stock in connection with initial public offering	$ -	$ 23,834
Warrant conversion to common stock	$ 3,079	-

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

NOTE 1 – DESCRIPTION OF BUSINESS

ACM Research, Inc. ("ACM") and its subsidiaries (collectively with ACM, the "Company") develop, manufacture and sell single-wafer wet cleaning equipment used to improve the manufacturing process and yield for advanced integrated chips. The Company markets and sells its single-wafer wet-cleaning equipment, under the brand name "Ultra C," based on the Company's proprietary Space Alternated Phase Shift ("SAPS") and Timely Energized Bubble Oscillation ("TEBO") technologies. These tools are designed to remove random defects from a wafer surface efficiently, without damaging the wafer or its features, even at increasingly advanced process nodes.

ACM was incorporated in California in 1998, and it initially focused on developing tools for manufacturing process steps involving the integration of ultra low-K materials and copper. The Company's early efforts focused on stress-free copper-polishing technology, and it sold tools based on that technology in the early 2000s.

In 2006 the Company established its operational center in Shanghai in the People's Republic of China (the "PRC"), where it operates through ACM's subsidiary ACM Research (Shanghai), Inc. ("ACM Shanghai"). ACM Shanghai was formed to help establish and build relationships with integrated circuit manufacturers in the PRC, and the Company initially financed its Shanghai operations in part through sales of non-controlling equity interests in ACM Shanghai.

In 2007 the Company began to focus its development efforts on single-wafer wet-cleaning solutions for the front-end chip fabrication process. The Company introduced its SAPS megasonic technology, which can be applied in wet wafer cleaning at numerous steps during the chip fabrication process, in 2009. It introduced its TEBO technology, which can be applied at numerous steps during the fabrication of small node two-dimensional conventional and three-dimensional patterned wafers, in March 2016. The Company has designed its equipment models for SAPS and TEBO solutions using a modular configuration that enables it to create a wet-cleaning tool meeting the specific requirements of a customer, while using pre-existing designs for chamber, electrical, chemical delivery and other modules. In August 2018, the Company introduced its Ultra-C Tahoe wafer cleaning tool, which can deliver high cleaning performance with significantly less sulfuric acid than typically consumed by conventional high-temperature single-wafer cleaning tools. The Company also offers a range of custom-made equipment, including cleaners, coaters and developers, to back-end wafer assembly and packaging factories, principally in the PRC.

In 2011 ACM Shanghai formed a wholly owned subsidiary in the PRC, ACM Research (Wuxi), Inc. ("ACM Wuxi"), to manage sales and service operations.

In November 2016 ACM redomesticated from California to Delaware pursuant to a merger in which ACM Research, Inc., a California corporation, was merged into a newly formed, wholly owned Delaware subsidiary, also named ACM Research, Inc.

In June 2017 ACM formed a wholly owned subsidiary in Hong Kong, CleanChip Technologies Limited ("CleanChip"), to act on the Company's behalf in Asian markets outside the PRC by, for example, serving as a trading partner between ACM Shanghai and its customers, procuring raw materials and components, performing sales and marketing activities, and making strategic investments.

In August 2017 ACM purchased 18.77% of ACM Shanghai's equity interests held by Shanghai Science and Technology Venture Capital Co., Ltd. On November 8, 2017, ACM purchased the remaining 18.36% of ACM Shanghai's equity interest held by third parties, Shanghai Pudong High-Tech Investment Co., Ltd. ("PDHTI") and Shanghai Zhangjiang Science & Technology Venture Capital Co., Ltd. ("ZSTVC"). At December 31, 2017, ACM owned all of the outstanding equity interests of ACM Shanghai, and indirectly through ACM Shanghai, owned all of the outstanding equity interests of ACM Wuxi.

On September 13, 2017, ACM effectuated a 1-for-3 reverse stock split of Class A and Class B common stock. Unless otherwise indicated, all share numbers, per share amount, share prices, exercise prices and conversion rates set forth in these notes and the accompanying condensed consolidated financial statements have been adjusted retrospectively to reflect the reverse stock split.

On November 2, 2017, the Registration Statement on Form S-1 (File No. 333- 220451) for ACM's initial public offering of Class A common stock (the "IPO") was declared effective by the U.S. Securities and Exchange Commission. Shares of Class A common stock began trading on the Nasdaq Global Market on November 3, 2017, and the closing for the IPO was held on November 7, 2017.

In December 2017 ACM formed a wholly owned subsidiary in the Republic of Korea, ACM Research Korea CO., LTD. ("ACM Korea"), to serve customers based in Republic of Korea and perform sales, marketing, research and development activities for new products and solutions.

NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements of the Company have been prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP"). The consolidated accounts include ACM and its subsidiaries, ACM Shanghai, ACM Wuxi, CleanChip and ACM Korea. Subsidiaries are those entities in which ACM, directly and indirectly, controls more than one half of the voting power. All significant intercompany transactions and balances have been eliminated upon consolidation.

Use of Estimates
The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the balance sheet date and the reported revenues and expenses during the reported period in the consolidated financial statements and accompanying notes. The Company's significant accounting estimates and assumptions include, but are not limited to, those used for the valuation and recognition of stock-based compensation arrangements and warrant liability, realization of deferred tax assets, assessment for impairment of long-lived assets, allowance for doubtful accounts, inventory valuation for excess and obsolete inventories, lower of cost and market value or net realizable value of inventories, depreciable lives of property and equipment, accrued warranty, and useful life of intangible assets.

Management evaluates these estimates and assumptions on a regular basis. Actual results could differ from those estimates and assumptions.

Cash and Cash Equivalents
Cash and cash equivalents consist of cash on hand, bank deposits that are unrestricted as to withdrawal and use, and highly liquid investments with an original maturity date of three months or less at the date of purchase. At times, cash deposits may exceed government-insured limits.

Accounts Receivable

Accounts receivable are presented net of an allowance for doubtful accounts. The Company reviews its accounts receivable on a periodic basis and makes general and specific allowances when there is doubt as to the collectability of individual balances. In evaluating the collectability of individual receivable balances, the Company considers many factors, including the age of the balance, a customer's historical payment history and credit worthiness, and current economic trends. Accounts are written off after all collection efforts have been exhausted. At December 31, 2018 and 2017, the Company, based on a review of its outstanding balances and its customers, determined the allowance for doubtful accounts in the amount of $0 and $0 respectively.

Inventory

Inventory consists of raw materials and related goods, work-in-progress, finished goods, and other consumable materials such as spare parts. Finished goods typically are shipped from the Company's warehouse within one month of completion.

Inventory was recorded at the lower of cost or net realizable value at December 31, 2018 and 2017.

- The cost of a general inventory item is determined using the weighted moving average method. Under the weighted moving average method, the Company calculates the new average price of all items of a particular inventory stock each time one or more items of that stock are purchased. The then-current average price of the stock is used for purposes of determining cost of inventory or cost of revenue. The cost of an inventory item purchased specifically for a customized product is determined using the specific identification method. Low-cost consumable materials and packaging materials are expensed as incurred.
- Market value is determined as the lower of replacement cost or net realizable value.
- Net realizable value is the estimated selling price, in the ordinary course of business, less estimated costs to complete or dispose.

The Company assesses the recoverability of all inventories quarterly to determine if any adjustments are required. Potential excess or obsolete inventory is written off based on management's analysis of inventory levels and estimates of future 12-month demand and market conditions.

Property, Plant and Equipment, Net

Property, plant and equipment are recorded at cost less accumulated depreciation and any provision for impairment in value. Depreciation begins when the asset is placed in service and is calculated by using the straight-line method over the estimated useful life of an asset (or, if shorter, over the lease term). Betterments or renewals are capitalized when incurred. Plant, property and equipment is reviewed each year to determine whether any events or circumstances indicate that the carrying amount of the assets may not be recoverable.

Estimated useful lives of assets in the United States are as follows:

Computer and office equipment	3 to 5 years
Furniture and fixtures	5 years
Leasehold improvements	shorter of lease term or estimated useful life

ACM's subsidiaries follow regulations for depreciation of fixed assets implemented under the PRC's Enterprise Income Tax Law, which state that the minimum useful lives used for calculating depreciation for fixed assets are as follows:

Manufacturing equipment	for small to medium-sized equipment, 5 years; for large equipment, estimated by purchasing department at time of acceptance
Furniture and fixtures	5 years
Transportation equipment	4 to 5 years
Electronic equipment	3 years
Leasehold improvements	remaining lease term for improvements on leased fixed assets or, for large improvements, estimated useful life; not less than 3 years for non-fixed asset repairs

Expenditures for maintenance and repairs that neither materially add to the value of the property nor appreciably prolong the life of the property are charged to expense as incurred. Upon retirement or sale of an asset, the cost of the asset and the related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is credited or charged to income.

Intangible Assets, Net

Intangible assets consist of software used for finance, manufacturing, and research and development purposes. Assets are valued at cost at the time of acquisition and are amortized over their beneficial periods. If a contract specifies a beneficial period, then the intangible asset is amortized over a term not exceeding the beneficial period. If the contract does not specify a beneficial period, then the intangible asset is amortized over a term not exceeding the valid period specified by local law. If neither the contract nor local law specifies a beneficial period, then the intangible asset is amortized over a period of up to 10 years. Currently, the software that the Company uses is amortized over a two-year period in accordance with the policy described above.

Valuation of Long-Lived Assets

Long-lived assets are evaluated for impairment whenever events or changes in circumstance indicate that the carrying value of the assets may not be fully recoverable or that the useful life of the assets is shorter than the Company had originally estimated. When these events or changes occur, the Company evaluates the impairment of the long-lived assets by comparing the carrying value of the assets to an estimate of future undiscounted cash flows expected to be generated from the use of the assets and their eventual disposition. If the sum of the expected future undiscounted cash flow is less than the carrying value of the assets, the Company recognizes an impairment loss based on the excess of the carrying value over the fair value. No impairment charge was recognized for either of the periods presented.

Leases

Each lease is classified at the inception date as either a capital lease or an operating lease. For the lessee, a lease is a capital lease if any of the following conditions exist: (a) ownership is transferred to the lessee by the end of the lease term; (b) there is a bargain purchase option; (c) the lease term is at least 75% of the property’s estimated remaining economic life; or (d) the present value of the minimum lease payments at the beginning of the lease term is 90% or more of the fair value of the leased property to the leasor at the inception date. A capital lease is accounted for as if there was an acquisition of an asset and an incurrence of an obligation at the inception of the lease. All other leases are accounted for as operating leases. Payments made under operating leases are charged to the consolidated statements of operations and comprehensive income on a straight-line basis over the terms of the underlying lease. The Company had no capital lease for either of the periods presented.

Redeemable Convertible Preferred Stock

The Company recorded each series of convertible preferred stock at fair value on the date of issuance, net of issuance costs. The convertible preferred stock is recorded outside of stockholders’ equity (deficit) because, in the event of certain deemed liquidation events considered not solely within the Company’s control (such as a merger, acquisition, or sale of all or substantially all of the Company’s assets), the convertible preferred stock will become redeemable at the option of the holders. The Company has not adjusted the carrying value of any series of convertible preferred stock to the liquidation preference of such series because it is uncertain whether or when an event would occur that would obligate the Company to pay the liquidation preferences to holders of convertible preferred stock. Subsequent adjustments to the carrying values to the liquidation preferences will be made only when it becomes probable that such a liquidation event will occur.

Revenue Recognition

On January 1, 2018, the Company adopted ASC Topic 606, *Revenue from Contracts with Customers*, and all the related amendments (the “New Revenue Standard”) to all contracts which were not completed as of January 1, 2018 using the modified retrospective method. The Company does not have open contracts that may result in any changes to revenues applying the New Revenue Standard.

The Company derives revenue principally from the sale of single-wafer wet cleaning equipment. Revenue from contracts with customers is recognized using the following five steps pursuant to the New Revenue Standard:

1. Identify the contract(s) with a customer;
2. Identify the performance obligations in the contract;
3. Determine the transaction price;
4. Allocate the transaction price to the performance obligations in the contract; and
5. Recognize revenue when (or as) the entity 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. Promises in contracts which do not result in the transfer of a good or service are not performance obligations, as well as those promises that are administrative in nature, or are immaterial in the context of the contract. The Company has addressed whether various goods and services promised to the customer represent distinct performance obligations. The Company applied the guidance of ASC Topic 606-10-25-16 through 18 in order to verify which promises should be assessed for classification as distinct performance obligations. The Company's contracts with customers include more than one performance obligation. For example, the delivery of a piece of equipment generally includes the promise to install the equipment in the customer's facility. The Company's performance obligations in connection with a sale of equipment generally include production, delivery and installation, together with the provision of a warranty.

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 excludes amounts collected on behalf of third parties, such as sales taxes. This is done on a relative selling price basis using standalone selling prices ("SSP"). The SSP represents the price at which the Company would sell that good or service on a standalone basis at the inception of the contract. Given the requirement for establishing SSP for all performance obligations, if the SSP is directly observable through standalone sales, then such sales should be considered in the establishment of the SSP for the performance obligation. All of the Company's products were sold in stand-alone arrangements. The Company does not have observable SSPs for most performance obligations as the obligations are not regularly sold on a standalone basis. Production, delivery and installation of a product, together with provision of a warranty, are a single unit of accounting.

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 (upon the acceptance of the products or upon the arrival at the destination as stipulated in the shipment terms) in a sale arrangement. In general, the Company recognizes revenue when a tool has been demonstrated to meet the customer's predetermined specifications and is accepted by the customer. If terms of the sale provide for a lapsing customer acceptance period, the Company recognizes revenue as of the earlier of the expiration of the lapsing acceptance period and customer acceptance. In the following circumstances, however, the Company recognizes revenue upon shipment or delivery, when legal title to the tool is passed to a customer as follows:

- When the customer has previously accepted the same tool with the same specifications and the Company can objectively demonstrate that the tool meets all of the required acceptance criteria;

- When the sales contract or purchase order contains no acceptance agreement or lapsing acceptance provision and the Company can objectively demonstrate that the tool meets all of the required acceptance criteria;
- When the customer withholds acceptance due to issues unrelated to product performance, in which case revenue is recognized when the system is performing as intended and meets predetermined specifications; or
- When the Company's sales arrangements do not include a general right of return.

The Company offers post-warranty period services, which consist principally of the installation and replacement of parts and small-scale modifications to the equipment. The related revenue and costs of revenue are recognized when parts have been delivered and installed, risk of loss has passed to the customer, and collection is probable. The Company does not expect revenue from extended maintenance service contracts to represent a material portion of its revenue in the future. As such, the Company has concluded that its revenue recognition under the adoption of the New Revenue Standard will remain the same as previously reported and will not have material impacts to its consolidated financial statements.

The Company incurs costs related to the acquisition of its contracts with customers in the form of sales commissions. Sales commissions are paid to third party representatives and distributors. Contractual agreements with these parties outline commission structures and rates to be paid. Generally speaking, the contracts are all individual procurement decisions by the customers and are not for significant periods of time, nor do they include renewal provisions. As such, all contracts have an economic life of significantly less than a year. Accordingly, the Company expenses sales commissions when incurred in accordance with the practical expedient in the New Revenue Standard when the underlying contract asset is less than one year. These costs are recorded within sales and marketing expenses.

Generally, all contracts have expected durations of one year or less. Accordingly, the Company applies the practical expedient allowed in the New Revenue Standard and does not disclose information about remaining performance obligations that have original expected durations of one year or less.

The Company does not incur any costs to fulfill the contracts with customers that are not already reported in compliance with another applicable standard (for example, inventory or plant, property and equipment).

Cost of Revenue

Cost of revenue primarily consists of: direct materials, comprised principally of parts used in assembling equipment, together with crating and shipping costs; direct labor, including salaries and other labor related expenses attributable to the Company's manufacturing department; and allocated overhead cost, such as personnel cost, depreciation expense, and allocated administrative costs associated with supply chain management and quality assurance activities, as well as shipping insurance premiums.

Research and Development Costs

Research and development costs relating to the development of new products and processes, including significant improvements and refinements to existing products or to the process of supporting customer evaluations of tools, including the development of new tools for evaluation by customers during the product demonstration process, are expensed as incurred.

Shipping and Handling Costs

Shipping and handling costs, which relate to transportation of products to customer locations, are charged to selling and marketing expense. For the year ended December 31, 2018 and 2017, shipping and handling costs included in sales and marketing expenses were $146 and $139 respectively.

Borrowing Costs

Borrowing costs attributable directly to the acquisition, construction or production of qualifying assets that require a substantial period of time to be ready for their intended use or sale are capitalized as part of the cost of those assets. Income earned on temporary investments of specific borrowings pending their expenditure on those assets is deducted from borrowing costs capitalized. All other borrowing costs are recognized in interest expenses in the consolidated statements of operations and comprehensive income in the period in which they are incurred. No borrowing costs were capitalized for the year ended December 31, 2018 or 2017.

Warranty

For each of its products, the Company generally provides a warranty ranging from 12 to 36 months and covering replacement of the product during the warranty period. The Company accounts for the estimated warranty costs as sales and marketing expenses at the time revenue is recognized. Warranty obligations are affected by historical failure rates and associated replacement costs. Utilizing historical warranty cost records, the Company calculates a rate of warranty expenses to revenue to determine the estimated warranty charge. The Company updates these estimated charges on a regular basis. The following table shows changes in the Company’s warranty obligations for the year ended December 31, 2018 and 2017, respectively.

	Year Ended December 31,	
	2018	2017
Balance at beginning of period	$ 839	$ 290
Additions	1,412	736
Utilized	(541)	(187)
Balance at end of period	$ 1,710	$ 839

Government Subsidies

ACM Shanghai has been awarded four subsidies from local and central governmental authorities in the PRC. The first subsidy, which was awarded in October 2008, relates to the development and commercialization of 65-45 nanometer Stress Free Polishing technology. The second subsidy was awarded in April 2009 to fund interest expenses for short-term borrowings. The third subsidy was awarded in January 2014 and relates to the development of Electro Copper Plating technology. The fourth subsidy was awarded in June of 2018, and related to development of Polytetrafluoroethylene. The PRC governmental authorities will provide the majority of the funding, although ACM Shanghai is also required to invest certain amounts in the projects.

The government subsidies contain certain operating conditions and therefore are recorded as long-term liabilities upon receipt. The grant amounts are recognized in the statements of operations and comprehensive income:

- Government subsidies relating to current expenses are recorded as reductions of those expenses in the periods in which the current expenses are recorded. For the years ended December 31, 2018 and 2017, related government subsidies recognized as reductions of relevant expenses in the consolidated statements of operations and comprehensive income were $1,486 and $3,421 respectively.

- Government subsidies related to depreciable assets are credited to income over the useful lives of the related assets for which the grant was received. For the years ended December 31, 2018 and 2017, related government subsidies recognized as other income in the consolidated statements of operations and comprehensive income were $144 and $135, respectively.

Unearned government subsidies received are deferred for recognition and recorded as other long-term liabilities (note 9) in the balance sheet until the criteria for such recognition are satisfied.

Stock-based Compensation

ACM grants stock options to employees and non-employee consultants and directors and accounts for those stock-based awards in accordance with FASB ASC Topic 718, Compensation – Stock Compensation, and FASB ASC Subtopic 505-50, Equity-Based Payments to Non-Employees.

Stock-based awards granted to employees are measured at the fair value of the awards on the grant date and are recognized as expenses either (a) immediately on grant, if no vesting conditions are required or (b) using the graded vesting method, net of estimated forfeitures, over the requisite service period. The fair value of stock options is determined using the Black-Scholes valuation model. Stock-based compensation expense, when recognized, is charged to the category of operating expense corresponding to the employee's service function.

Stock-based awards granted to non-employees are accounted for at the fair value of the awards at the earlier of (a) the date at which a commitment for performance by the non-employee to earn the awards is reached and (b) the date at which the non-employee's performance is complete. The fair value of such non-employee awards is re-measured at each reporting date using the fair value at each period end until the vesting date. Changes in fair value between the reporting dates are recognized by the graded vesting method.

Operating and Financial Risks

Concentration of Credit Risk

Financial instruments that potentially subject the Company to credit risk consist principally of cash and cash equivalents and accounts receivable. The Company deposits and invests its cash with financial institutions that management believes are creditworthy.

The Company is potentially subject to concentrations of credit risks in its accounts receivable. Three customers individually accounted for greater than ten percent of the Company's revenue for the year ended 2018 and two of those customers individually accounted for greater than ten percent of the Company's revenue in 2017:

	Year Ended December 31	
	2018	**2017**
Customer A	24.17%	*
Customer B	23.83	18.10
Customer C	*	12.77
Customer D	*	14.12
Customer E	39.63	10.23

* Customer accounted for less than 10% of revenue in the period.

Interest Rate Risk

As of December 31, 2018 and 2017, the balance of bank borrowings (note 6) was short-term in nature, matured at various dates within the following year and did not expose the Company to interest rate risk.

Liquidity Risk

The Company's working capital at December 31, 2018 and 2017 was sufficient to meet its then-current requirements. The Company may, however, require additional cash due to changing business conditions or other future developments, including any investments or acquisitions the Company decides to pursue. In the long run, the Company intends to rely primarily on cash flows from operations and additional borrowings from financial institutions in order to meet its cash needs. If those sources are insufficient to meet cash requirements, the Company may seek to issue additional debt or equity.

Country Risk

The Company has significant investments in the PRC. The operating results of the Company may be adversely affected by changes in the political and social conditions in the PRC and by changes in Chinese government policies with respect to laws and regulations, anti-inflationary measures, currency conversion and remittance abroad, and rates and methods of taxation, among other things.

Foreign Currency Risk and Translation

The Company's consolidated financial statements are presented in U.S. dollars, which is the Company's reporting currency, while the functional currency of ACM's subsidiaries is the Chinese Renminbi ("RMB"), and the Korean Won. Changes in the relative values of U.S. dollars and Chinese RMB affect the Company's reported levels of revenues and profitability as the results of its operations are translated from RMB into U.S. dollars for reporting purposes. Because the Company has not engaged in any hedging activities, it cannot predict the impact of future exchange rate fluctuations on the results of its operations and it may experience economic losses as a result of foreign currency exchange rate fluctuations.

Transactions of ACM's subsidiaries involving foreign currencies are recorded in functional currency according to the rate of exchange prevailing on the date when the transaction occurs. The ending balances of the Company's foreign currency accounts are converted into functional currency using the rate of exchange prevailing at the end of each reporting period. Net gains and losses resulting from foreign exchange transactions are included in the consolidated statements of operations and comprehensive income. Total exchange gain (loss) was ($979) and $1,052 for the years ended December 31, 2018 and 2017.

In accordance with FASB ASC Topic 830, *Foreign Currency Matters*, the Company translates assets and liabilities into U.S. dollars from RMB or Korean Won using the rate of exchange prevailing at the applicable balance sheet date and the consolidated statements of operations and comprehensive income and consolidated statements of cash flows are translated at an average rate during the reporting period. Adjustments resulting from the translation are recorded in stockholders' (deficit) equity as part of accumulated other comprehensive income (loss). Any differences between the initially recorded amount and the settlement amount are recorded as a gain or loss on foreign currency transaction in the consolidated statements of operations and comprehensive income.

Translations of amounts from RMB and Korean Won into U.S. dollars were made at the following exchange rates for the respective dates and periods:

Consolidated balance sheets:	
At December 31, 2018	RMB 6.8634 to $1.00
At December 31, 2017	RMB 6.5359 to $1.00
At December 31, 2018	KRW 1,114.83 to $1.00
At December 31, 2017	No transactions in Korean Won
Consolidated statements of operations and comprehensive income:	
Year ended December 31, 2018	RMB 6.6181 to $1.00
Year ended December 31, 2017	RMB 6.7522 to $1.00
Year ended December 31, 2018	KRW 1,100.11 to $1.00
Year ended December 31, 2017	No transactions in Korean Won

Income Taxes

The Company accounts for income taxes using the liability method whereby deferred tax asset and liability account balances are determined based on differences between the financial reporting and tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The Company provides a valuation allowance, if necessary, to reduce deferred tax assets to their estimated realizable values.

In evaluating the ability to recover its deferred income tax assets, the Company considers all available positive and negative evidence, including its operating results, ongoing tax planning and forecasts of future taxable income on a jurisdiction-by-jurisdiction basis. In the event the Company determines that it would be able to realize its deferred income tax assets in the future in excess of their net recorded amount, it would make an adjustment to the valuation allowance that would reduce the provision for income taxes. Conversely, in the event that all or part of the net deferred tax assets are determined not to be realizable in the future, an adjustment to the valuation allowance would be charged to earnings in the period such determination is made.

Tax benefits related to uncertain tax positions are recognized when it is more likely than not that a tax position will be sustained during an audit. Interest and penalties related to unrecognized tax benefits are included within the provision for income tax.

Basic and Diluted Net Income (Loss) per Common Share

Basic and diluted net income (loss) per common share is calculated as follows:

	For the Year Ended December 31	
	2018	**2017**
Numerator:		
Net income (loss)	$ 6,574	$ (872)
Net loss attributable to non-controlling interest	-	(554)
Net income (loss) attributable to ACM, basic and diluted	6,574	$ (318)
Denominator:		
Weighted average shares outstanding, basic	15,788,460	6,865,390
Effect of dilutive securities	2,123,645	-
Weighted average shares outstanding, diluted	17,912,105	6,865,390
Net income (loss) attributable to ACM per common share:		
Basic	$ 0.42	$ (0.05)
Diluted	$ 0.37	$ (0.05)

Basic and diluted net income (loss) per common share is presented using the two-class method, which allocates undistributed earnings to common stock and any participating securities according to dividend rights and participation rights on a proportionate basis. Under the two-class method, basic net income (loss) per common share is computed by dividing the sum of distributed and undistributed earnings attributable to common stockholders by the weighted average number of shares of common stock outstanding during the period. Shares of ACM's Series A, B, C, D, E and F convertible preferred stock are participating securities, as the holders are entitled to participate in and receive the same dividends as may be declared for common stockholders on a pro-rata, if-converted basis.

ACM has been authorized to issue Class A and Class B common stock since redomesticating in Delaware in November 2016. The two classes of common stock are substantially identical in all material respects, except for voting rights. Since ACM did not declare any dividends during the years ended December 31, 2018 and 2017, the net income (loss) per common share attributable to each class is the same under the "two-class" method. As such, the two classes of common stock have been presented on a combined basis in the consolidated statements of operations and comprehensive income (loss) and in the above computation of net income (loss) per common share.

Diluted net income (loss) per common share reflects the potential dilution from securities that could share in ACM's earnings. All potential dilutive securities, including potentially dilutive convertible preferred stocks and stock options, if any, were excluded from the computation of dilutive net loss per common share for the years ended December 31, 2018 and 2017, as their effects are antidilutive due to our net loss for those periods. The potentially dilutive securities that were not included in the calculation of diluted net income per share in the periods presented where their inclusion would be anti-dilutive are as follows:

	Year Ended December 31	
	2018	**2017**
Stock options	3,715,779	3,372,292
Warrant	80,000	477,502
	3,795,779	3,849,794

Comprehensive Income (Loss) Attributable to the Company

The Company applies FASB ASC Topic 220, Comprehensive Income, which establishes standards for the reporting and display of comprehensive income or loss, requiring its components to be reported in a financial statement with the same prominence as other financial statements. The comprehensive income (loss) attributable to the Company was $5,595 and $(31) for the years ended December 31, 2018 and 2017, respectively.

Appropriated Retained Earnings

The income of ACM's PRC subsidiaries is distributable to their shareholders after transfers to reserves as required under relevant PRC laws and regulations and the subsidiaries' Articles of Association. As stipulated by the relevant laws and regulations in the PRC, the PRC subsidiaries are required to maintain reserves, including reserves for statutory surpluses and public welfare funds that are not distributable to shareholders. A PRC subsidiary's appropriations to the reserves are approved by its board of directors. At least 10% of annual statutory after-tax profits, as determined in accordance with PRC accounting standards and regulations, is required to be allocated to the statutory surplus reserves. If the cumulative total of the statutory surplus reserves reaches 50% of a PRC subsidiary's registered capital, any further appropriation is optional.

Statutory surplus reserves may be used to offset accumulated losses or to increase the registered capital of a PRC subsidiary, subject to approval from the relevant PRC authorities, and are not available for dividend distribution to the subsidiary's shareholders. The PRC subsidiaries are prohibited from distributing dividends unless any losses from prior years have been offset. Except for offsetting prior years' losses, however, statutory surplus reserves must be maintained at a minimum of 25% of share capital after such usage. No retained earnings of either PRC subsidiary had been appropriated to statutory surplus reserves as the PRC subsidiaries recorded accumulated losses as of December 31, 2018 and 2017.

Fair Value of Financial Instruments

Under the FASB's authoritative guidance on fair value measurements, fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. In determining the fair value, the Company uses various methods including market, income and cost approaches. Based on these approaches, the Company often utilizes certain assumptions that market participants would use in pricing the asset or liability, including assumptions about risk and the risks inherent in the inputs to the valuation technique. These inputs can be readily observable, market corroborated or generally unobservable inputs. The Company uses valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs. Based on observability of the inputs used in the valuation techniques, the Company is required to provide the following information according to the fair value hierarchy. The fair value hierarchy ranks the quality and reliability of the information used to determine fair values. Financial assets and liabilities carried at fair value are classified and disclosed in one of the following three categories:

Level 1: Valuations for assets and liabilities traded in active exchange markets. Valuations are obtained from readily available pricing sources for market transactions involving identical assets or liabilities.

Level 2: Valuations for assets and liabilities traded in less active dealer or broker markets. Valuations are obtained from third party pricing services for identical or similar assets or liabilities.

Level 3: Valuations for assets and liabilities that are derived from other valuation methodologies, including option pricing models, discounted cash flow models and similar techniques, and not based on market exchange, dealer or broker traded transactions. Level 3 valuations incorporate certain unobservable assumptions and projections in determining the fair value assigned to such assets.

All transfers between fair value hierarchy levels are recognized by the Company at the end of each reporting period. In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, an investment's level within the fair value hierarchy is based on the lowest level of input that is significant to the fair value measurement in its entirety requires judgment, and considers factors specific to the investment. The inputs or methodology used for valuing financial instruments are not necessarily an indication of the risks associated with investment in those instruments.

Fair Value Measured or Disclosed on a Recurring Basis

Short-term borrowings—Interest rates under the borrowing agreements with the lending parties were determined based on the prevailing interest rates in the market. The Company classifies the valuation techniques that use these inputs as Level 2 fair value measurement.

Warrant liability—The fair value of the warrant liability derives from the Black-Scholes valuation model which incorporates certain unobservable assumptions (Note 8). The Company classifies the valuation techniques that use these inputs as Level 3 fair value measurement.

Other financial items for disclosure purpose—The fair value of other financial items of the Company for disclosure purpose, including cash and cash equivalents, accounts receivable, other receivables, other current assets, accounts payable, advances from customers, and other payables and accrued expenses, approximate their carrying value due to their short-term nature.

As of December 31, 2018 and 2017, information about inputs into the fair value measurement of the Company's liabilities that are measured and recorded at fair value on a recurring basis in periods subsequent to their initial recognition is as follows:

	Fair Value Measurement at Reporting Date Using			
	Quoted Prices in Active Markets for Identical Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
		(in thousands)		
As of December 31, 2018:				
Liabilities:				
Short-term borrowings	$ -	$ 9,447	$ -	$ 9,447
	$ -	$ 9,447	$ -	$ 9,447
As of December 31, 2017:				
Liabilities:				
Short-term borrowings	$ -	$ 5,095	$ -	$ 5,095
Warrant liability	-	-	3,079	3,079
	$ -	$ 5,095	$ 3,079	$ 8,174

Fair Value Measured on a Non-Recurring Basis

The Company reviews long-lived assets for impairment annually or more frequently if events or changes in circumstances indicate the possibility of impairment. Long-lived assets are measured at fair value on a nonrecurring basis when there is an indicator of impairment, and they are recorded at fair value only when impairment is recognized. In determining the fair value, the Company used projections of cash flows directly associated with, and which are expected to arise as a direct result of, the use and eventual disposition of the assets. This approach required significant judgments including the Company's projected net cash flows, which were derived using the most recent available estimate for the reporting unit containing the assets tested. Several key assumptions included periods of operation, projections of product pricing, production levels, product costs, market supply and demand, and inflation.

Reclassification of Accounts

Certain prior year's amounts have been reclassified to conform to current year presentations. There was no change to previously reported stockholders' deficit or net income.

Recently Adopted Accounting Pronouncements

In May 2017, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2017-09, *Compensation—Stock Compensation (Topic 718): Scope of Modification Accounting* ("ASU 2017-09"), which provides guidance on determining which changes to the terms and conditions of share-based payment awards require an entity to apply modification accounting under Topic 718. The amendments in this ASU are effective for all entities for annual periods, and interim periods within those annual periods, beginning after December 15, 2017. Early adoption is permitted, including adoption in any interim period, for (1) public business entities for reporting periods for which financial statements have not yet been issued and (2) all other entities for reporting periods for which financial statements have not yet been made available for issuance. The amendments in this ASU should be applied prospectively to an award modified on or after the adoption date. The adoption of ASU 2017-09 did not have a material impact on the Company's consolidated financial statements.

In February 2017, the FASB issued ASU No. 2017-05, *Other Income—Gains and Losses from the Derecognition of Nonfinancial Assets (Subtopic 610-20): Clarifying the Scope of Asset Derecognition Guidance and Accounting for Partial Sales of Nonfinancial Assets* ("ASU 2017-05"), which clarifies the scope of nonfinancial asset guidance in Subtopic 610-20. This ASU also clarifies that derecognition of all businesses and nonprofit activities (except those related to conveyances of oil and gas mineral rights or contracts with customers) should be accounted for in accordance with the derecognition and deconsolidation guidance in Subtopic 810-10. The amendments in this ASU also provide guidance on the accounting for so-called "partial sales" of nonfinancial assets within the scope of Subtopic 610-20 and contributions of nonfinancial assets to a joint venture or other noncontrolled investee. The amendments in this ASU are effective for annual reporting reports beginning after December 15, 2017, including interim reporting periods within that reporting period. The adoption of ASU 2017-05 did not have a material impact on the Company's consolidated financial statements.

In November 2016, the FASB issued ASU No. 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash* ("ASU 2016-18"), which requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The amendments in this ASU do not provide a definition of restricted cash or restricted cash equivalents. The amendments in this ASU are effective for public business entities for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years. Early adoption is permitted, including adoption in an interim period. The adoption of ASU 2016-18 did not have a material impact on the Company's consolidated financial statements.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments* ("ASU 2016-15"), which addresses the following cash flow issues: (1) debt prepayment or debt extinguishment costs; (2) settlement of zero-coupon debt instruments or other debt instruments with coupon interest rates that are insignificant in relation to the effective interest rate of the borrowing; (3) contingent consideration payments made after a business combination; (4) proceeds from the settlement of insurance claims; (5) proceeds from the settlement of corporate-owned life insurance policies, including bank-owned life insurance policies; (6) distributions received from equity method investees; (7) beneficial interests in securitization transactions; and (8) separately identifiable cash flows and application of the predominance principle. The amendments in this ASU are effective for public business entities for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years and are effective for all other entities for fiscal years beginning after December 15, 2018 and interim periods within fiscal years beginning after December 15, 2019. Early adoption is permitted, including adoption in an interim period. The adoption of ASU 2016-15 did not have material impact on the Company's consolidated financial statements.

In January 2016, the FASB issued ASU No. 2016-01, *"Financial Instruments – Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities"* ("ASU 2016-01"). The amendments in this update require all equity investments to be measured at fair value with changes in the fair value recognized through net income (other than those accounted for under the equity method of accounting or those that result in consolidation of the investee). The amendments in this update also require an entity to present separately in other comprehensive income the portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk when the entity has elected to measure the liability at fair value in accordance with the fair value option for financial instruments. In addition, the amendments in this update eliminate the requirement to disclose the method(s) and significant assumptions used to estimate the fair value that is required to be disclosed for financial instruments measured at amortized cost on the balance sheet for public entities. For public business entities, the amendments in ASU 2016-01 are effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. Except for the early application guidance discussed in ASU 2016-01, early adoption of the amendments in this update is not permitted. The adoption of the ASU 2016-01 did not have a material impact on the Company's consolidated financial statements.

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* ("ASU 2014-09"), which amended the existing accounting standards for revenue recognition. ASU 2014-09 establishes principles for recognizing revenue upon the transfer of promised goods or services to customers, in an amount that reflects the expected consideration received in exchange for those goods or services. ASU 2014-09 and its related clarifying ASUs are effective for annual reporting periods beginning after December 15, 2017 and interim periods within those annual periods.

On January 1, 2018, the Company adopted ASC Topic 606, *Revenue from Contracts with Customers*, and all the related amendments (the "New Revenue Standard") to all contracts which were not completed as of January 1, 2018 using the modified retrospective method. The Company does not have open contracts that may result in any changes to revenues applying the New Revenue Standard.

Recent Accounting Pronouncements Not Yet Adopted

In June 2018, the FASB issued ASU 2018-07, *Compensation — Stock Compensation (Topic 718) — Improvements to Nonemployee Share-Based Payment Accounting* ("ASU 2018-07"), which simplifies several aspects of the accounting for nonemployee share-based payment transactions resulting from expanding the scope of Topic 718, Compensation--Stock Compensation, to include share-based payment transactions for acquiring goods and services from nonemployees. Some of the areas for simplification apply only to nonpublic entities. ASU 2018-07 specifies that Topic 718 applies to all share-based payment transactions in which a grantor acquires goods or services to be used or consumed in a grantor's own operations by issuing share-based payment awards. ASU 2018-07 also clarify that Topic 718 does not apply to share-based payments used to effectively provide (1) financing to the issuer or (2) awards granted in conjunction with selling goods or services to customers as part of a contract accounted for under the New Revenue Standard. ASU 2018-07 is effective for public business entities for fiscal years beginning after December 15, 2018, including interim periods within that fiscal year. Early adoption is permitted. The Company does not expect the adoption of ASU 2018-07 to have a material impact on its consolidated financial statements and related disclosures.

In February 2018, the FASB issued ASU No. 2018-02, *Income Statement—Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income* ("ASU 2018-02"), which provides financial statement preparers with an option to reclassify stranded tax effects within accumulated other comprehensive income to retained earnings in each period in which the effect of the change in the U.S. federal corporate income tax rate in the Tax Cuts and Jobs Act (or portion thereof) is recorded. The amendments in ASU 2018-02 are effective for all entities for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early adoption of ASU 2018-02 is permitted, including adoption in any interim period for the public business entities for reporting periods for which financial statements have not yet been issued. The amendments in ASU 2018-02 should be applied either in the period of adoption or retrospectively to each period (or periods) in which the effect of the change in the U.S. federal corporate income tax rate in the Tax Cuts and Jobs Act is recognized. The Company does not expect the adoption of ASU 2018-02 to have a material impact on its consolidated financial statements.

In July 2017, the FASB issued ASU No. 2017-11, *Earnings Per Share (Topic 260); Distinguishing Liabilities from Equity (Topic 480); Derivatives and Hedging (Topic 815): (Part I) Accounting for Certain Financial Instruments with Down Round Features, (Part II) Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception* ("ASU 2017-11"), which addresses the complexity of accounting for certain financial instruments with down round features. Down round features are features of certain equity-linked instruments (or embedded features) that result in the strike price being reduced on the basis of the pricing of future equity offerings. Current accounting guidance creates cost and complexity for entities that issue financial instruments (such as warrants and convertible instruments) with down round features that require fair value measurement of the entire instrument or conversion option. For public business entities, the amendments in Part I of ASU 2017-11 are effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. For all other entities, the amendments in Part I of ASU 2017-11 are effective for fiscal years beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. The Company is evaluating the impact of the adoption of ASU 2017-11 on its consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-04, *Intangibles—Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment* ("ASU 2017-04"), which removes Step 2 from the goodwill impairment test. An entity will apply a one-step quantitative test and record the amount of goodwill impairment as the excess of a reporting unit's carrying amount over its fair value, not to exceed the total amount of goodwill allocated to the reporting unit. ASU 2017-04 does not amend the optional qualitative assessment of goodwill impairment. A business entity that is an SEC filer must adopt the amendments in ASU 2017-04 for its annual or any interim goodwill impairment test in fiscal years beginning after December 15, 2019. Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017. The Company is evaluating the impact of the adoption of ASU 2017-04 on its consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)* ("ASU 2016-02"). The amendments in ASU 2016-02 create Topic 842, *Leases*, and supersede the leases requirements in Topic 840, *Leases*. Topic 842 specifies the accounting for leases. The objective of Topic 842 is to establish the principles that lessees and lessors shall apply to report useful information to users of financial statements about the amount, timing, and uncertainty of cash flows arising from a lease. The main difference between Topic 842 and Topic 840 is the recognition of lease assets and lease liabilities for those leases classified as operating leases under Topic 840. Topic 842 retains a distinction between finance leases and operating leases. The classification criteria for distinguishing between finance leases and operating leases are substantially similar to the classification criteria for distinguishing between capital leases and operating leases in the previous lease guidance. The result of retaining a distinction between finance leases and operating leases is that under the lessee accounting model in Topic 842, the effect of leases in the statement of comprehensive income and the statement of cash flows is largely unchanged from previous GAAP. The amendments in ASU No. 2016-02 are effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years for public business entities. Early application of the amendments in ASU No. 2016-02 is permitted. We will adopt Topic 842 effective January 1, 2019 using a modified retrospective 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 $5 million of lease assets and liabilities will be recognized on our balance sheet upon adoption, primarily relating to real estate. We are substantially complete with our implementation efforts.

NOTE 3 – ACCOUNTS RECEIVABLE

At December 31, 2018 and 2017, accounts receivable consisted of the following:

	December 31, 2018	December 31, 2017
Accounts receivable	$ 24,608	$ 26,762
Less: Allowance for doubtful accounts	-	
Total	$ 24,608	$ 26,762

The Company reviews accounts receivable on a periodic basis and makes general and specific allowances when there is doubt as to the collectability of individual balances. No allowance for doubtful accounts was considered necessary at December 31, 2018 and 2017. At December 31, 2018 and 2017, accounts receivable of $1,457 (RMB 10,000) and $1,805 (RMB 11,800), respectively, were pledged as collateral for borrowings from financial institutions (note 6).

NOTE 4 – INVENTORY

At December 31, 2018 and 2017, inventory consisted of the following:

	December 31, 2018	December 31, 2017
Raw materials	$ 12,646	$ 6,181
Work in process	9,631	4,328
Finished goods	16,487	4,879
Total inventory, gross	38,764	15,388
Inventory reserve	-	-
Total inventory, net	$ 38,764	$ 15,388

The Company did not set up any inventory reserve as of December 31, 2018 or 2017 and no inventory was pledged as collateral for borrowings from financial institutions. System shipments of first-tools to an existing or prospective customer, for which ownership does not transfer until customer acceptance, are classified as finished goods inventory and carried at cost until ownership is transferred.

NOTE 5 – PROPERTY, PLANT AND EQUIPMENT, NET

At December 31, 2018 and 2017, property, plant and equipment consisted of the following:

	December 31, 2018	December 31, 2017
Manufacturing equipment	$ 9,703	$ 9,660
Office equipment	512	463
Transportation equipment	184	203
Leasehold improvement	1,379	277
Total cost	11,778	10,603
Less: Total accumulated depreciation	(8,102)	(8,263)
Construction in progress	32	-
Total property, plant and equipment, net	$ 3,708	$ 2,340

Depreciation expense was $350 and $243 for the years ended December 31, 2018 and 2017, respectively.

NOTE 6 – SHORT-TERM BORROWINGS

At December 31, 2018 and 2017, short-term borrowings consisted of the following:

	December 31,	
	2018	2017
Line of credit up to RMB 30,000 from Bank of China Pudong Branch, due on March 5, 2018 with annual interest rate of 5.69%, secured by certain of the Company's intellectual property and fully repaid on March 5, 2018 .	$ -	$ 2,219
Line of credit up to RMB 25,000 from Bank of Shanghai Pudong Branch, due on Various dates of October 2018 with an annual interest rate of 5.66%, guaranteed by the Company's CEO and fully repaid on May 8, 2018.	-	2,111
Line of credit up to RMB 50,000 from Bank of Shanghai Pudong Branch, due on April 17, 2019 with an annual interest rate of 4.99%, guaranteed by the Company's CEO.	3,133	-
Line of credit up to RMB 50,000 from Bank of Shanghai Pudong Branch, due on February 14, 2019 with an annual interest rate of 5.15%, guaranteed by the Company's CEO.	485	-
Line of credit up to RMB 5,000 from Shanghai Rural Commercial Bank, due on November 21, 2018 with an annual interest rate of 5.44%, guaranteed by the Company's CEO and pledged by accounts receivable (Note 3).	-	765
Line of credit up to RMB 10,000 from Shanghai Rural Commercial Bank, due on January 23, 2019 with an annual interest rate of 5.44%, guaranteed by the Company's CEO and pledged by accounts receivable (Note 3).	1,457	-
Line of credit up to RMB 30,000 from Bank of China Pudong Branch, due on June 6, 2019 with annual interest rate of 5.22%, secured by certain of the Company's intellectual property and the Company's CEO.	2,186	-
Line of credit up to RMB 30,000 from Bank of China Pudong Branch, due on June 13, 2019 with annual interest rate of 5.22%, secured by certain of the Company's intellectual property and the Company's CEO.	2,186	
Total	$ 9,447	$ 5,095

For the years ended December 31, 2018 and 2017, interest expense related to short-term borrowings amounted to $498 and $272 respectively.

NOTE 7 – OTHER PAYABLE AND ACCRUED EXPENSES

At December 31, 2018 and 2017, other payable and accrued expenses consisted of the following:

	December 31,	
	2018	2017
Lease expenses and payable for leasehold improvement due to a related party (note 11)	$ 53	$ 2,024
Accrued commissions	2,931	836
Accrued warranty	1,710	839
Accrued payroll	626	745
Accrued professional fees	64	60
Accrued machine testing fees	3,076	684
Others	1,950	849
Total	$ 10,410	$ 6,037

NOTE 8 – WARRANT LIABILITY

On December 9, 2016, Shengxin (Shanghai) Management Consulting Limited Partnership ("SMC"), a related party (note 11), delivered RMB 20,124 (approximately $2,981 as of the close of business on such date) in cash (the "SMC Investment") to ACM Shanghai for potential investment pursuant to terms to be subsequently negotiated

On March 14, 2017, ACM, ACM Shanghai and SMC entered into a securities purchase agreement (the "SMC Agreement") pursuant to which, in exchange for the SMC Investment, ACM issued to SMC a warrant exercisable, for cash or on a cashless basis, to purchase, at any time on or before May 17, 2023, all, but not less than all, of 397,502 shares of Class A common stock at a price of $7.50 per share.

The warrant issued to SMC, while outstanding as of December 31, 2017, was classified as a liability as it was conditionally puttable in accordance with FASB ASC 480, Distinguishing Liabilities from Equity. The fair value of the warrant was adjusted for changes in fair value at each reporting period but could not be lower than the proceeds of the SMC Investment. The corresponding non-cash gain or loss of the changes in fair value was recorded in earnings. The methodology used to value the warrant was the Black-Scholes valuation model.

On March 30, 2018, ACM entered into a warrant exercise agreement with ACM Shanghai and SMC pursuant to which SMC exercised its warrant in full by issuing to ACM a senior secured promissory note in the principal amount of approximately $3,000. ACM then transferred the SMC note to ACM Shanghai in exchange for an intercompany promissory note of ACM Shanghai in the principal amount of approximately $3,000. Each of the two notes bears interest at a rate of 3.01% per annum and matures on August 17, 2023. As security for its performance of its obligations under its note, SMC granted to ACM Shanghai a security interest in the 397,502 shares of Class A common stock issued to SMC upon its exercise of the warrant. Upon the issuance of 397,502 shares of Class A common stock to SMC, the senior secured promissory note issued to AMC by SMC was offset against the SMC investment.

NOTE 9– OTHER LONG-TERM LIABILITIES

Other long-term liabilities represent government subsidies received from PRC governmental authorities for development and commercialization of certain technology but not yet recognized (note 2). As of December 31, 2018 and 2017, other long-term liabilities consisted of the following unearned government subsidies:

	December 31	
	2018	**2017**
Subsidies to Stress Free Polishing project, commenced in 2008 and 2017	$ 1,483	$ 1,952
Subsidies to Electro Copper Plating project, commenced in 2014	2,860	4,265
Subsidies to Polytetrafluoroethylene, commenced in 2018	178	-
Other	62	-
Total	$ 4,583	$ 6,217

NOTE 10 – EQUITY METHOD INVESTMENT

On September 6, 2017, ACM and Ninebell Co., Ltd. ("Ninebell"), a Korean company that is one of the Company's principal materials suppliers, entered into an ordinary share purchase agreement, effective as of September 11, 2017, pursuant to which Ninebell issued to ACM ordinary shares representing 20% of Ninebell's post-closing equity for a purchase price of $1,200, and a common stock purchase agreement, effective as of September 11, 2017, pursuant to which ACM issued 133,334 shares of Class A common stock to Ninebell for a purchase price of $1,000 at $7.50 per share. The investment in Ninebell is accounted for under the equity method. Undistributed earnings attributable to ACM's equity method investment represented $123 and $37 of the consolidated retained earnings at December 31, 2018 and 2017, respectively.

NOTE 11 – RELATED PARTY BALANCES AND TRANSACTIONS

On August 18, 2017, ACM and Ninebell, its equity method investment affiliate (note 10), entered into a loan agreement pursuant to which ACM made an interest-free loan of $946 to Ninebell, payable in 180 days or automatically extended another 180 days if in default. The loan was secured by a pledge of Ninebell's accounts receivable due from ACM and all money that Ninebell received from ACM. Ninebell repaid the loan in March 2018. ACM purchased materials from Ninebell amounting to $7,785 and $3,704 during the years ended December 31, 2018 and 2017, respectively. As of December 31, 2018 and 2017, accounts payable due to Ninebell were $1,477 and $2,118, respectively, and prepaid to Ninebell for material purchases were $572 and $229, respectively.

In 2007 ACM Shanghai entered into an operating lease agreement with Shanghai Zhangjiang Group Co., Ltd. ("Zhangjiang Group") to lease manufacturing and office space located in Shanghai, China. An affiliate of Zhangjiang Group holds 787,098 shares of Class A common stock that it acquired in September 2017 for $5,903. Pursuant to the lease agreement, Zhangjiang Group provided $771 to ACM Shanghai for leasehold improvements. In September 2016 the lease agreement was amended to modify payment terms and extend the lease through December 31, 2017. From January 1 to April 25, 2018, ACM Shanghai leased the property on a month-to-month basis. On April 26, 2018, ACM Shanghai entered into a renewed lease with Zhangjiang Group for the period from January 1, 2018 through December 31, 2022. Under the lease, ACM Shanghai would pay a monthly rental fee of approximately RMB 366 (equivalent to $55). The required security deposit is RMB 1,077 (equivalent to $163). The Company incurred leasing expenses under the lease agreement of $620 and $638 during the years ended December 31, 2018 and 2017, respectively. As of December 31, 2018 and 2017, payables to Zhangjiang Group for lease expenses and leasehold improvements recorded as other payables and accrued expenses amounted to $53 and $2,024, respectively (note 7).

On December 9, 2016, ACM Shanghai received the SMC Investment from SMC for potential investment pursuant to terms to be subsequently negotiated (note 8). SMC is a limited partnership incorporated in the PRC, whose partners consist of employees of ACM Shanghai. On March 14, 2017, ACM, ACM Shanghai and SMC entered into a securities purchase agreement (the "SMC Agreement") pursuant to which, in exchange for the SMC Investment, ACM issued to SMC a warrant exercisable, for cash or on a cashless basis, to purchase, at any time on or before May 17, 2023, all, but not less than all, of 397,502 shares of Class A common stock at a price of $7.50 per share, for a total exercise price of $2,981. On March 30, 2018, SMC exercised the warrant and purchased 397,502 shares of Class A common stock (note 8).

NOTE 12 – LEASES

ACM entered into a two-year lease agreement in March 2015 for office and warehouse space of approximately 3,000 square feet for its headquarters in Fremont, California, at a rate of $2 per month. On February 4, 2019, ACM amended the lease agreement to extend the lease term through March 31, 2020 and increase the base rent to $3.3 per month from April 1, 2019 to March 31, 2020 and $3.4 per month from April 1, 2020 to March 31, 2021.

ACM Shanghai entered into an operating lease agreement with Zhangjiang Group (a related party, see Note 11) in 2007 for manufacturing and office space of approximately 63,510 square feet in Shanghai, China. The lease terms and its payment terms are subject to modification and extension with Zhangjiang Group from time to time. The lease with Zhangjiang Group expired on December 31, 2017 and from January 1, 2018 to April 25, 2018 we leased the property on a month-to-month basis. On April 26, 2018, ACM Shanghai entered into a renewed lease with Zhangjiang Group for the period from January 1, 2018 through December 31, 2022. Under the lease, ACM Shanghai would pay a monthly rental fee of approximately RMB 366 (equivalent to $55). The required security deposit is RMB 1,077 (equivalent to $163).

ACM Wuxi leases office space in Wuxi, China, at a rate of less than $1 per month.

In January 2018, ACM Shanghai entered into an operating lease agreement for the second factory in the Pudong region of Shanghai from January 2018 to January 2023. The new facility has a total of 50,000 square feet of available floor space. The monthly rent varies during the term of the lease.

ACM leases its administrative, research and development and manufacturing facilities under various operating leases. Future minimum lease payments under non-cancelable lease agreements as of December 31, 2018 were as follows:

	December 31, 2018
2019	$ 1,391
2020	1,371
2021	1,403
2022	1,441
Total	$ 5,606

Rent expense was $1867 and $670 for the years ended December 31, 2018 and 2017, respectively.

NOTE 13 – COMMON STOCK

ACM is authorized to issue 100,000,000 shares of Class A common stock and 7,303,533 shares of Class B common stock, each with a par value of $0.0001. Each share of Class A common stock is entitled to one vote, and each share of Class B common stock is entitled to twenty votes and is convertible at any time into one share of Class A common stock. Shares of Class A common stock and Class B common stock are treated equally, identically and ratably with respect to any dividends declared by the Board of Directors unless the Board of Directors declares different dividends to the Class A common stock and Class B common stock by getting approval from a majority of common stock holders.

In August 2017 ACM entered into a securities purchase agreement with PDHTI and its subsidiary Pudong Science and Technology (Cayman) Co., Ltd. (“PST”), in which ACM agreed to bid, in an auction process mandated by PRC regulations, to purchase PDHTI’s 10.78% equity interest in ACM Shanghai and to sell shares of Class A common stock to PST. On September 8, 2017, ACM issued 1,119,576 shares of Class A common stock to PST for a purchase price of $7.50 per share, representing an aggregate purchase price of $8,397.

In August 2017 ACM entered into a securities purchase agreement with ZSTVC and its subsidiary Zhangjiang AJ Company Limited (“ZJAJ”), in which ACM agreed to bid, in an auction process mandated by PRC regulations, to purchase ZSTVC’s 7.58% equity interest in ACM Shanghai and to sell shares of Class A common stock to ZJAJ. On September 8, 2017, ACM issued 787,098 shares of Class A common stock to ZJAJ for a purchase price of $7.50 per share, or an aggregate purchase price of $5,903.

In September 2017 ACM issued 133,334 shares of Class A common stock to Ninebell for a purchase price of $7.50 per share, or an aggregate purchase price of $1,000 (note 10).

In November 2017 ACM issued 2,233,000 shares of Class A common stock and received net proceeds of $11,664 from the IPO and concurrently ACM issued an additional 1,333,334 shares of Class A common stock in a private placement for net proceeds of $7,053.

Upon the completion of the IPO on November 2, 2017, the Company issued a five-year warrant (the “Underwriter's Warrant”) to Roth Capital Partners, LLC, the lead underwriter of the IPO, for the purchase of up to 80,000 shares of Class A common stock at an exercise price of $6.16 per share. The Underwriter’s Warrant was immediately exercisable and expires on November 1, 2022. The Underwriter's Warrant is equity classified and its fair value was $137 at the IPO closing date, using the Black Scholes model with the following assumptions: volatility of 28.26%, a dividend rate of 0%, and a risk-free discount rate of 2%.

In September 2017 ACM issued 133,334 shares of Class A common stock to Ninebell for a purchase price of $7.50 per share, or an aggregate purchase price of $1,000 (note 10).

At various dates during 2017, ACM issued 472,889 shares of Class A common stock upon options exercises by certain employees and non-employees. During the year ended December 31, 2018, the Company issued 265,952 shares of Class A common stock upon options exercises by certain employees and non-employees.

On March 30, 2018, SMC exercised its warrant (note 8) and purchased 397,502 shares of Class A common stock.

At December 31, 2018 and 2017, the number of shares of Class A common stock issued and outstanding was 14,110,315 and 12,935,546, respectively. At December 31, 2018 and 2017, the number of shares of Class B common stock issued and outstanding was 1,898,423 and 2,409,738, respectively. During the year ended December 31, 2018, 511,315 shares of Class B common stock were converted into Class A common stock.

NOTE 14 – STOCK-BASED COMPENSATION

On April 29, 1998, ACM adopted the 1998 Stock Option Plan (the "1998 Plan"). The options issued under the Plan consisted of incentive stock options ("ISOs") and nonstatutory stock options ("NSOs") that should be determined at the time of grant. ISOs could be granted only to employees. NSOs could be granted to employees, directors and consultants. The option price of each ISO and each NSO could not be less than 100% or less than 85% of the fair market value of stock price at the time of grant, respectively. The vesting period was to be determined by the Board of Directors for each grant. The total number of shares of common stock reserved under the 1998 Plan, as amended, was 766,667. If any option granted under the 1998 Plan expires or otherwise terminates without having been exercised in full, the shares of common stock subject to that option would become available for re-grant. At March 3, 2014, the 1998 Plan terminated and no further grants under the 1998 Plan could be made thereunder, although certain previously granted options remained outstanding in accordance with their terms.

On December 28, 2016, ACM adopted the 2016 Omnibus Incentive Plan (the "2016 Plan"). Under the 2016 Plan, the aggregate number of shares of Class A common stock that may be issued shall equal the sum of (a) 2,333,334 and (b) an annual increase on the first day of each year beginning in 2018 and ending in 2026 equal to the lesser of (i) 4% of the shares of Class A and Class B common stock outstanding (on an as-converted basis) on the last day of the immediately preceding year and (ii) such smaller number of shares as may be determined by the Board. A maximum of 2,333,334 shares is available for issuance as ISOs under the 2016 Plan. Besides the stock options, the 2016 Plan also authorizes issuance of stock appreciation rights, restricted stock, restricted stock units, and other share-based and cash awards. The 2016 Plan will terminate on December 27, 2026.

Employee Awards

The following table summarizes the Company's employee share option activities during the year ended December 31, 2018:

	Number of Option Shares	Weighted Average Grant Date Fair Value	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term
Outstanding at December 31, 2016	2,100,377	$ 0.54	$ 2.03	7.83 years
Granted	140,002	2.28	6.75	
Exercised	(174,334)	0.45	0.75	
Expired	(3,752)	0.54	3.00	
Forfeited	(16,677)	0.54	3.00	
Outstanding at December 31, 2017	2,045,616	0.66	2.46	7.57 years
Granted	745,700	1.52	8.12	
Exercised	(151,650)	0.53	2.06	
Expired	(4,622)	0.55	3.00	
Forfeited	(131,639)	0.97	3.87	
Outstanding at December 31, 2018	2,503,405	0.91	4.09	7.30 years
Vested and exercisable at December 31, 2018	1,327,189			

During the years ended December 31, 2018 and 2017, ACM recognized employee stock-based compensation expense of $712 and $271, respectively. As of December 31, 2018 and 2017, $2,424 and $729, respectively, of total unrecognized employee stock-based compensation expense, net of estimated forfeitures, related to stock-based awards were expected to be recognized over a weighted-average period of 1.62 years and 1.77 years, respectively. Total unrecognized compensation cost may be adjusted for future changes in estimated forfeitures.

The fair value of each option granted to employee is estimated on the grant date using the Black-Scholes valuation model with the following assumptions.

	December 31,	
	2018	**2017**
Fair value of common share(1)	$5.31-13.85	$5.60-7.59
Expected term in years(2)	6.25	6.25
Volatility(3)	39.14% -43.00%	28.62% -29.18%
Risk-free interest rate(4)	2.55%-2.96%	2.21%-2.22%
Expected dividend(5)	0%	0%

(1) Common stock value was the close market value on December 31, 2018.

(2) Expected term of share options is based on the average of the vesting period and the contractual term for each grant according to Staff Accounting Bulletin 110.

(3) Volatility is calculated based on the historical volatility of ACM's comparable companies in the period equal to the expected term of each grant.

(4) Risk-free interest rate is based on the yields of U.S. Treasury securities with maturities similar to the expected term of the share options in effect at the time of grant.

(5) Expected dividend is assumed to be 0% as ACM has no history or expectation of paying a dividend on its common stock.

Non-employee Awards

The following table summarizes the Company's non-employee share option activities during the year ended December 31, 2018:

	Number of Option Shares	**Weighted Average Grant Date Fair Value**	**Weighted Average Exercise Price**	**Weighted Average Remaining Contractual Term**
Outstanding at December 31, 2016	1,578,565	$ 0.51	$ 1.58	6.81 years
Granted	196,669	2.25	6.90	
Exercised	(298,555)	0.39	0.93	
Expired	(133,336)	0.45	0.75	
Forfeited	(16,667)	2.58	7.50	
Outstanding at December 31, 2017	1,326,676	0.78	2.52	7.54 years
Granted	-	-	-	-
Exercised	(114,302)	0.43	1.92	-
Expired	-	-	-	-
Forfeited	-	-	-	-
Outstanding at December 31, 2018	1,212,374	$ 0.78	2.57	6.66 years
Vested and exercisable at December 31, 2018	946,691			

During the years ended December 31, 2018 and 2017, the Company recognized non-employee stock-based compensation expense of $2,651 and $1,351, respectively.

The fair value of each option granted to non-employees is re-measured at each period end until the vesting date using the Black-Scholes valuation model with the following assumptions:

	December 31,	
	2018	2017
Fair value of common share(1)	$10.88	$5.25-7.59
Expected term in years(2)	2.58-5.36	3.58-6.25
Volatility(3)	40.24%-45.48%	28.71-29.41 %
Risk-free interest rate(4)	2.39%-2.94%	1.62%-2.43 %
Expected dividend(5)	0%	0%

(1) Common stock value was the close market value on December 31, 2018.

(2) Expected term of share options is based on the average of the vesting period and the contractual term for each grant according to Staff Accounting Bulletin 110.

(3) Volatility is calculated based on the historical volatility of ACM's comparable companies in the period equal to the expected term of each grant.

(4) Risk-free interest rate is based on the yields of U.S. Treasury securities with maturities similar to the expected term of the share options in effect at the time of grant.

(5) Expected dividend is assumed to be 0% as ACM has no history or expectation of paying a dividend on its common stock.

NOTE 15 – INCOME TAXES

The following represent components of the income tax expense (benefit) for the years ended December 31, 2018 and 2017:

	Year Ended December 31,	
	2018	2017
Current:		
U.S. federal	$ -	$ -
U.S. state	-	-
Foreign	(1,149)	-
Total current tax expense	(1,149)	-
Deferred:		
U.S. federal	-	-
U.S. state	-	-
Foreign	343	(547)
Total deferred tax income (expense)	343	(547)
Total income tax expense	$ (806)	$ (547)

Tax effects of temporary differences that give rise to significant portions of the Company's deferred tax assets at December 31, 2018 and 2017 are presented below:

	December 31,	
	2018	2017
Deferred tax assets:		
Net operating loss carry forwards (offshore)	$ 16	$ 4,418
Net operating loss carry forwards (U.S.) and credit	4,105	683
Deferred revenue (offshore)	558	656
Accruals (U.S.)	11	18
Reserves and other (offshore)	1,080	495
Stock-based compensation (U.S.)	1,021	453
Property and equipment (U.S.)	1	2
Total gross deferred tax assets	6,792	6,725
Less: valuation allowance	(5,155)	(5,431)
Total deferred tax assets	1,637	1,294
Total deferred tax liabilities	-	-
Translation difference	-	-
Deferred tax assets, net	$ 1,637	$ 1,294

The Company considers all available evidence to determine whether it is more likely than not that some portion or all of the deferred tax assets will be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become realizable. Management considers the scheduled reversal of deferred tax liabilities (including the impact of available carryback and carry-forward periods), and projected taxable income in assessing the realizability of deferred tax assets. In making such judgments, significant weight is given to evidence that can be objectively verified. Based on all available evidence, a partial valuation allowance has been established against some net deferred tax assets as of December 31, 2018 and 2017, based on estimates of recoverability. While the Company has optimistic plans for its business strategy, it determined that such a valuation allowance was necessary given its historical losses and the uncertainty with respect to its ability to generate sufficient profits from its business model from all tax jurisdictions. In order to fully realize the U.S. deferred tax assets, the Company must generate sufficient taxable income in future periods before the expiration of the deferred tax assets governed by the tax code. The valuation allowance in the U.S. decreased by $278 for the year ended December 31, 2018 and increased $760 for the year ended December 31, 2017. The valuation allowance in China decreased by $2 and decreased by $58 during the years ended December 31, 2018 and 2017, respectively.

The Company did not have any significant temporary differences relating to deferred tax liabilities as of December 31, 2018 or 2017.

As of December 31, 2018 and 2017, the Company had net operating loss carry-forwards of respectively, $15,867 and $20,116 for U.S federal purposes, $714 and $536 for U.S. state purposes and $6,411 for Chinese income tax purposes. Such losses are set to expire in 2019, 2032, and 2019 for U.S. federal, U.S. state and Chinese income tax purposes, respectively.

As of December 31, 2018 and 2017, the Company had research credit carry-forwards of $606 for U.S. federal purposes, and $377 for U.S. state purposes. Such credits are set to expire in 2025 for U.S. federal carry-forwards. There is no expiration date for U.S. state carry-forwards.

A limitation may apply to the use of the U.S. net operating loss and credit carry-forwards, under provisions of the U.S. Internal Revenue Code that would be applicable if ACM experiences an "ownership change." Should these limitations apply, the carry-forwards would be subject to an annual limitation, resulting in a substantial reduction in the gross deferred tax assets before considering the valuation allowance. As of December 31, 2018 and 2017, the Company had not performed an analysis to determine if its net operating loss and credit carry-forwards would be subject to such limitations.

The Company's effective tax rate differs from statutory rates of 21% for U.S. federal income tax purposes and 15%-25% for Chinese income tax purpose due to the effects of the valuation allowance and certain permanent differences as it pertains to book-tax differences in the value of client shares received for services. Pursuant to the Corporate Income Tax Law of the PRC, all of the Company's PRC subsidiaries are liable to PRC Corporate Income Taxes at a rate of 25% except for ACM Shanghai. According to Guoshuihan 2009 No. 203, if an entity is certified as an "advanced and new technology enterprise," it is entitled to a preferential income tax rate of 15%. ACM Shanghai obtained the certificate of "advanced and new technology enterprise" in 2012 and again in 2016 with an effective period of three years, and the provision for PRC corporate income tax for ACM Shanghai is calculated by applying the income tax rate of 15% for the years ended December 31, 2018 and 2017.

Income tax expense (benefit) for the years ended December 31, 2018 and 2017 differed from the amounts computed by applying the statutory federal income tax rate of 21% and 34%, respectively, to pretax income (loss) as a result of the following:

	Year Ended December 31,	
	2018	**2017**
Effective tax rate reconciliation:		
Income tax provision at statutory rate	21.00%	34.00%
State taxes, net of Federal benefit	-	-
Foreign rate differential	(20.88)	6.80
Other permanent difference	15.59	197.7
Effect of tax reform	-	(757)
Change in valuation allowance	(4.78)	349.9
Total income tax expense (benefit)	(10.93%)	(168.65%)

Tax positions are evaluated in a two-step process. The Company first determines whether it is more likely than not that a tax position will be sustained upon examination. If a tax position meets the more-likely-than-not recognition threshold it is then measured to determine the amount of benefit to recognize in the financial statements. The tax position is measured as the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement. The aggregate changes in the balance of gross unrecognized tax benefits, which excludes interest and penalties, for the years ended December 31, 2018 and 2017, are as follows:

	December 31,	
	2018	**2017**
Beginning balance	$ 44	$ 44
Increase/(Decrease) of unrecognized tax benefits taken in prior years	-	-
Increase/(Decrease) of unrecognized tax benefits related to current year	-	-
Increase/(Decreases) of unrecognized tax benefits related to settlements	-	-
Reductions to unrecognized tax benefits related to lapsing statute of limitations	-	-
Ending balance	$ 44	$ 44

The Company files income tax returns in the United States, and state and foreign jurisdictions. The federal, state and foreign income tax returns are under the statute of limitations subject to tax examinations for the tax years ended December 31, 2009 through December 31, 2017. To the extent the Company has tax attribute carry-forwards, the tax years in which the attribute was generated may still be adjusted upon examination by the U.S. Internal Revenue Service, state or foreign tax authorities to the extent utilized in a future period.

The Company had $44 of unrecognized tax benefits as of December 31, 2018 and 2017.

The Company recognizes interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2018 and 2017, the Company had $44 of accrued penalties and $44 of accrued penalties related to uncertain tax positions, none of which has been recognized in the Company's consolidated statements of operations and comprehensive income for the years ended December 31, 2018 and 2017. There were no ongoing examinations by taxing authorities as of December 31, 2018 and 2017.

The Company intends to indefinitely reinvest the PRC earnings outside of the U.S. as of December 31, 2018 and 2017. Thus, deferred taxes are not provided in the U.S. for unremitted earnings in the PRC.

On December 22, 2017, the 2017 Tax Cuts and Jobs Act was enacted into law and the new legislation contains several key tax provisions that affect us, including a one-time mandatory transition tax on accumulated foreign earnings and a reduction of the corporate income tax rate to 21% effective January 1, 2018, among others. We are required to recognize the effect of the tax law changes in the period of enactment, such as determining the transition tax, remeasuring our U.S. deferred tax assets and liabilities as well as reassessing the net realizability of our deferred tax assets and liabilities.

NOTE 16 – COMMITMENTS AND CONTINGENCIES

The Company leases offices under non-cancelable operating lease agreements. The rental expenses were $1,867 and $670 for the years ended December 31, 2018 and 2017, respectively. See note 12 for future minimum lease payments under non-cancelable operating lease agreements with initial terms of one year or more.

The Company did not have any capital commitments during the reported periods.

From time to time the Company is subject to legal proceedings, including claims in the ordinary course of business and claims with respect to patent infringements.

NOTE 17 – RESTRICTED NET ASSETS

In accordance with the PRC's Foreign Enterprise Law, ACM Shanghai and ACM Wuxi are required to make contributions to a statutory surplus reserve (note 2).

As a result of PRC laws and regulations that require annual appropriations of 10% of net after-tax profits to be set aside prior to payment of dividends as a general reserve fund or statutory surplus fund, ACM Shanghai is restricted in its ability to transfer a portion of its net assets to ACM (including any assets received as distributions from ACM Wuxi). Amounts restricted included paid-in capital and statutory reserve funds, as determined pursuant to PRC accounting standards and regulations, were $32,076 and $29,927 as of December 31, 2018 and 2017.

NOTE 18 – PARENT COMPANY ONLY CONDENSED FINANCIAL INFORMATION

The Company performed a test on the restricted net assets of consolidated subsidiaries in accordance with Rule 4-08(e)(3) of Regulation S-X of the SEC and concluded that it was applicable for the Company to disclose the financial information for ACM only. Certain information and footnote disclosures generally included in financial statements prepared in accordance with GAAP have been condensed or omitted. The footnote disclosure contains supplemental information relating to the operations of ACM separately.

ACM's subsidiaries did not pay any dividends to ACM during the periods presented.

ACM did not have significant capital or other commitments, long-term obligations, or guarantees as of December 31, 2018 and 2017.

The following represents condensed unconsolidated financial information of ACM only as of and for the years ended December 31, 2018 and 2017:

CONDENSED BALANCE SHEET

	December 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 13,161	$ 10,874
Accounts Receivable	983	118
Inventory	720	565
Due from intercompany	14,494	12,669
Other receivable	175	50
Total current assets	29,533	24,276
Investment in unconsolidated subsidiaries	26,861	15,476
Due from related party	-	946
Total assets	56,394	40,698
Liabilities and Stockholders' Equity		
Notes payable	-	11
Accounts payable	2,818	739
Other payable	58	47
Income taxes payable	1,193	44
Total liabilities	4,069	841
Total redeemable convertible preferred stocks	-	-
Total stockholders' equity	52,325	39,857
Total liabilities and stockholders' equity	$ 56,394	$ 40,698

CONDENSED STATEMENT OF OPERATIONS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Revenue	$ 25,506	$ 6,985
Cost of revenue	(23,927)	(6,394)
Gross profit	1,579	591
Operating expenses:		
Sales and marketing expenses	(301)	(368)
General and administrative expenses	(5,083)	(3,961)
Research and development expenses	(255)	(50)
Loss from operations	(4,060)	(3,788)
Equity in earnings of unconsolidated subsidiaries	10,360	3,475
Other income (expense), net	108	-
Interest expense, net	166	(5)
Income (loss) before income taxes	6,574	(318)
Income tax expense (benefit)	-	-
Net income (loss)	$ 6,574	$ (318)

CONDENSED STATEMENT OF CASH FLOWS

	Year Ended December 31,	
	2018	2017
Net cash used in operating activities	$ (1,189)	$ (13,848)
Net cash provided by (used in) investing activities	946	(21,754)
Net cash provided by financing activities	3,510	38,676
Net increase in cash and cash equivalents	3,267	3,074
Cash and cash equivalents, beginning of year	10,874	7,264
Effect of exchange rate changes on cash and cash equivalents	(980)	536
Cash and cash equivalents, end of year	$ 13,161	$ 10,874

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Accounting Officer, evaluated the effectiveness of our disclosure controls and procedures pursuant to Rule 13a-15 under the Securities Exchange Act of 1934, or the Exchange Act, as of December 31, 2018. The evaluation included certain internal control areas in which we have made and are continuing to make changes to improve and enhance controls. In designing and evaluating the disclosure controls and procedures, management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply its judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Based on that evaluation, our Chief Executive Officer and Chief Accounting Officer concluded that our disclosure controls and procedures are effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Accounting Officer, as appropriate, to allow timely decisions regarding required disclosure.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as 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 general accepted accounting principles. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. 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.

Our management, with the participation of our Chief Executive Officer and Chief Accounting Officer, assessed the effectiveness of our internal control over financial reporting as of December 31, 2018. In making this assessment, our management used the criteria set forth in the Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on its assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2018.

This report does not include an attestation report of our independent registered public accounting firm due to a transition period established by rules of the Securities and Exchange Commission for "emerging growth companies."

Changes in Internal Control over Financial Reporting and Remediation Efforts

During year ended December 31, 2018, no changes, other than those in conjunction with certain remediation efforts described below, were identified to our internal control over financial reporting that materially affected, or were reasonably likely to materially affect, our internal control over financial reporting.

In connection with its audits of our consolidated financial statements as of, and for the year ended, December 31, 2017, BDO China Shu Lun Pan Certified Public Accountants LLP informed us that it had identified a material weakness in our internal control over financial reporting relating to our lack of sufficient qualified financial reporting and accounting personnel with an appropriate level of expertise to properly address complex accounting issues under GAAP and to prepare and review our consolidated financial statements and related disclosures to fulfill GAAP and Securities and Exchange Commission financial reporting requirements.

In the nine months ended September 30, 2018, we hired additional accounting and finance personnel and engaged outside consulting firms in order to improve our internal control over the financial reporting process.

We will continue to monitor the effectiveness of our internal control over financial reporting and will seek to employ any additional tools and resources deemed necessary to enhance our internal control over financial reporting.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this report.

Item 11. Executive Compensation

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this report.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this report.

Item 13. Certain Relationships and Related Transactions, and Director Independence

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this report.

Item 14. Principal Accounting Fees and Services

Information responsive to this item is incorporated herein by reference to our definitive proxy statement with respect to our 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this report.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) See “Item 8. Financial Statements and Supplementary Data – Index to Consolidated Financial Statements” above and “Exhibit Index” below.

(b) Exhibits.

Exhibit No.	Description
3.03	Restated Certificate of Incorporation of ACM Research, Inc.
3.04	Restated Bylaws of ACM Research, Inc.
4.01	Form of Warrant dated November 2, 2017 issued to the underwriters of ACM Research, Inc.'s initial public offering exercisable for an aggregate of 80,000 shares of Class A common stock
4.02	Senior Secured Promissory Note dated March 30, 2018 issued by Shengxin (Shanghai) Management Consulting Limited Partnership to ACM Research (Shanghai), Inc.
4.03	Intercompany Promissory Note dated March 30, 2018 issued by ACM Research (Shanghai), Inc. to ACM Research, Inc.
10.01(a)	Lease dated March 22, 2017 between ACM Research, Inc. and D&J Construction, Inc.
10.01(b)	Lease Amendment dated February 28, 2018 between ACM Research, Inc. and D&J Construction, Inc.
10.01(c)	Lease Amendment dated February 4, 2019 between ACM Research, Inc. and D&J Construction, Inc.
10.02	Lease Agreement dated April 26, 2018 between ACM Research (Shanghai), Inc. and Shanghai Zhangjiang Group Co., Ltd.
10.03	Lease Agreement dated January 18, 2018 between ACM Research (Shanghai), Inc. and Shanghai Shengyu Culture Development Co., Ltd.
10.04	Securities Purchase Agreement dated March 14, 2017 by and among ACM Research, Inc., Shengxin (Shanghai) Management Consulting Limited Partnership and ACM Research (Shanghai), Inc.
10.05	Securities Purchase Agreement dated March 23, 2017 between ACM Research, Inc. and Shanghai Science and Technology Venture Capital Co., Ltd., as amended
10.06	Securities Purchase Agreement dated August 31, 2017 by and among ACM Research, Inc., Shanghai Pudong High-Tech Investment Co., Ltd. and Pudong Science and Technology (Cayman) Co., Ltd.
10.07	Securities Purchase Agreement dated August 31, 2017 by and among ACM Research, Inc., Shanghai Zhangjiang Science & Technology Venture Capital Co., Ltd. and Zhangjiang AJ Company Limited
10.08	Ordinary Share Purchase Agreement dated September 6, 2017 by and among ACM Research, Inc., Ninebell Co., Ltd. and Moon-Soo Choi
10.09	Class A Common Stock Purchase Agreement dated September 6, 2017 by and among ACM Research, Inc., Ninebell Co., Ltd. and Moon-Soo Choi
10.10	Form of Second Amended and Restated Registration Rights Agreement to be entered into between ACM Research, Inc. and certain of its stockholders
10.11	Stock Purchase Agreement, dated October 11, 2017, by and among ACM Research, Inc., Xunxin (Shanghai) Capital Co., Limited, Xinxin (Hongkong) Capital Co., Limited and David H. Wang
10.12	Stock Purchase Agreement, dated October 16, 2017, by and between ACM Research, Inc. and Victorious Way Limited
10.13	Nomination and Voting Agreement, dated October 11, 2017, by and among Xinxin (Hongkong) Capital Co., Limited, ACM Research, Inc., David H. Wang, and the individuals named therein
10.14	Voting Agreement, dated March 23, 2017, by and among Shanghai Technology Venture Capital Co., Ltd. (also known as Shanghai Science and Technology Venture Capital Co., Ltd.) and ACM Research, Inc.
10.15+	2016 Omnibus Incentive Plan of ACM Research, Inc.

Exhibit No.	Description
10.15(a)+	Form of Incentive Stock Option Grant Notice and Agreement under 2016 Omnibus Incentive Plan
10.15(b)+	Form of Non-qualified Stock Option Grant Notice and Agreement under 2016 Omnibus Incentive Plan
10.15(c)+	Form of Restricted Stock Unit Grant Notice and Agreement under 2016 Omnibus Incentive Plan
10.16+	Form of Nonstatutory Stock Option Agreement of ACM Research, Inc.
10.17+	1998 Stock Option Plan of ACM Research, Inc.
10.17(a)+	Form of Incentive Stock Option Agreement under 1998 Stock Option Plan
10.17(b)+	Form of Non-statutory Stock Option Agreement under 1998 Stock Option Plan
10.18	Form of Indemnification Agreement entered into between ACM Research, Inc. and certain of its directors and officers
10.19+	Executive Retention Agreement dated November 14, 2016 between ACM Research, Inc. and Min Xu
10.20+	Advisory Board Agreement dated May 1, 2016 by and between ACM Research, Inc. and Chenming Hu
10.21	Line of Credit Agreement dated January 19, 2018 between ACM Research (Shanghai), Inc. and Shanghai Rural Commercial Bank
10.22	Line of Credit Agreement dated February 2, 2018 between ACM Research (Shanghai), Inc. and Bank of Shanghai Pudong Branch
10.23	Line of Credit Agreement dated August 24, 2018 between ACM Research (Shanghai), Inc. and Bank of China Shanghai Pudong Branch
10.24	Advisory Board Agreement dated May 1, 2016 by and between ACM Research, Inc. and Chenming Hu
10.25	Warrant Exercise Agreement dated March 30, 2018 by and among ACM Research, Inc., ACM Research (Shanghai), Inc., and Shengxin (Shanghai) Management Consulting Limited Partnership
21.01	List of Subsidiaries of ACM Research, Inc.
23.01	Consent of BDO China Shu Lan Pan Certified Public Accountants LLP
31.01	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.02	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.01	Certification of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

+ Indicates management contract or compensatory plan.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, as of March 14, 2019.

ACM RESEARCH, INC.

By: /s/ David H. Wang
David H. Wang
Chief Executive Officer and President

Pursuant to the requirements of the Securities Act of 1934, this report has been signed below by the following persons in the capacities indicated on March 14, 2019:

Signature	Title
/s/ David H. Wang **David H. Wang**	Chief Executive Officer, President and Director (*Principal Executive Officer*)
/s/ Lisa Feng **Lisa Feng**	Interim Chief Financial Officer, Chief Accounting Officer and Treasurer (*Principal Accounting Officer*)
/s/ Haiping Dun **Haiping Dun**	Director
/s/ Chenming Hu **Chenming Hu**	Director
/s/ Tracy Liu **Tracy Liu**	Director
/s/ Yinan Xiang **Yinan Xiang**	Director
/s/ Zhengfan Yang **Zhengfan Yang**	Director

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

ACM Research, Inc.
42307 Osgood Road, Suite I
Fremont, California 94539
United States

We hereby consent to the incorporation by reference in the Registration Statements on Form S3 (No. 333-228734) and Form S-8 (No. 333-222702) of ACM Research, Inc. of our report dated March 14, 2019, relating to the consolidated financial statements, which appears in this Form 10-K for the year ended December 31, 2018.

BDO China Shu Lun Pan Certified Public Accountants LLP
Shenzhen, The People's Republic of China

March 14, 2019