

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, 2020

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

(State or Other Jurisdiction of Incorporation or Organization)

42307 Osgood Road, Suite I, Fremont, California
(Address of Principal Executive Offices)

94-3290283

(I.R.S. Employer Identification No.)

94539
(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	Trading Symbol	Name of Each Exchange on which Registered
Class A Common Stock, \$0.0001 par value	ACMR	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 every Interactive Data file required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if 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 has filed a report on and attestation to its management's assessment of the effectiveness of internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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 30, 2020 (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 \$62.36 closing price of the stock on that date, was \$735.7 million. 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	16,967,095 shares outstanding as of February 23, 2021
Class B Common Stock, \$0.0001 par value	1,775,939 shares outstanding as of February 23, 2021

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, 2020. Portions of such proxy statement are incorporated by reference in Part III of this report.



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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. and its subsidiaries, including ACM Shanghai, collectively.

For purposes of this report, certain amounts in Renminbi, or RMB, have been translated into U.S. dollars solely for the convenience of the reader. The translations have been made based on the conversion rates published by the State Administration of Foreign Exchange of the People's Republic of China.

SAPS, TEBO, ULTRA C and ULTRA FURNACE are our trademarks. For convenience, these trademarks appear in this report without TM 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 forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, included in this report regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as “may,” “might,” “will,” “objective,” “intend,” “should,” “could,” “can,” “would,” “expect,” “believe,” “anticipate,” “project,” “target,” “design,” “estimate,” “predict,” “potential,” “plan” or the negative of these terms, and similar expressions intended to identify forward-looking statements. These statements reflect our current views with respect to future events and are based on our management’s belief and assumptions and on information currently available to our management. Although we believe that the expectations reflected in these forward-looking statements are reasonable, these statements relate to future events or our future operational or financial performance, and involve known and unknown risks, uncertainties and other factors, including those described or incorporated by reference in “Item 1A. Risk Factors” of Part I of this report, that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements.

The information included under the heading “Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations – Overview,” of Part II of this report contains statistical data and estimates, including forecasts, that are based on information provided by Gartner, Inc., or Gartner, in “Forecast: Semiconductor Wafer Fab Equipment, Worldwide, 4Q20 Update” (December 22, 2020), or the Gartner Report. The Gartner Report represents research opinions or viewpoints that are published, as part of a syndicated subscription service, by Gartner and are not representations of fact. The Gartner Report speaks as of its original publication date (and not as of the date of this report), and the opinions expressed in the Gartner Report are subject to change without notice. While we are not aware of any misstatements regarding any of the data presented from the Gartner Report, estimates, and in particular forecasts, involve numerous assumptions and are subject to risks and uncertainties, as well as change based on various factors, that could cause results to differ materially from those expressed in the data presented below.

Any forward-looking statement made by us in this report speaks only as of the date on which it is made. Except as required by law, we assume no obligation to update these statements publicly or to update the reasons actual results could differ materially from those anticipated in these statements, even if new information becomes available in the future.

You should read this report, and the documents that we reference in this report and have filed as exhibits to this report, completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements.

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 wet-cleaning and other front-end processing 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.

Revenue from wet cleaning and other front-end processing tools totaled \$136.3 million, or 87.0% of total revenue in 2020; \$90.9 million, or 84.6% of total revenue, in 2019; and \$68.5 million, or 91.7% of total revenue, in 2018. Selling prices for our wet-cleaning production tools range from \$2 million to more than \$5 million. Our customers for wet-cleaning and other front-end processing tools have included Semiconductor Manufacturing International Corporation, Shanghai Huali Microelectronics Corporation, The Huahong Group, SK Hynix Inc., Yangtze Memory Technologies Co., Ltd, and ChangXin Memory Technologies.

Revenue from advanced packaging, other back-end processing tools, services and spares totaled \$20.4 million, or 13.0% of total revenue in 2020, \$16.6 million, or 15.4% of total revenue in 2019, and \$6.2 million or 8.3% of total revenue in 2018. Selling prices for these tools range from \$0.5 million to more than \$2 million. Our customers for advanced packaging, and other back-end processing tools have included Jiangyin Changdian Advanced Packaging Co. Ltd., a leading PRC-based wafer bumping packaging house that is a subsidiary of JCET Group Co., Ltd.; Nantong Tongfu Microelectronics Co., Ltd., a PRC-based chip assembly and testing company that is a subsidiary of Nantong Fujitsu Microelectronics Co., Ltd.; Nepes Co., Ltd., a semiconductor packaging company based in South Korea which acquired the operations of Deca Technologies' Philippines manufacturing facility in 2020; and Wafer Works Corporation, a leading PRC-based wafer supplier.

We estimate, based on third-party reports and on customer and other information, that our current product portfolio addresses more than \$5 billion of the global wafer equipment market. By product line, we estimate an approximately \$2.5 billion market opportunity is addressed by our wafer cleaning equipment, \$1.7 billion by our furnace equipment, \$500 million by our electro-chemical plating, or ECP equipment, and more than \$300 million by our stress-free polishing, or SFP, advanced packaging, wafer processing, and other back-end processing equipment. By major equipment segment, Gartner estimates a 2020 global market size of \$3.5 billion for wafer cleaning equipment (auto wet stations, single-wafer processors, batch spray processors, and other clean process equipment), \$2.4 billion for furnace equipment (tube CVD, oxidation/diffusion furnace, and batch atomic layer deposition), and \$546 million for ECD (electro-chemical deposition). Based on Gartner's estimates, the total available global market for these equipment segments increased by 15% from \$5.6 billion in 2019 to \$6.4 billion in 2020, and is expected to increase by 6% to \$6.8 billion in 2021.

We have focused 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 has helped us penetrate the mature chip manufacturing markets and build credibility with additional industry leaders. We have used a "demo-to-sales" process to place evaluation equipment, or "first tools," with a number of selected customers.

Since 2009 we have delivered more than 135 wet cleaning and other front-end processing tools, more than 120 of which have been accepted by customers and thereby generated revenue to us. The balance of the delivered tools are awaiting customer acceptance should contractual conditions be met. To date, a substantial majority 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 foreseeable future. We have begun to add to our efforts to further address customers in North America, Western Europe and Southeast Asia by expanding our direct sales and services teams and increasing our global marketing activities.

We are focused on building a strategic portfolio of intellectual property to support and protect our key innovations. Our tools have been developed using our key proprietary technologies:

- *Space Alternated Phase Shift, or SAPS, technology for flat and patterned (deep via or deep trench with stronger structure) wafer surfaces.* 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, with increasing relative effectiveness at more advanced production nodes.

- *Timely Energized Bubble Oscillation, or TEBO, technology for patterned wafer surfaces at advanced process nodes.* 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 (16 to 19 nanometers, or nm), 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.* 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.
- *ECP technology for advanced metal plating.* Our Ultra ECP ap, or Advanced Packaging, technology was developed for back-end assembly processes to deliver a more uniform metal layer at the notch area of wafers prior to packaging. Our Ultra ECP map, or Multi-Anode Partial Plating, technology was developed for front-end wafer fabrication processes to deliver advanced electrochemical copper plating for copper interconnect applications. Ultra ECP map offers improved gap-filling performance for ultra-thin seed layer applications, which is critical for advanced nodes at 14nm and beyond.

In 2020 we introduced and delivered a range of new tools intended to broaden our revenue opportunity with global semiconductor manufacturers. Product extensions include the Ultra SFP ap tool for advanced packaging solutions, the Ultra C VI 18-chamber single wafer cleaning tool for advanced memory devices, and the Ultra ECP 3d platform for through-silicon-via, or tsv, application. New product lines include the Ultra fn Furnace, our first dry processing tool, and a suite of semi-critical cleaning systems which include single wafer back side cleaning, scrubber, and auto bench cleaning tools.

We have been issued more than 350 patents in the United States, the People's Republic of China or PRC, Japan, Singapore, South Korea and Taiwan.

We conduct a substantial majority of our product development, manufacturing, support and services in the PRC, with additional product development and subsystem production in South Korea. Substantially all of our integrated tools are built to order at our manufacturing facilities in the Pudong region of Shanghai, which facilities now encompass a total of 136,000 square feet of floor space for production capacity, with 50,000 square feet having been added in 2020 through an expansion of our second facility in the Pudong region of Shanghai. In May 2020 ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc., entered into an agreement for a land use right in the Lingang region of Shanghai. In July 2020 Shengwei Research (Shanghai), Inc. began a multi-year construction project for a new 1,000,000 square foot development and production center that will incorporate state-of-the-art manufacturing systems and automation technologies, and will provide floor space to support significantly increase production capacity and related research and development activities. 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 in the PRC 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 technologies, and enable us to design innovative products and solutions to address their needs.

In June 2019 we announced a strategic plan to list shares of ACM Shanghai on the Shanghai Stock Exchange's Sci-Tech Innovation Board, as described under "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Recent Developments—STAR Market Listing and IPO."

Our Technology and Product Offerings

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 in the front-end production process, during which individual devices are patterned in a chip prior to being interconnected on a wafer. 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 increasingly advanced process nodes (the minimum line widths on a chip) of 22nm 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 300 millimeter, or mm, 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 in 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.

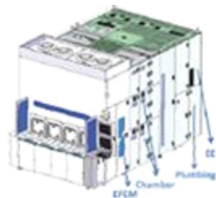
Recycled Test Wafers. In addition to using silicon wafers for chip production, chip manufacturers routinely process wafers through a limited portion of the front-end fabrication steps in order to evaluate the health, performance and reliability of those steps. Manufacturers also use wafers for non-product 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 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.



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), requiring limited clean room floor space;
- 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 or low-damage 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

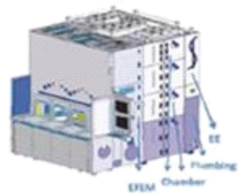
We offer two models of wet wafer cleaning equipment based on our TEBO technology, Ultra C TEBO II and Ultra C TEBO V. Each of these models is a single-wafer, serial-processing tool that can be configured to customer specifications and, in conjunction with appropriate dilute chemicals, used at numerous manufacturing processing steps for effective, damage-free cleaning of chips at process nodes of 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 is being evaluated by a select group of leading memory and logic chip customers.

Each model of TEBO equipment includes:



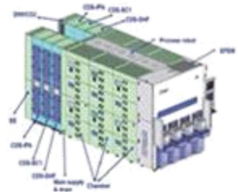
- an equipment front-end module, or EFEM, which moves wafers from chamber to chamber;
- one or more chamber modules, each equipped with a TEBO megasonic generator system;
- an electrical module to provide power for the tool; and
- a chemical delivery module.

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



- 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. Tahoe employs a proprietary hybrid approach in which the sulfuric acid cleaning steps are processed in batch mode, and the final stage cleaning are processed with single-wafer cleaning technologies. 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 delivered our first Ultra C Tahoe tool to a strategic customer in 2019.

Advanced Packaging and other Back-End Processing Tools

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.



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; 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

Since 2009 we have delivered more than 135 wet cleaning and other front-end processing tools, more than 120 of which have been accepted by customers and thereby generated revenue to us. The balance of the delivered tools are awaiting customer acceptance should contractual conditions be met. To date, substantially 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 foreseeable future. We have begun to add to our efforts to further address customers in North America, Western Europe and Southeast Asia, by expanding our direct sales teams and increasing our global marketing activities.

We generate most of our revenue from a limited number of customers as the result of our strategy of initially placing equipment with a small number of leading chip manufacturers that are driving technology trends and key capability implementation. In 2020, 75.8% of our revenue was derived from three customers: Shanghai Huali Microelectronics Corporation together with Huahong Semiconductor Ltd., collectively known as The Shanghai Huahong (Group) Company, Ltd. (“The Huali Huahong Group”), a leading PRC foundry, accounted for 36.9% of our revenue; Yangtze Memory Technologies Co., Ltd., a leading PRC memory chip company, together with one of its subsidiaries, accounted for 26.8% of our revenue; and Semiconductor Manufacturing International Corporation, a leading PRC foundry, accounted for 12.1% of our revenue. In 2019 73.8% of our revenue was derived from three customers: Yangtze Memory Technologies Co., Ltd., together with its subsidiaries accounted for 27.5% of our revenue; The Huali Huahong Group accounted for 26.5% of our revenue; and SK Hynix Inc., a leading Korean memory chip company, accounted for 19.8% of our revenue. In 2018, 87.6% of our revenue was derived from three customers: Yangtze Memory Technologies Co., Ltd. (together with a subsidiary) accounted for 39.6% of our revenue; Shanghai Huali Microelectronics Corporation accounted for 24.2% of our revenue; and SK Hynix Inc. accounted for 23.8% of our revenue.

Based on our market experience, we believe that implementation of our 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. As an example, 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. The period from new product introduction to high volume manufacturing can range from one to several years.

For our back-end wafer assembly and packaging customers, we focus on providing custom-made, differentiated equipment that incorporates a customer’s requested features at a competitive cost of ownership. Our customers for advanced packaging, wafer processing, and other back-end processing tools have included Jiangyin Changdian Advanced Packaging Co. Ltd., a leading PRC-based wafer bumping packaging house that is a subsidiary of JCET Group Co., Ltd.; Nantong Tongfu Microelectronics Co., Ltd., a PRC-based chip assembly and testing company that is a subsidiary of Nantong Fujitsu Microelectronics Co., Ltd.; Nepes Co., Ltd., a semiconductor packaging company based in South Korea which acquired the operations of Deca Technologies’ Philippines manufacturing facility in 2020; and Wafer Works Corporation, a leading PRC-based wafer supplier.

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, South 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, South Korea and Taiwan. We select these independent representatives based on their ability to provide effective field sales, marketing forecast and technical requirement updates 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 a few weeks ahead, followed by the corresponding purchase order four months ahead of the customer's desired delivery date. Consistent with industry practice, we allow customers to reschedule or cancel orders at a certain cost to them 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

We conduct a substantial majority of our product development, manufacturing, support and services in the PRC, with additional product development and subsystem production in South Korea. Substantially all of our tools are built to order at our manufacturing facilities in the Pudong region of Shanghai, which now encompass a total of 136,000 square feet of floor space for production capacity, with 50,000 square feet having been added in the second quarter of 2020 through an expansion of our second facility in the Pudong region of Shanghai.

In May 2020 ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc., entered into an agreement for a land use right in the Lingang region of Shanghai. In July 2020 Shengwei Research (Shanghai), Inc. began a multi-year construction project for a new development and production center. The planned 1,000,000 square foot facility will incorporate state-of-the-art manufacturing systems and automation technologies, and will provide the floor space to support significantly more production capacity and related research and development activities when fully-staffed and supplied. See "Item 2. Properties," of Part I of this report.

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, Tahoe and ECP technologies, and enable us to design innovative products and solutions to address their needs.

In February 2020 our ACM Shanghai headquarters were closed for an additional six days beyond the normal Lunar New Year Holiday in accordance with Shanghai government restrictions related to the COVID-19 outbreak. We took steps before and after the 2020 Lunar New Year to ensure no employees took unreasonable risks to rush back to work. Currently substantially all of our staff have returned to work at both of our Shanghai facilities. For additional information, see "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Recent Developments—COVID-19 Outbreak," of Part II of this report.

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 have or are currently collaborating with external research and development entities such as International SEMATECH, Shanghai Integrated Circuits Research & Development Center (ICRD), and IMEC on specific areas of interests. We also retain, as technical advisors, several experts in semiconductor technology.

For the foreseeable future we are focusing on enhancing our Ultra C SAPS, TEBO, Tahoe and ECP 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 \$19.1 million or 12.2% of revenue in 2020, \$12.9 million, or 12.0% of revenue, in 2019 and \$10.4 million, or 13.9% of revenue, in 2018. 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 filing 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, Singapore, South Korea, 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, 2020, we had 28 issued patents, and 30 patents pending, in the United States. These patents carry expiration dates from 2022 through 2039. Many of the US patents and applications have also been filed internationally, in one or more of the European Union, Japan, PRC, Singapore, South Korea, 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 350 patents in the United States, the PRC, Japan, Korea, Singapore and Taiwan.

We 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, 928177, 9492852, 9595457, 9633833, and 10020208 as well as their corresponding international patents. We have 35 patents granted internationally protecting our SAPS technologies. We also have filed 11 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 SFP and 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, 8518224, and 10227705, 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 include US Patent Number 8598039 titled “Barrier layer removal method and apparatus,” and US Patent Number 10615073 titled “method for removing barrier layer for minimizing sidewall recess.”

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 Lam Research Corporation, Kokusai Semiconductor Equipment Corporation, NAURA Technology Group Co., Ltd., Mujin Electronics Co., Ltd., SCREEN SPE USA, LLC (a subsidiary of SCREEN Holdings 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 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 and Human Capital

As of December 31, 2020, we had 543 full-time equivalent employees, of whom 59 were in administration, 127 were in manufacturing, 216 were in research and development, and 141 were in sales and marketing and customer services. Of these employees, 485 were located in mainland China and the Taiwan region, 49 were located in Korea and 9 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.

We compete in the highly competitive semiconductor equipment industry, with operations principally in the PRC. Attracting, developing, and retaining skilled and experienced employees in research and development, manufacturing, sales and marketing, and other positions is crucial to our ability to compete effectively. Our ability to recruit and retain such employees depends on a number of factors, including our corporate culture and work environment, informed by our values and behaviors, our corporate philosophy of talent development and career opportunities, and compensation and benefits.

To attract and retain qualified employees and key talent, we offer total compensation packages that are competitive with comparable companies, particularly in the PRC and, specifically, Shanghai.

We provide training and development programs to our employees, and we have trained many of our key engineers and managers for more than a decade. Retention of these key employees is critical to secure our future growth and technology development. To assist in employee retention and recruitment, we intend to offer employee housing in the Lingang region of Shanghai in connection with ACM Shanghai's recent acquisition of a land use right in Lingang, where we began construction of a new research and development center and factory in July 2020.

When it comes to employee safety, we are committed to providing a safe work environment for our employees that meets or exceeds local environmental, health, and safety laws and regulations. As a result of the COVID-19 pandemic, we have augmented certain of our normal business practices to ensure that we promote health and safety for our employees. We have established safety policies and protocols, and we regularly update our employees with respect to any changes. A majority of our workforce provide services that cannot be performed remotely, and we have prioritized the health of those individuals that continue to work at our facilities. We have provided personal protective equipment and cleaning supplies. We require masks to be worn in our facilities and have prohibited all non-essential domestic and international travel for all employees. We have also provided general information updates and support for our employees to ensure that they have resources and information to protect their health and that of those around them, including their families and co-workers.

Environmental

Severe weather events, including earthquakes, fires, floods, heat waves, hurricanes and other environmental disasters, could pose a threat to our manufacturing and research and development activities through physical damage to our operating facilities or equipment or disruption of power supply or telecommunications infrastructure. The frequency and intensity of severe weather events are reportedly increasing throughout the world as part of broader climate changes. Global weather pattern changes may also pose long-term risks of physical impacts to our business. We maintain disaster recovery and business continuity plans that would be implemented to help us recover in the event of severe weather events that interrupt our business. See "Item 1A. Risk Factors—General—Our production facilities could be damaged or disrupted by a natural disaster, war, terrorist attacks or other catastrophic events."

Concerns about climate change have resulted in various laws and regulations that are intended to limit carbon emissions and address other environmental concerns. In recent years, the PRC, where our production facilities are located, has undertaken comprehensive sustainability initiatives that are requiring companies to meet new environmental standards and deal with higher energy and other production costs. Environmental laws and regulations may impose new or unexpected either directly through, for example, higher energy costs or indirectly through increased costs of compliance or of failing to comply with these laws and regulations. These laws and regulations might increase the cost of construction, maintenance and operation of our new research and development center and factory in the Lingang region of Shanghai.

We do not currently expect that existing or pending climate change laws and regulations will be material to our results of operations in the foreseeable future. Climate change could, however, have a direct effect on our customer base of semiconductor fabricators, whose operations typically require copious quantities of power and water and a number of chemicals. Chip fabrication operations often result in significant amounts of wastewater, which can contain a number of harmful contaminants, including antimony, arsenic, hydrofluoric acid and hydrogen peroxide, that historically have resulted in groundwater pollution and related violations of environmental laws. Moreover, water and chemical demands for semiconductor fabrication are expected to increase with the production of more advanced chips at smaller process nodes. As a result, some leading chip fabricators have begun to invest in conservation and treatment technologies for water and chemicals.

We have designed our wet cleaning front-end processing tools to require significantly reduced levels of environmentally harmful chemicals, which helps customers face increased environmental laws and regulations. SAPS and TEBO technologies use 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. In interconnect and barrier metals applications based on SAPS technology, for example, these chemical solutions take the place of chemicals such as piranha solution, a high-temperature mixture of sulfuric acid and hydrogen peroxide used by conventional wet wafer cleaning processes. Similarly, 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. For additional information, see "—Our Technology and Product Offerings—Wet Cleaning Equipment for Front End Production Processes."

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.acmrcsh.com as soon as reasonably practicable after such reports are electronically filed with or furnished to the SEC.

Investors should note that we 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.

RISK FACTOR SUMMARY

Our business is subject to a number of risks, including risks that may prevent us from achieving our business objectives or may adversely affect our business, financial condition, results of operations, cash flows and prospects. The risks are discussed more fully below and include, but are not limited to, the risks summarized below.

Risks Related to Our Business and Our Industry

- our limited operating income;
- our potential future needs for additional capital that may not be available at all or on terms acceptable to us;
- the cyclical nature of the semiconductor industry that may lead to substantial variations in demand for our products;
- industry manufacturers of integrated circuits, or chips, adopting our Space Alternated Phase Shift or SAPS, Timely Energized Bubble Oscillation or TEBO, Tahoe and Electro-Chemical Plating or ECP, technologies and Furnace our single-wafer wet cleaning equipment and other capital equipment, or tools;
- our SAPS, TEBO, Tahoe and ECP technologies not achieving widespread market acceptance;
- our ability to continue to enhance our existing single-wafer wet cleaning tools and identifying and entering new product markets;
- our ability to establish and maintain a reputation for credibility and product quality;
- our ability to expand our customer base;
- our dependence on a small number of customers for a substantial portion of our revenue;
- our long and unpredictable sales cycle, including our incurrence of significant expenses long before we can recognize revenue from new products, if at all;
- difficulties in forecasting demand for our tools;
- our reliance on third parties to manufacture significant portions of our tools and our ability to manage our relationships with these parties;
- any shortage of components or subassemblies, which could result in delayed delivery of products to us or in increased costs to us;
- our dependence on a limited number of suppliers, including single source suppliers, for critical components and subassemblies;
- our dependence on our Chief Executive Officer and President and other senior management and key employees.

Regulatory Risks

- changes in government trade policies that could limit the demand for our tools and increase the cost of our tools;
- regulatory action limiting our ability to sell our tools to Chinese customers;
- changes in political and economic policies with respect to the People’s Republic of China or PRC;
- the inability of the U.S. Public Company Accounting Oversight Board, or PCAOB, to inspect our auditor, as a registered public accounting firm operating in the PRC and the adoption of proposed legislation related to companies operating in “restrictive markets”

Risks Related to Our STAR Market Listing

- our ability to implement our strategy to expand our PRC operations by completing an initial public offering and listing of shares of ACM Shanghai on the Shanghai Stock Exchange’s Sci-Tech innovAtion boARd, or STAR Market;
- our ability to achieve the results contemplated by our business strategy and our strategy for growth in the PRC related to the STAR Market listing;
- the effect of ACM Shanghai’s status as a publicly traded company that is controlled, but less than wholly owned, by ACM Research;
- our ability to manage potentially inconsistent accounting and disclosure requirements of ACM Research and ACM Shanghai if the planned listing initial public offering of shares of ACM Shanghai in the PRC, which we refer to as the STAR IPO, in connection with the planned listing, which we refer to as the STAR Listing, of ACM Shanghai shares on the STAR Market are completed;

Risks Related to Our Intellectual Property and Data Security

- our ability to protect our intellectual property, including in the PRC;
- breaches of our cybersecurity systems;

Risks Related to the COVID-19 Outbreak

- impacts on our global supply chain due to the COVID-19 outbreak;
- the impact of the COVID-19 outbreak on our currently planned projects and investments in the PRC, including the STAR IPO.

Risks Related to Ownership of Class A Common Stock

- the volatility in the market price of Class A common stock;
- manipulative short sellers of our stock, which may drive down the market price of our Class A common stock and could result in litigation;
- the difficulty to predict the effect of the proposed STAR Listing and STAR IPO on the Class A common stock;
- the dual class structure of Class A common stock, which has the effect of concentrating voting control with our executive officers and directors;
- the limited experience of our management team managing a public company, including a “large accelerated filer.”

RISK FACTORS

Risks Related to Our Business and Our Industry

We have generated limited operating income in the past, and if our revenue does not meet our expectations in future years we may not be able to maintain or increase our profitability.

We have incurred significant losses since our inception in 1998. We generated net income of \$21.7 million in 2020, \$19.5 million in 2019 and \$6.6 million in 2018, but incurred net losses in every year from 1998 to 2015 and in 2017. We have a limited history of generating meaningful levels of revenue, and we expect our costs to increase in future periods. If we are unable to increase our revenue at a rate sufficient to offset the expected increase in our costs, 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.

Our revenue was \$156.6 million in 2020, \$107.5 million in 2019 and \$74.6 million in 2018, but totaled only \$36.5 million in 2017, \$27.4 million in 2016 and \$31.2 million in 2015. Our ability to generate significant revenue depends on a number of factors, including our ability to:

- achieve wider market acceptance of Ultra C equipment based on SAPS, TEBO and Tahoe technology;
- increase our customer base in the PRC and globally, 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.

We expect to expend increasing levels of 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 tools for evaluation by customers;
- the cost of goods being manufactured and sold for our installed base; and
- expansion of field service.

These investments may not result in increased revenue or growth in our business.

Additionally, we may encounter unforeseen operating expenses, difficulties, complications, delays and other factors that may result in losses in future periods. 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 and Lingang-related land purchases and deposits, and with increasing our sales and marketing and service and support efforts, and with 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.

Proceeds received by ACM Shanghai from the initial placements of shares with PRC investors and from the planned listing initial public offering of shares of ACM Shanghai in the PRC, which we refer to as the STAR IPO, in connection with the planned listing, which we refer to as the STAR Listing, of ACM Shanghai shares on the STAR Market will be used to grow and support our PRC operations. Those proceeds generally will not be available for distribution to ACM Research. Under existing PRC laws and regulations, it may be difficult, if not impossible, for ACM Research to be able to receive dividends comprised of funds generated by ACM Shanghai and, even if such dividends can be paid from the PRC to the United States, after the completion of the STAR Listing and the STAR IPO, any such dividends can be paid to ACM Research only if other holders of ACM Shanghai shares receive their pro rata dividends. As a result, it is unlikely that funds raised or generated by ACM Shanghai will be readily distributable to ACM Research.

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 cyclical nature of the semiconductor industry and the related impact on the purchase of equipment used in the manufacture of 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;
- our ability to sell our tools to Chinese customers due to regulatory restrictions, including the addition of our customers to the Entity List;

- 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, or Lunar, 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.

Cyclical 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 cyclical 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.

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, Tahoe and ECP 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, Tahoe and ECP 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, Tahoe and ECP 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, Tahoe, and ECP 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. A total of three customers accounted for 75.8% of our revenue in 2020, 73.8% of our revenue in 2019 and 87.6% of our revenue in 2018.

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 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 a significant amount 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, 2020, we had accrued \$4.0 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; Ninebell Co., Ltd., or Ninebell, as the principal supplier of robotic delivery system subassemblies used in our single-wafer cleaning equipment; and Advanced Electric Co. Inc., as a key supplier of valves used in our single-wafer cleaning equipment. An adverse change to our relationship with any of these suppliers 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, 2018, 2019, and 2020. 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, Tahoe and ECP.

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 50% in 2020, 32% in 2019, and 35% in 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, including as a result of preparations for the STAR Listing and the STAR IPO. We will need to continue to scale and adapt our operational, financial and management controls, as well as our reporting systems and procedures, at both ACM Research and ACM Shanghai. 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.

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, the Chair of the Board, Chief Executive Officer and President of ACM Research. All of our senior management are at-will employees, which means either we or the employee may terminate their employment at any time. 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. Moreover, in connection with planning for the STAR Listing and the STAR IPO, ACM Shanghai is now managed by a group of officers separate from those of ACM Research and those officers owe fiduciary duties to the various stakeholders of ACM Shanghai. We do not have employment or retention agreements with, or 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. The loss of Dr. Wang or other key management personnel, including our 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, 2020, we had net operating loss carryforward amounts, or NOLs, of \$45.0 million for U.S. federal income tax purposes and \$545,000 for U.S. state income tax purposes. As of December 31, 2019, we had net operating loss carryforward amounts, or NOLs, of \$12.2 million for U.S. federal income tax purposes and \$559,000 for U.S. state income tax purposes. The federal and state NOLs will expire at various dates in the future.

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, our follow on public offering in August 2019, and any future equity issuances. 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 encounter difficulties related to required CFIUS approval (see also “—Regulatory and Litigation Risks—Certain of our investments may be subject to review by and approval from CFIUS, which may prevent us from taking advantage of investment opportunities that would otherwise be advantageous to our stockholders”);
- 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.

Substantially all of our sales in 2020, 2019 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, such as work stoppages and travel restrictions imposed in connection with the COVID-19 pandemic;
- 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 the 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 South 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.

Regulatory Risks

Changes in government trade policies could limit the demand for our tools and increase the cost of our tools.

General trade tensions between the United States and the PRC escalated beginning in 2018. In each of July, August and September 2018, June and September 2019, and February 2020, 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 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.

Our ability to sell our tools to Chinese customers may be restricted by regulatory actions.

The Bureau of Industry and Security of the U.S. Department of Commerce, or BIS, recently has imposed and may continue to impose additional restrictions, including licensing requirements, under the Export Administration Regulations, or EAR, with respect to certain PRC companies that impact the supply of U.S. products and certain non-U.S. products incorporating U.S. content, or that are manufactured using certain U.S. technology or software, to such companies and the sourcing of U.S. items by non-U.S. companies for use in manufacturing products for such companies. For example, BIS has recently added a number of PRC entities to the Entity List under the EAR which means that any items subject to the EAR, including certain non-U.S. produced products with U.S. content, require a BIS license for supply to the listed entities. Among other companies, in December 2020, SMIC, one of the largest chip manufacturers in the PRC, was added to the Entity List. Challenges faced by SMIC and its key suppliers as a result of the listing could indirectly impact SMIC's demand for, or our ability to supply, our products.

We cannot be certain what additional actions the U.S. government may take with respect to PRC entities, and whether such actions will impact our relationships with our PRC-based customers, including changes to the Entity List restrictions, other export regulations, tariffs or other trade restrictions, or whether the PRC government may take any actions in response to U.S. government action that may adversely affect our ability to do business with our PRC-based customers. Even in the absence of new restrictions, tariffs or trade actions imposed by the U.S. or PRC government, our PRC-based customers may take actions to reduce dependence on the supply of products subject to potential U.S. trade regulations, including our tools, which could have a material adverse effect on our operating results. We are unable to predict the duration of the restrictions imposed by the U.S. government or of any additional governmental actions that may impact our relationships with our PRC-based customers, any of which could have a long-term adverse effect on our business, operating results and financial condition.

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.

Changes in political and economic policies with respect to the PRC may make it difficult for us to release the benefit of our investments.

On November 12, 2020, then-President Trump issued an executive order, or the Order, establishing a new sanctions program designed to prohibit U.S. persons from entering into transactions in certain publicly traded securities, as well as derivatives and securities designed to provide investment exposure to such securities, of any “Communist Chinese military company,” or CCMC, as designated by the U.S. Department of Defense, or DOD, or the U.S. Secretary of the Treasury. Continued ownership of such securities by U.S. persons would be prohibited after a one-year divestment period from the time of designation of the issuer. A number of PRC issuers have been designated under this program and more could be added.

On December 3, 2020, SMIC was designated as a CCMC by the DOD. Consequently, ACM Shanghai could be required to divest its ownership of SMIC shares prior to December 3, 2021. If ACM Shanghai is not able to sell its shares of SMIC prior to December 3, 2020, ACM Shanghai’s continued possession of SMIC securities may subject ACM Shanghai and ACM Research to penalties. Certain implementation matters related to the scope of, and compliance with, the Order have not yet been resolved, and the ultimate application and enforcement of the Order may change due to, among other things, the change in the U.S. Presidential administration.

In addition, we may seek to conduct business transactions with SMIC and other entities on the CCMC list in the future. Although the Order does not prohibit commercial relations with CCMC companies other than the securities transactions noted above, certain other export restrictions have been imposed under the Export Administration Regulations on some CCMC companies, including SMIC. These and any similar future U.S. government restrictions on our suppliers or customers may adversely affect our business operations in the PRC, overall company results or our financial condition.

Certain of our investments may be subject to review by and approval from CFIUS, which may prevent us from taking advantage of investment opportunities that would otherwise be advantageous to our stockholders.

Certain of our investments may be subject to review by and approval from the U.S. Committee on Foreign Investment in the U.S., or CFIUS. In the event that CFIUS reviews one or more of the our investments, there can be no assurances that we will be able to maintain or proceed with such investments on terms acceptable to us. Additionally, CFIUS may seek to impose limitations on one or more such investments that may prevent us from maintaining or pursuing investment opportunities that we otherwise would have maintained or pursued, which could adversely affect the performance of our investments and thus our overall performance. Certain of our stockholders may be non-U.S. investors, and in the aggregate, may comprise a substantial portion of our net asset value, which may increase the risks of such limitations being imposed in connection with investments pursued or made by us. Legislative and regulatory changes, including changes to agency practice, in the future may negatively impact our ability to realize value from certain existing and future investments, including by limiting exit opportunities or causing us to favor buyers that we believe are less likely to require CFIUS review, even in circumstances where other buyers may offer better terms or more consideration.

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.

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 Shu Lun Pan Certified Public Accountants LLP, or 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, 2020, 2019 and 2018. BDO China, as an auditor of companies that are traded publicly in the United States and a firm registered with the 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 of 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.

We could be adversely affected if proposed legislation is adopted regarding improved access to audit and other information and audit inspections of accounting firms, including registered public accounting firms operating in the PRC such as our auditor, or if Nasdaq's proposals requiring additional criteria to companies operating in "restrictive markets" become effective.

BDO China, our independent registered public accounting firm, is not inspected by the PCAOB, as described in the preceding risk factor. ACM is one of 283 companies named in PCAOB's list of "Public Companies that are Audit Clients of PCAOB-Registered Firms from Non-U.S. Jurisdictions where the PCAOB is Denied Access to Conduct Inspections."

On April 21, 2020, the SEC and the PCAOB issued a joint statement highlighting the significant disclosure, financial reporting and other risks associated with emerging market investments, including the PCAOB's continued inability to inspect audit work papers of auditors in the PRC. This statement is the latest in a series of recent proposed actions:

- In December 2018 the SEC and the PCAOB issued a joint statement highlighting continued challenges faced by U.S. regulators in their oversight of financial statement audits of U.S.-listed reporting companies with significant operations in the PRC.

- In June 2019 a bipartisan group of lawmakers introduced bills in both houses of the U.S. Congress that, if passed, would have required the SEC to maintain a list of foreign reporting companies for which the PCAOB is not able to inspect or investigate an auditor report issued by a foreign public accounting firm. The proposed Ensuring Quality Information and Transparency for Abroad-Based Listings on our Exchanges Act, or EQUITABLE Act, would have prescribed increased disclosure requirements for these reporting companies and, beginning in 2025, provided for the delisting from U.S. stock exchanges of reporting companies included on the SEC’s list for three consecutive years.
- In May 2020 the U.S. Senate approved a bill entitled the “Holding Foreign Companies Accountable Act”, which, if also approved by the U.S. House of Representatives, would allow the SEC to delist the stocks of foreign companies listed on US exchanges that are audited by firms not allowed to be inspected by the PCAOB.
- In May 2020 Nasdaq requested approval by the SEC of proposals that would impact companies with businesses principally administered in jurisdictions defined as “restrictive markets,” which likely would encompass the PRC. These proposals contemplate, among other things, the application of more stringent listing criteria if a listed company’s auditor does not demonstrate a PCAOB inspection record (as is the case with our auditor), employee expertise and training, or geographic or other resources sufficient to perform the company’s audit satisfactorily. Examples of more stringent criteria that Nasdaq could apply include requiring: (a) higher levels of equity, assets, earnings or liquidity than are otherwise needed; (b) that any public offering to be underwritten on a firm commitment basis (involving more due diligence by the underwriter); and (c) the imposition of lock-up restrictions on directors and officers to allow market mechanisms to determine an appropriate price for shares before the insiders could sell. Alternatively, Nasdaq could deny continued listing to a company.

It remains unclear what further actions the SEC, the PCAOB or Nasdaq will take to address these issues and what impact those actions will have on US companies that have significant operations in the PRC and have securities listed on a U.S. stock exchange. Any such actions could materially affect our operations and stock price, including by resulting in our being de-listed from Nasdaq or being required to engage a new audit firm, which would require significant expense and management time.

Risks Related to Our STAR Market Listing

If we are unable to implement our strategy to expand our PRC operations by completing an initial public offering and listing on the STAR Market, our ability to strengthen our market position and operations in the PRC, including our ability to increase our revenues and augment our product line, could be materially impaired.

In June 2019 we announced plans to complete over the following three years the STAR Listing, which consists of a listing, of shares of ACM Shanghai on the Shanghai Stock Exchange’s STAR Market, and the STAR IPO, which would be a concurrent initial public offering of ACM Shanghai shares in the PRC. ACM Shanghai is our principal operating company and, prior to the STAR Listing process, was a wholly owned subsidiary of ACM Research. Following the STAR Listing and the STAR IPO, ACM Shanghai will be a majority owned subsidiary of ACM Research. We may not be able to complete the STAR Listing and the STAR IPO for a number of reasons, many of which are outside our control. ACM Shanghai must succeed in obtaining PRC governmental approvals required to permit the STAR Listing and the STAR IPO, and one or more of those approvals may be denied, or significantly delayed, by the PRC regulators for reasons outside our control or unknown to us. Similarly, the STAR Listing application may be denied or delayed by the Shanghai Stock Exchange in its discretion. See also “—Risks Related to the COVID-19 Outbreak—The COVID-19 outbreak could negatively impact our currently planned projects and investments in the PRC, including the STAR IPO.”

If we are unable to complete the STAR Listing and the STAR IPO, we may not otherwise be able to realize the advantages to our PRC operations contemplated by our business strategy, including improving our ability to market our products, building our brand in the PRC markets, assisting our sales efforts to new customers and encouraging additional purchases of our tools by existing customers. Because it may be more than three years before we know whether the STAR Listing and the STAR IPO will be completed, we may, in the interim, forego or postpone other alternative actions to strengthen our market position and operations in the PRC.

PRC companies are critical to the global semiconductor industry, and our current business is substantially concentrated in the PRC market. Our inability to build, or any delay in growing, our PRC-based operations over the next three years would materially and adversely limit our operations and operating results, including our revenue growth. In addition, during that time, the process underlying the STAR Listing and the STAR IPO could result in significant diversion of management time as well as substantial out-of-pocket costs, which could further impair our ability to expand our business.

Even if we complete the STAR Listing and the STAR IPO, we may not achieve the results contemplated by our business strategy and our strategy for growth in the PRC may not result in increases in the price of Class A common stock.

We cannot assure you that, even if the STAR Listing and the STAR IPO are completed, we will realize any or all of our anticipated benefits of the STAR Listing and the STAR IPO. Our completion of the STAR Listing and the STAR IPO may not have the anticipated effects of including the strengthening of our market position and operations in the PRC. If the STAR Listing and the STAR IPO are completed, ACM Shanghai will have broad discretion in the use of the proceeds from the initial sales of shares to investors and the proceeds from the STAR IPO, and it may not spend or invest those proceeds in a manner that results in our operating success or with which ACM Research stockholders agree. Our failure to successfully leverage the completion of the STAR Listing and the STAR IPO to expand our PRC business could result in a decrease in the price of the Class A common stock, and we cannot assure you that the success of ACM Shanghai will have an attendant positive effect on the price of the Class A common stock.

Completion of the STAR Listing and the STAR IPO may not occur until 2022 or later. In the interim, ACM Shanghai may require additional funding from ACM Research in order to proceed to augment its PRC operations, and we cannot give any assurance that such capital will be available from ACM Research at all in terms acceptable to us. Any such inability to obtain funds from ACM Research or other sources may impair the ability of ACM Shanghai to grow its operations, which could have a material adverse effect on our consolidated operating results and on the price of the Class A common stock.

ACM Shanghai's status as a publicly traded company that is controlled, but less than wholly owned, by ACM Research could have an adverse effect on us.

As the result of actions being taken in connection with the STAR Listing and the STAR IPO, ACM Shanghai will no longer be a wholly owned subsidiary of ACM Research, and the interests of ACM Shanghai may diverge from the interests of ACM Research and its other subsidiaries in the future. We may face conflicts of interest in managing, financing or engaging in transactions with ACM Shanghai, or allocating business opportunities between our subsidiaries, including future arrangements for operating subsidiaries other than ACM Shanghai to license and use our intellectual property. Substantially all of our intellectual property has been developed in the PRC and is owned by ACM Shanghai. As we expand our global operations through operating subsidiaries outside of the PRC, those operating subsidiaries may need to license intellectual property from ACM Shanghai in order to operate, and there can be no assurance that conflicts of interest will not preclude those operating subsidiaries from licensing the required intellectual property from ACM Shanghai on reasonable terms or at all.

ACM Research will retain majority ownership of ACM Shanghai after the STAR IPO, but ACM Shanghai will be managed by a separate board of directors and officers and those directors and officers will owe fiduciary duties to the various stakeholders of ACM Shanghai, including shareholders other than ACM Research. In the operation of ACM Shanghai's business, there may be situations that arise whereby the directors and officers of ACM Shanghai, in the exercise of their fiduciary duties, take actions that may be contrary to the best interests of ACM Research.

In the future, ACM Shanghai may issue options, restricted shares and other forms of share-based compensation to its directors, officers and employees, which could dilute ACM Research's ownership in ACM Shanghai. In addition, ACM Shanghai may engage in capital raising activities in the future that could further dilute ACM Research's ownership interest.

If the STAR Listing and the STAR IPO are completed, ACM Research and ACM Shanghai both will be public reporting companies but each will be subject to separate, and potentially inconsistent, accounting and disclosure requirements, which may lead to investor confusion or uncertainty that could cause decreased demand for, or fluctuations in the price of, one or both of the companies' publicly traded shares.

If ACM Shanghai completes the STAR Listing and the STAR IPO, it will be subject to accounting, disclosure and other regulatory requirements of the STAR Market. At the same time, ACM Research will remain subject to accounting, disclosure and other regulatory requirements of the SEC and the Nasdaq Global Market, or Nasdaq. As a result, ACM Research and ACM Shanghai periodically will disclose information simultaneously pursuant to differing laws and regulations. Even though substantially all of the operations of ACM Research are currently conducted through ACM Shanghai, the information disclosed by the two companies will differ, and may differ materially from time to time, due to the distinct, and potentially inconsistent, accounting standards applicable to the two companies and disclosure requirements imposed by securities regulatory authorities, as well as differences in language, culture and expression habit, in composition of investors in the United States and PRC, and in the capital markets of the United States and the PRC.

Differing disclosures could lead to confusion or uncertainty among investors in the publicly traded shares of one or both companies. Differences between the price of ACM Shanghai shares on the STAR Market and the price of ACM Research Class A common stock on Nasdaq could lead to increased volatility, as some investors seek to arbitrage price differences. Moreover, such volatility could be exacerbated by the fact that ACM Shanghai shares currently represent substantially all of the assets of ACM Research.

Risks Related to Our Intellectual Property and Data Security

Our success depends on our ability to protect our intellectual property, including our SAPS, TEBO, Tahoe, SFP and ECP 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, Tahoe, SFP and ECP 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, including the PRC, 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.

The significant majority of our intellectual property has been developed in the PRC and is owned by ACM Shanghai. Implementation and enforcement of intellectual property-related laws in the PRC has historically been lacking due primarily to ambiguities in PRC intellectual property law. Accordingly, protection of intellectual property and proprietary rights in the PRC may not be as effective as in the United States or other countries. As a result, third parties could illegally use the technologies and proprietary processes that we have developed and compete with us, which could negatively affect any competitive advantage we enjoy, dilute our brand and harm our operating results. Litigation may be necessary to enforce our intellectual property rights, and given the relative unpredictability of the PRC's legal system and potential difficulties enforcing a court judgment in the PRC, there is no guarantee litigation would result in an outcome favorable to us.

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.

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. Additionally, we face potential heightened cybersecurity risks during the COVID-19 pandemic as our level of dependence on our IT networks and related systems increases, stemming from employees working remotely, and the number of malware campaigns and phishing attacks preying on the uncertainties surrounding the COVID-19 pandemic increases. These heightened cybersecurity risks may increase our vulnerability to cyber-attacks and cause disruptions to our internal control procedures. 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.

Risks Related to the COVID-19 Outbreak

The outbreak of COVID-19, the coronavirus, continues both in the United States and globally, and related government and private sector responsive actions are adversely affecting our business operations.

We have set forth below key risks from the COVID-19 outbreak that we have identified or experienced to date. The situation continues to evolve, however, and it is impossible to predict the effect and ongoing impact of the COVID-19 outbreak on our business operations and results. While the quarantine, social distancing and other regulatory measures instituted or recommended in response to COVID-19 were expected to be temporary, such measures have remained in effect, and have changed, over the last year, and the duration of the business disruptions, and related financial impact, cannot be estimated at this time. The COVID-19 outbreak could ultimately reduce demand for our products and our customers' chips and have a material adverse impact on our business, operating results and financial condition.

Substantially all of our operations are located in areas impacted by the COVID-19 outbreak, and those operations have been, and may continue to be, adversely affected by the COVID-19 outbreak.

We conduct substantially all of our product development, manufacturing, support and services in the PRC, and those activities have been directly impacted by the COVID-19 outbreak and related restrictions on transportation and public appearances. In February 2020 our ACM Shanghai headquarters were closed for an additional six days beyond the normal Lunar New Year Holiday in accordance with Shanghai government restrictions related to the outbreak. We cannot assure you that further closures or reductions of our PRC operations or production may not be necessary in upcoming months as the result of business interruptions arising from protective measures being taken by the PRC and other governmental agencies or of other consequences of the COVID-19 outbreak.

Our corporate headquarters are located in San Mateo County in the San Francisco Bay Area. In order to attempt to mitigate the COVID-19 pandemic, in March 2020 (a) the State of California declared a state of emergency related to the spread of COVID-19, (b) the San Francisco Department of Public Health announced aggressive recommendations to reduce the spread of the disease, (c) the health officers of six San Francisco Bay Area counties, including San Mateo County, issued shelter-in-place orders, which (i) direct all individuals living in those counties to shelter at their places of residence (subject to limited exceptions), (ii) direct all businesses and governmental agencies to cease non-essential operations at physical locations in those counties, (iii) prohibit all non-essential gatherings of any number of individuals, and (iv) order cessation of all non-essential travel, and (d) the Governor of California and the State Public Health Officer and Director of the California Department of Public Health ordered all individuals living in the State of California to stay at their place of residence for an indefinite period of time (subject to limited exceptions). The effects of these types of actions in the future may negatively impact productivity, disrupt our business and delay timelines, the magnitude of which will depend, in part, on the length and severity of the restrictions and other limitations on our ability to conduct our business in the ordinary course.

The prolonged and broad-based shift to a remote working environment continues to create inherent productivity, connectivity, and oversight challenges and could affect our ability to enhance, develop and support existing products and services, detect and prevent spam and problematic content, hold product sales and marketing events, and generate new sales leads, among others. In addition, the changed environment under which we are operating could have an effect on our internal controls over financial reporting as well as our ability to meet a number of our compliance requirements in a timely or quality manner. Additional and/or extended, governmental lockdowns, restrictions or new regulations could significantly impact the ability of our employees and vendors to work productively. Governmental restrictions have been globally inconsistent and it remains unclear when a return to worksite locations or travel will be permitted or what restrictions will be in place in those environments. As we prepare to return our workforce in more locations back to the office in 2021, we may experience increased costs as we prepare our facilities for a safe return to work environment and experiment with hybrid work models, in addition to potential effects on our ability to compete effectively and maintain our corporate culture.

Extended periods of interruption to our corporate, development or manufacturing facilities due to the COVID-19 outbreak could cause us to lose revenue and market share, which would depress our financial performance and could be difficult to recapture. Our business may also be harmed if travel to or from the PRC or the United States continues to be restricted or inadvisable or if members of management and other employees are absent because they contract the coronavirus, they elect not to come to work due to the illness affecting others in our office or laboratory facilities, or they are subject to quarantines or other governmentally imposed restrictions.

Our global supply chain may be materially adversely impacted due to the COVID-19 outbreak.

We rely upon the facilities of our global suppliers with operations in the PRC, Japan, Taiwan and the United States to support our business. We source the substantial majority of our components from Asia. The outbreak has resulted in significant governmental measures in many countries being implemented to control the spread of COVID-19, including restrictions on manufacturing and the movement of employees both in and out of China and within many regions of the PRC. As a result of COVID-19 and the measures designed to contain its spread, our suppliers may not have the materials, capacity, or capability to supply our components according to our schedule and specifications. Further, there may be logistics issues, including our ability and our supply chain's ability to quickly ramp up production, and transportation demands that may cause further delays. If our suppliers' operations are curtailed, we may need to seek alternate sources of supply, which may be more expensive. Alternate sources may not be available or may result in delays in shipments to us from our supply chain and subsequently to our customers, each of which would affect our results of operations. While the disruptions and restrictions on the ability to travel, quarantines and temporary closures of the facilities of our suppliers, as well as general limitations on movement in the region, are expected to be temporary, the duration of the production and supply chain disruption, and related financial impact, cannot be estimated at this time. Should the production and distribution closures continue for an extended period of time, the impact on our supply chain could have a material adverse effect on our results of operations and cash flows. Business disruptions could also negatively affect the sources and availability of components and materials that are essential to the operation of our business. Moreover, our customers source a range of production equipment, supplies and services from other suppliers with operations around the world, and any reduction in supply capacity at those customers' factories due to the COVID-19 pandemic may reduce or even halt those customers' production and result in a decrease in the demand for our products.

The COVID-19 outbreak could negatively impact our currently planned projects and investments in the PRC, including the STAR IPO.

Our strategy includes a number of plans to support the growth of our core business. In June 2019 we began working toward the proposed STAR Listing and STAR IPO with respect to shares of ACM Shanghai, and in November 2019 ACM Shanghai entered into an agreement initiating a process intended to lead to our acquisition of land rights in the Lingang area of Shanghai where we can construct a new research and development center and factory. The extent to which COVID-19 impacts these projects will depend on future developments that are highly uncertain and cannot be predicted. If the disruptions posed by COVID-19 and related government measures, or other matters of global concern, continue for an extensive period of time, our ability to consummate one or both of these planned projects could be materially adversely affected.

In September 2019 ACM Shanghai entered into a partnership agreement for the purposes of engaging in equity venture capital investments in strategic emerging and high-tech industries with a focus on the semiconductor industry. We cannot predict the ongoing effect that the COVID-19 outbreak in the PRC will have on companies that would otherwise be desirable investments for the partnership, and the outbreak or related governmental actions could significantly impair the ability of the partnership to identify desirable investments or our ability to realize the anticipated benefits of the partnership.

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.

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. During the quarter ended December 31, 2020, such a suit was filed against our company and certain members of our management team as described in "Item 3. Legal Proceedings." Such litigation could result in substantial costs and a diversion of our management's attention and resources.

No company with stock publicly traded in the United States has effected a STAR Market listing of stock of a PRC-based subsidiary, and it is therefore difficult to predict the effect of the proposed STAR Listing and STAR IPO on the Class A common stock.

The China Securities Regulatory Commission initially launched the STAR Market in June 2019 and trading on the Market began in July 2019. We believe we are the first publicly traded U.S. company to propose an initial public offering of shares of a PRC subsidiary on the STAR Market. As a result, no assurance can be given regarding the effect of the STAR Listing and the STAR IPO on the market price of the Class A common stock. The market price of Class A common stock may be volatile or may decline, for reasons other than the risk and uncertainties described above, as the result of investor negativity or uncertainty with respect to the impact of the proposed STAR Listing and STAR IPO.

ACM Research stockholders were not entitled to purchase ACM Shanghai shares in the pre-STAR Listing placement, and they may have limited opportunities to purchase ACM Shanghai shares even if the STAR Listing and the STAR IPO are completed. Investors may elect to invest in our business and operations by purchasing ACM Shanghai shares in the STAR IPO or on the STAR Market rather than purchasing ACM Research Class A common stock, and that reduction in demand could lead to a decrease in the market price for the Class A common stock.

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 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 February 23, 2021, stockholders who hold shares of Class B common stock, who consist principally of our executive officers, employees, directors and their respective affiliates, collectively held 67.7% 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.

Because of the market capitalization achieved by Class A common stock during October 2020, our charter no longer contemplates circumstances in which all of the shares of Class B common stock will mandatorily convert into Class A common stock. Instead, all of the Class B common stock generally will convert into Class A common stock only upon the election of the holders of a majority of the then-outstanding shares of Class B common stock, and specific shares of Class B common stock will convert into Class A common stock upon future transfers by the holders of those shares. The potential 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, including a "large accelerated filer."

The experience of the current members of our management team in managing a publicly traded company, in particular a company that is a "large accelerated filer," 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 "large accelerated filer" 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.

Effective as of December 31, 2020, we are a large accelerated filer, which will increase our costs and demands on management.

As a result of our public float (the market value of Class A common shares held by non-affiliates) as of June 30, 2020, we have become a large accelerated filer as of December 31, 2020 and therefore no longer qualify as an "emerging growth company," as defined in the JOBS Act. As a large accelerated filer, we are subject to certain disclosure and compliance requirements that apply to other public companies but did not previously apply to us due to our status as an emerging growth company. These requirements include, but are not limited to:

- the requirement that our independent registered public accounting firm attest to the effectiveness of our internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act of 2002;
- compliance 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;
- the requirement that we provide full and more detailed disclosures regarding executive compensation; and
- the requirement that we hold a non-binding advisory vote on executive compensation and obtain stockholder approval of any golden parachute payments not previously approved.

We expect that compliance with the additional requirements of being a "large accelerated filer" will increase our legal and financial compliance costs and cause management and other personnel to divert attention from operational and other business matters to devote substantial time to public company reporting requirements. In addition, if we are not able to comply with changing requirements in a timely manner, the market price of Class A common stock could decline and we could be subject to sanctions or investigations by the stock exchange on which Class A common stock is listed, the SEC, or other regulatory authorities, which would require additional financial and management resources.

We will incur increased costs and demands upon management as a result of complying with the laws and regulations affecting public companies, particularly as 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," effective as of December 31, 2020, 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, required 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.

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.

Short sellers of our stock may be manipulative and may drive down the market price of our Class A common stock.

Short selling is the practice of selling securities that a seller does not own but rather has borrowed, or intends to borrow, from a third party with the intention of buying identical securities at a later date to return to the lender. A short seller hopes to profit from a decline in the value of the securities between the sale of the borrowed securities and the purchase of the replacement shares, as the short seller expects to pay less in that purchase than it received in the sale. As it is in the short seller's interest for the price of the stock to decline, some short sellers publish, or arrange for the publication of, opinions or characterizations regarding the relevant issuer, its business prospects and similar matters calculated to or which may create negative market momentum, which may permit them to obtain profits for themselves as a result of selling the securities short. The use of the Internet, social media, and blogging have allowed short sellers to publicly attack a company's credibility, strategy and veracity by means of so-called "research reports" that mimic the type of investment analysis performed by legitimate securities research analysts. Issuers with limited trading volumes or substantial retail stockholder bases can be particularly susceptible to higher volatility levels, and can be particularly vulnerable to such short attacks.

Short seller publications are not regulated by any governmental or self-regulatory organization or any other official authority in the United States and are not subject to the certification requirements imposed by the SEC in Regulation Analyst Certification. Accordingly, the opinions they express may be based on distortions of actual facts or, in some cases, outright fabrications. In light of the limited risks involved in publishing such information, and the significant profits that can be made from running successful short attacks, short sellers will likely continue to issue such reports. Short-seller publications may create the appearance or perception of wrongdoing, even when they are not substantiated, and may therefore affect the reputation or perception of our company and management.

While we intend to strongly defend our public filings against any such short seller attacks, in many situations we could be constrained, for example, by principles of freedom of speech, applicable state law or issues of commercial confidentiality, in the manner in which we are able to proceed against the relevant short seller.

Such short-seller attacks have caused, and may cause in the future, temporary or possibly long term, declines in the market price of Class A common stock and possible litigation initiated against us. During the quarter ended December 31, 2020, such a short-seller publication was issued with respect to our company and certain members of the management team, and has been referenced by the plaintiffs in the litigation described in "Item 3. Legal Proceedings."

General

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. The frequency and intensity of severe weather events are reportedly increasing throughout the world as part of broader climate changes. Global weather pattern changes may pose long-term risks of physical impacts to our business. 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.

Item 2. Properties

We have occupied our current corporate headquarters in Fremont, California, since February 2008, under a lease that, after an amendment in February 2021, now extends through March 2023.

We conduct research and development, service support operations, and a portion of our manufacturing at ACM Shanghai's 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 and our lease currently extends 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 100,000 square feet are allocated for production. The lease term expires on January 15, 2022.

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

In May 2020 ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc. or Shengwei, entered into an agreement for a 50-year land use right in the Lingang region of Shanghai. In July 2020 Shengwei began a multi-year construction project for a new development and production center, with the objective of commencing production at the new facility in late 2022. The planned 1,000,000 square foot facility will incorporate state-of-the-art manufacturing systems and automation technologies, and will provide the floor space to support significantly more production capacity and related research and development activities when fully-staffed and supplied.

In connection with the Lingang facility project, on October 28, 2020, a wholly owned subsidiary of Shengwei entered into Shanghai Public Rental Housing Overall Pre-Sale Contracts with Shanghai Lingang Industrial Zone Public Rental Housing Construction and Operation Management Co., Ltd. for an aggregate price to us of approximately \$40 million. Under these contracts, Shengwei's subsidiary will receive apartment units and corresponding land use rights before October 31, 2021 as part of a pilot project of public rental housing in the "rent before sale" park in the Lingang Industrial Zone. The contracts stipulate that, for a ten-year term, Shengwei's subsidiary will be obligated to manage the apartment units for public rental use in accordance with public rental housing standards and must rent the apartment units to employees of ACM Shanghai and its subsidiaries who work in the Lingang Industrial Zone. After that ten-year period expires, Shengwei's subsidiary may use the apartment units as stock of commercial housing and may sell them separately in sets.

Item 3. Legal Proceedings

Securities Class Action Lawsuit

On December 21, 2020, a putative class action lawsuit against our company and three of our current executive officers was filed in the U.S. District Court for the Northern District of California under the caption *Kain v. ACM Research, Inc., et al.*, No. 3:20-cv-09241, which we refer to as the Securities Class Action. The complaint asserts claims under Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder, and seeks monetary damages in an unspecified amount as well as costs and expenses incurred in the litigation. The court has not yet appointed a lead plaintiff. Our management believes the claims are without merit and intend to vigorously defend this litigation. We are currently unable to predict the outcome of this lawsuit and therefore cannot determine the likelihood of loss nor estimate a range of possible loss.

From time to time we may become involved in other legal proceedings or may be subject to claims arising in the ordinary course of our business. Although the results of these proceedings 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. The Class B common stock is not listed or traded on any stock exchange.

Holders of Common Stock

As of February 23, 2021, there were 16,967,095 shares of Class A common stock outstanding held of record by 47 stockholders. 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.

As of February 23, 2021, there were 1,775,939 shares of Class B common stock held of record by 24 stockholders.

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.

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 2021 Annual Meeting of Stockholders and is incorporated by reference herein.

Sales of Unregistered Securities

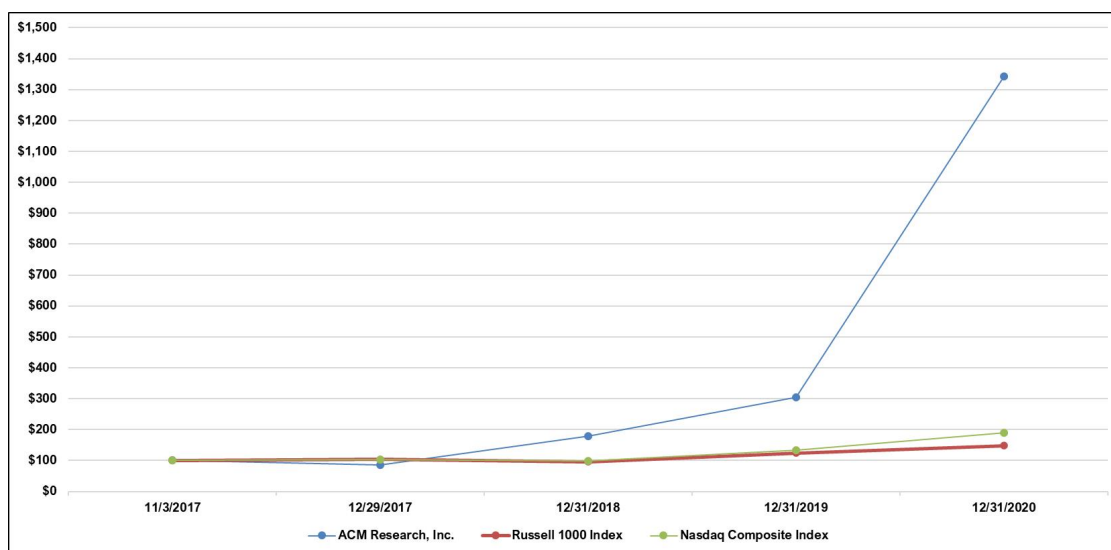
In 2020, we issued, pursuant to the exercise of stock options at per share exercise prices ranging from \$0.75 to \$1.50 per share, an aggregate of 323,667 shares of Class A common stock that were not registered under the Securities Act of 1933.

The offer and sale of those shares were exempt from registration under the Securities Act of 1933 by virtue of Section 4(a)(2) thereof (or Regulation D promulgated thereunder) because they did not involve a public offering. The recipients of the shares 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 recorded with respect to the shares. The recipients of the shares were accredited investors under Rule 501 of Regulation D.

Performance Graph

The following graph compares the total return of an investment of \$100 in cash at the closing price of November 3, 2017 through December 31, 2020 for (1) our common stock, (2) the Russell 1000 index, and (3) the Nasdaq Composite Index. All values assume reinvestment of all dividends. Stockholder returns over the indicated period are based on historical data and are not necessarily indicative of future stockholder returns.

**COMPARISON OF 3 YEAR CUMULATIVE TOTAL RETURN
Among ACM Research, Inc., the Nasdaq Index, and the Russell 1000 Index**



Company Name/Index	Base	Years Ending			
	Period	11/3/2017	12/29/2017	12/31/2018	12/31/2019
ACM Research, Inc.	100	86.78	179.83	304.96	1,342.98
Russell 1000 Index	100	103.34	96.54	124.43	147.91
Nasdaq Composite Index	100	102.05	98.09	132.64	190.53

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 3 of this report. Please read "Item 1A. 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 wet-cleaning and other front-end processing 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.

We are focused on building a strategic portfolio of intellectual property to support and protect our key innovations. Our tools have 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;
- *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; and
- *Electro-Chemical Plating, or ECP, technology for advanced metal plating*, which includes Ultra ECP ap, or Advanced Packaging, technology for back-end assembly processes, Ultra ECP 3d for through-silicon-via, or tsv, and Ultra ECP map, or Multi-Anode Partial Plating, technology for front-end wafer fabrication processes.

We conduct a substantial majority of our product development, manufacturing, support and services in the PRC, with additional product development and subsystem production in South Korea. Substantially all of our tools are built to order at our manufacturing facilities in the Pudong region of Shanghai, which facilities now encompass a total of 136,000 square feet of floor space for production capacity, with 50,000 square feet having been added in the second quarter of 2020 through an expansion of our second facility in the Pudong region of Shanghai. In May 2020 ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc., entered into an agreement for a land use right in the Lingang region of Shanghai. In July 2020 Shengwei Research (Shanghai), Inc. began a multi-year construction project for a new 1,000,000 square foot development and production center. that will incorporate state-of-the-art manufacturing systems and automation technologies, and will provide the floor space to support significantly increased production capacity and related research and development activities. See "Item 2. Properties" of Part I of this report.

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, Tahoe and ECP technologies, and enable us to design innovative products and solutions to address their needs.

Recent Developments

STAR Market Listing and IPO

In June 2019 we announced our intention to complete:

- a listing, which we refer to as the STAR Listing, of shares of ACM Shanghai on the Shanghai Stock Exchange's Sci-Tech innovAtion boARd, known as the STAR Market; and
- a concurrent initial public offering, which we refer to as the STAR IPO, of ACM Shanghai shares in the PRC, at a pre-offering valuation of not less than RMB 5.15 billion (\$747.1 million).

We believe the STAR Listing will help us scale our business in mainland PRC, as we continue to seek to broaden our markets in Europe, Japan, South Korea, Taiwan and the United States. Our global headquarters will continue to be located in Fremont, California, and we are committed to maintaining the listing of Class A common stock on the Nasdaq Global Market.

To qualify for the STAR Listing, ACM Shanghai was required to have multiple independent stockholders in the PRC. In June and November 2019, ACM Shanghai entered into private placement agreements with fifteen investors pursuant to which the investors purchased ACM Shanghai shares for a total of RMB 416.1 million (\$59.7 million as of the investment dates). As of December 31, 2020, 91.7% of the outstanding shares of ACM Shanghai were owned by ACM Research and 8.3% were owned by the private placement investors.

Upon the submission of application documents by ACM Shanghai for the STAR Listing and STAR IPO to the Shanghai Stock Exchange during the second quarter of 2020, the shares of ACM Shanghai issued to the private placement investors were reclassified from redeemable non-controlling interests to non-controlling interests. Upon the termination of such redemption feature, we released the aggregate proceeds of the private placement funding from reserved cash, which we previously had voluntarily imposed in light of a potential redemption.

On September 30, 2020, the application was approved by the Listing Committee of the STAR Market. The Listing Committee subsequently determined to reassess the approval application in light of allegations regarding our business and operations that were contained in a report issued by J Capital Research USA Ltd. on October 8, 2020 and an ensuing putative class action lawsuit against our company and three of our current executive officers filed on December 21, 2020 (See “Item 3. Legal Proceedings” of Part I of this report). Pending the completion of the Listing Committee’s reassessment, the STAR Listing remains subject to submission of formal registration and to review and approval by the China Securities Regulatory Commission.

ACM Shanghai currently proposes to offer up to ten percent of its shares in the STAR IPO. The net proceeds of the STAR IPO are expected to be used to fund:

- the land lease for, and construction of, ACM Shanghai’s proposed development and production center in the Lingang region of Shanghai;
- product development to upgrade and expand our process equipment targeted at more advanced process nodes, including technical improvement and development of TEBO megasonic cleaning equipment, Tahoe single wafer wet bench combined cleaning equipment, front-end brush scrubbing equipment, auto bench cleaning equipment, front end process electroplating equipment, Stress Free Polish equipment and vertical furnace equipment, additional new products to expand our product portfolio; and
- working capital.

COVID–19 Outbreak

Following its initial outbreak in December 2019, COVID–19, or the coronavirus, spread across the PRC, the United States and globally. The COVID–19 outbreak affected our business and operating results for the first quarter of 2020. Since that time, our personnel have been largely unable to travel between our offices in the United States and our facilities in the PRC, which may impact our ability to effectively operate our company and to oversee our operations. The COVID–19 situation continues to evolve, and it is impossible for us to predict the effect and ultimate impact of the COVID–19 outbreak on our business operations and results. While the quarantine, social distancing and other regulatory measures instituted or recommended in response to COVID–19 are expected to be temporary, the duration of the business disruptions, and related financial impact, of the outbreak cannot be estimated at this time. For an explanation of some of the risks we potentially face, please read carefully the information provided under “Item 1A. Risk Factors—Risks Related to the COVID–19 Outbreak,” of part I of this report.

The following summary reflects our expectations and estimates based on information known to us as of the date of this filing:

- *Operations:* We conduct substantially all of our product development, manufacturing, support and services in the PRC, and those activities have been directly impacted by the COVID–19 outbreak and related restrictions on transportation and public appearances. In February 2020 our ACM Shanghai headquarters were closed for an additional six days beyond the normal Lunar New Year Holiday in accordance with Shanghai government restrictions related to the outbreak. We took steps before and after the Lunar New Year to ensure no employees took unreasonable risks to rush back to work. Currently substantially all of our staff have returned to work at both of our Shanghai facilities. To date we have not experienced absenteeism of management or other key employees, other than certain of our executive officers being delayed in traveling back to the PRC after working from our California office in February. Our corporate headquarters are located in Alameda County in the San Francisco Bay Area and are the subject of a number of state and county public health directives and orders. These actions have not negatively impacted our business to date, however, because of the limited number of employees at our headquarters and the nature of the work they generally perform.

- **Customers:** Our customers' business operations have been, and are continuing to be, subject to business interruptions arising from the COVID-19 outbreak. Historically a majority of our revenue from sales of single-wafer wet cleaning equipment for front-end manufacturing has been derived from customers located in the PRC and surrounding areas that have been impacted by COVID-19. Three customers that accounted for 75.8% of our revenue in 2020, 73.8% in 2019 and 87.6% of our revenue in 2018 are based in the PRC and South Korea. One of those customers, Yangtze Memory Technologies Co., Ltd. — which accounted for 26.8% of our 2020 revenue, 27.5% of our 2019 revenue and 39.6% of our 2018 revenue — is based in Wuhan. While Yangtze Memory Technologies Co., Ltd. and other key customers continued to operate their fabrication facilities without interruption during and after the first quarter of 2020, they were forced to restrict access of service personnel and deliveries to and from their facilities. A portion of the shipments we previously had expected to deliver in the first quarter of 2020 were postponed due to these factors, and were subsequently delivered in the second quarter of 2020.
- **Suppliers:** Our global supply chain includes components sourced from the PRC, Japan, Taiwan, the United States and Europe. While the COVID-19 outbreak has resulted in significant governmental measures being implemented to control the spread of COVID-19 around the world, to date we have not experienced material issues with our supply chain. As with our customers, we continue to be in close contact with our key suppliers to help ensure we are able to identify any potential supply issues that may arise.
- **Projects:** Our strategy includes a number of plans to support the growth of our core business, including the STAR Listing and STAR IPO with respect to shares of ACM Shanghai described above as well as ACM Shanghai's recent acquisition of a land use right in the Lingang area of Shanghai where we began construction of a new research and development center and factory in July 2020. The extent to which COVID-19 impacts these projects will depend on future developments that are highly uncertain, but to date, the timing of these ongoing projects has not been delayed or disrupted by COVID-19 or related government measures.

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 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. In some cases, we do not receive any payment on first-time purchases until the tool is accepted. As a result, we may spend more than \$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 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 production 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."

Substantially all of our sales in 2020, 2019 and 2018 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 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 standard warranty coverage periods, which for sales to date have extended from 12 to 36 months as described under "—Critical Accounting 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 2020 and 2019, we received payments for parts and labor for service activities provided from time to time, but as of December 31, 2020 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 44.4% in 2020, 47.1% in 2019 and 46.2% in 2018. Gross margin varies 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 the 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 absolute dollar amount of our operating expenses, as we invest to support the anticipated growth of our customer base and the continued development of proprietary technologies.

Sales and Marketing

Sales and marketing expense accounted for 10.7% of our revenue in 2020, 11.1% of our revenue in 2019 and 12.9% of our revenue in 2018. 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 12.2% of our revenue in 2020, 12.0% of our revenue in 2019 and 13.9% of our revenue in 2018. 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 13% and 15% 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 7.8% of our revenue in 2020, 7.5% of our revenue in 2019 and 10.7% of our revenue in 2018. 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.

Stock-Based Compensation Expense

We grant stock options to employees and non-employee consultants and directors, and we account for those stock-based awards in accordance with ASC Topic 718, *Compensation—Stock Compensation*.

- Stock-based awards granted to employees and non-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 service function of the employee or non-employee.
- We also grant discounts to employees when they subscribe for the new shares of ACM Shanghai, and we account for those stock-based awards in accordance with Accounting Standards Codification, or ASC, Topic 718, *Compensation—Stock Compensation*

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

	Year Ended December 31,		
	2020	2019	2018
Stock-Based Compensation Expense:			
Cost of revenue	\$ 175	\$ 250	\$ 71
Sales and marketing expense	1,199	328	120
Research and development expense	763	1,093	255
General and administrative expense	3,491	1,901	2,917
	<u>\$ 5,628</u>	<u>\$ 3,572</u>	<u>\$ 3,363</u>

We recognized stock-based compensation expense to employees of \$5.2 million in 2020, \$2.3 million in 2019 and \$0.7 million in 2018. As of December 31, 2020, 2019 and 2018, we had \$8.7 million, \$4.7 million and \$2.4 million, respectively, of total unrecognized employee stock-based compensation expense, net of estimated forfeitures, related to unvested stock-based awards. These are expected to be recognized over a weighted-average period of 1.89 years, 1.47 years and 1.62 years, respectively.

We recognized stock-based compensation expense to non-employees of \$0.4 million in 2020, \$1.3 million in 2019 and \$2.7 million in 2018.

Expiration of Potential Market Cap-Based Automatic Conversion of Class B Common Stock

We have a dual class structure of common stock, with Class A common stock having one vote per share and Class B common stock having twenty votes per share. Class B common stock is convertible into Class A common stock in circumstances specified in our restated charter. The terms of our restated charter contemplate that all outstanding shares of Class B common stock will convert automatically into shares of Class A common stock, on a one for one basis, upon the first December 31 occurring in or after 2022 as of which the “October Market Cap” for the immediately preceding month of October exceeds \$1.0 billion, *provided* that no such automatic conversion will ever occur if the October Market Cap for the month of October in any year from 2018 through 2021 exceeds \$1.0 billion. For these purposes, “October Market Cap” for a specified month of October is equal to (a) the average of the daily volume weighted average trading prices of Class A common stock for each of the days in such month of October multiplied by (b) the number of shares of common stock outstanding on the last trading day of such month of October.

The October Market Cap for October 2020 was \$1.2 billion. As a result, no automatic conversion of Class B common stock into Class A common stock will ever occur under the above-described restated charter provisions.

Under the restated charter, all outstanding shares of Class B common stock continue to be subject to automatic conversion into shares of Class A common stock, on a one for one basis, upon the election of the holders of a majority of the then-outstanding shares of Class B common stock. In addition, each outstanding share of Class B common stock continues to be convertible into one share of Class A common stock (a) at any time, at the option of the holder, or (b) upon any transfer of such share of Class B common stock, whether or not for value, except for certain transfers described in the restated charter, including transfers to family members, trusts solely for the benefit of the stockholder or their family members, and partnerships, corporations, and other entities exclusively owned by the stockholder or their family members.

Holders of Class B common stock, who consist principally of our executive officers, employees, directors and their respective affiliates, collectively will continue to control a majority of the combined voting power of common stock and therefore be able to control all matters submitted to our stockholders for approval for the foreseeable future. Please read carefully “Item 1A. Risk Factors—Risks Related to Ownership of Class A Common Stock—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.”

PRC Government Research and Development Funding

ACM Shanghai has received six special government grants from the PRC's Ministry of Science and Technology, the Shanghai Municipal Commission of Economy and Information, and the Shanghai Science and Technology Committee. 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. The fifth grant was made in 2020, and relates to the development of Tahoe single bench cleaning technologies. The sixth grant was made in 2020, and relates to the development of backside cleaning technologies. These governmental authorities provide the majority of the funding, although ACM Shanghai is also required to invest certain amounts in the projects.

The 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 recorded as reductions of those expenses in the periods in which the current expenses are recorded. For the years ended December 31, 2020, 2019 and 2018, related government subsidies recognized as reductions of relevant expenses in the consolidated statements of operations and comprehensive income were \$2.7 million, \$3.2 million and \$1.5 million, 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, 2020, 2019 and 2018, related government subsidies recognized as other income in the consolidated statements of operations and comprehensive income were \$149,000, \$147,000 and \$144,000, respectively.

Unearned government subsidies received are deferred for recognition and recorded as other long-term liabilities (see note 13 in the Notes to Consolidated Financial Statements included herein under "Item 8. Financial Statements and Supplementary Data.") in the balance sheet until the criteria for such recognition are satisfied.

Net Income Attributable to Non-Controlling Interests and Redeemable Non-Controlling Interests

As described above under "—Recent Developments—STAR Market Listing and IPO", in 2019, ACM Shanghai sold a total number of shares representing 8.3% of its outstanding ACM Shanghai shares. ACM Research continues to hold the remaining 91.7% of ACM Shanghai's outstanding shares. During the second quarter of 2020, the redemption feature of the private placement funding terminated and the aggregate proceeds of the funding were reclassified from redeemable non-controlling interests to non-controlling interests. As a result, we reflect, as net income attributable to non-controlling interests and redeemable non-controlling interests, the portion of our net income allocable to the minority holders of ACM Shanghai shares.

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 a 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 totaled \$182 million for 2020, \$115 million for 2019 and \$95 million for 2018.

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, 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, the most directly comparable GAAP financial measure, to adjusted EBITDA:

	Year Ended December 31,		
	2020	2019	2018
	<i>(in thousands)</i>		
Adjusted EBITDA Data:			
Net Income	\$ 21,677	\$ 19,458	\$ 6,574
Interest expense, net	85	412	469
Income tax expense (benefit)	(2,382)	(518)	806
Depreciation and amortization	1,055	788	417
Stock based compensation	5,628	3,572	3,363
Change in fair value of financial liability	11,964	-	-
Unrealized gain on trading securities	(12,574)	-	-
Adjusted EBITDA	<u>\$ 25,453</u>	<u>\$ 23,712</u>	<u>\$ 11,629</u>

Adjusted EBITDA was \$25.5 million in 2020, as compared to \$23.7 million in 2019 and \$11.6 million in 2018. The increase of \$1.7 million from 2019 to 2020 reflected an increase of \$2.2 million in net income, and an increase of \$2.1 million of stock-based compensation, offset by a \$1.9 million higher income tax benefit and the offsetting impact of change in fair value of financial liability and unrealized gain on trading securities. The increase of \$12.1 million from 2018 to 2019 reflected principally an increase of \$12.9 million in net income, a \$0.4 million increase in depreciation and amortization, and a \$0.2 million increase in stock-based compensation, partly offset by a \$1.3 million decrease in income tax expense (benefit).

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 (used in) operating activities, the most directly comparable GAAP financial measure, to free cash flow:

	Year Ended December 31,		
	2020	2019	2018
	<i>(in thousands)</i>		
Free Cash Flow Data:			
Net cash used (provided by) in operating activities	\$ (13,547)	\$ 9,403	\$ 6,909
Purchase property and equipment	(5,211)	(971)	(1,830)
Purchase of intangible assets	(324)	(154)	(241)
Purchase of land-use-right	(9,744)	-	-
Prepayment for property	(40,206)	-	-
Purchase of trading securities	(15,020)	-	-
Free cash flow	<u>\$ (84,052)</u>	<u>\$ 8,278</u>	<u>\$ 4,838</u>

Free cash flow in 2020 declined by \$92.3 million as compared to 2019, due to a prepayment for property of \$40.2 million, a net decline of \$23.0 million of cash from operations, \$15.0 million purchase of trading securities, \$9.7 million purchase of land-use right, and a \$4.2 million increase in purchase of property and equipment and intangible assets. Free cash flow in 2019, as compared to 2018, reflected the factors driving net cash provided by operating activities, principally increase in net income, offset by an increase in accounts receivable, inventory and deferred taxes, and a decrease in accounts payable. 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,								
	2020			2019			2018		
	Actual (GAAP)	SBC	Adjusted (Non- GAAP)	Actual (GAAP)	SBC	Adjusted (Non- GAAP)	Actual (GAAP)	SBC	Adjusted (Non- GAAP)
	<i>(in thousands)</i>								
Revenue	\$ 156,624	\$ -	\$ 156,624	\$ 107,524	\$ -	\$ 107,524	\$ 74,643	\$ -	\$ 74,643
Cost of revenue	(87,025)	(175)	(86,850)	(56,870)	(250)	(56,620)	(40,194)	(71)	(40,123)
Gross profit	69,599	(175)	69,774	50,654	(250)	50,904	34,449	(71)	34,520
Operating expenses:									
Sales and marketing	(16,773)	(1,199)	(15,574)	(11,902)	(328)	(11,574)	(9,611)	(120)	(9,491)
Research and development	(19,119)	(763)	(18,356)	(12,900)	(1,093)	(11,807)	(10,380)	(255)	(10,125)
General and administrative	(12,215)	(3,491)	(8,724)	(8,061)	(1,901)	(6,160)	(7,987)	(2,917)	(5,070)
Income (loss) from operations	21,492	(5,628)	27,120	17,791	(3,572)	21,363	6,471	(3,363)	9,834

Adjusted operating income in 2020, as compared to 2019 reflected increases in operating income of \$3.7 million and stock-based compensation of \$2.0 million. Adjusted operating income in 2019, as compared to 2018 reflected increases in operating income of \$11.5 million and stock-based compensation of \$0.2 million.

Critical Accounting Policies and Estimates

In preparing our consolidated financial statements in conformity with GAAP, we make assumptions, judgments and estimates in applying our accounting policies that can have a significant impact on our revenue, operating income and net income, as well as on the value of certain assets and liabilities on our consolidated balance sheets. We base our assumptions, judgments and estimates on historical experience and various other factors that we believe to be reasonable under the circumstances. At least quarterly, we evaluate our assumptions, judgments and estimates and make changes as deemed necessary. Actual results could differ materially from these estimates under different assumptions or conditions.

We believe that the assumptions, judgments and estimates involved in the accounting for the following accounting policies have the greatest potential impact on our consolidated financial statement, and we therefore consider these to be our critical accounting estimates. For information on our significant accounting policies, see Note 2 in the notes to consolidated financial statements.

Revenue Recognition

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 ASC Topic 606, *Revenue from Contracts with Customers*:

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.

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. These costs are recorded within sales and marketing expenses.

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-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 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.

- We use 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.

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, 2020 and 2019. 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. We had an inventory reserve of \$1.1 million at December 31, 2020 and had no inventory reserve at December 31, 2019.

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. No allowance for doubtful accounts was considered necessary at December 31, 2020 or 2019.

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 2020 and 2019.

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, 2020 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.

Warranty

We have provided standard 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. As of December 31, 2020 and 2019, we had accrued \$4.0 million and \$2.8 million, respectively, in liability contingency for potential warranty claims.

Financial Liability Carried at Fair Value

As described in note 16 in the Notes to Consolidated Financial Statements, in preparation for the STAR IPO we entered into two agreements with Shengxin (Shanghai) Management Consulting Limited Partnership, or SMC, relating to outstanding obligations for which we had agreed to deliver certain consideration. We accounted for this consideration as a financial liability and applied fair value option methodology to measure the consideration in accordance with ASC 825-10-15-4a. On July 29, 2020 we entered into an amended agreement with SMC under which, in settlement of the financial liability, we issued to SMC a warrant to purchase shares of Class A common stock. The financial liability was remeasured to fair value as of July 29, 2020 and was retired upon issuance of the warrant. The warrant was initially measured at fair value at the issuance date and classified as equity permanently in accordance with ASC Topic 815, *Derivatives and Hedging*. Estimates related to this item required significant judgment, and a change in the estimates could have a material effect on our results of operations during the periods involved.

Recent Accounting Pronouncements

For a discussion of recent accounting pronouncements impacting our company, see note 2 in the Notes to Consolidated Financial Statements included 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,		
	2020	2019	2018
Revenue	100.0%	100.0%	100.0%
Cost of revenue	55.6	52.9	53.8
Gross margin	44.4	47.1	46.2
Operating expenses:			
Sales and marketing	10.7	11.1	12.9
Research and development	12.2	12.0	13.9
General and administrative	7.8	7.5	10.7
Total operating expenses, net	30.7	30.6	37.5
Income from operations	13.7	16.5	8.7
Interest income (expense), net	(0.1)	(0.4)	(0.6)
Change in fair value of financial liability	(7.6)	-	-
Unrealized gain on trading securities	8.0	-	-
Other income (expense), net	(2.2)	1.3	1.7
Equity income in net income of affiliates	0.4	0.2	0.2
Income before income taxes	12.3	17.6	9.9
Income tax benefit (expense)	1.5	0.5	(1.1)
Net income	13.8	18.1	8.8
Less: Net income attributable to non-controlling interests and redeemable non-controlling interests	1.8	0.4	-
Net income attributable to ACM Research, Inc.	12.0%	17.7%	8.8%

Comparison of Year Ended December 31, 2020, 2019 and 2018

Revenue

	Year Ended December 31,			% Change 2020 v 2019	% Change 2019 v 2018
	2020	2019	2018		
	(in thousands)				
Revenue	\$ 156,624	\$ 107,524	\$ 74,643	45.7%	44.1%

	Year Ended December 31,		
	2020	2019	2018
Single Wafer Cleaning, Tahoe and Semi-Critical Cleaning Equipment	131,248	90,501	68,341
ECP (front-end and packaging), Furnace and Other Technologies	13,343	6,900	-
Advanced Packaging (excluding ECP), Services & Spares	12,033	10,124	6,302
Total Revenue By Product Category	156,624	107,524	74,643
Wet cleaning and other front-end processing tools	136,317	90,935	68,366
Advanced packaging, other back-end processing tools, services and spares	20,307	16,590	6,277
Total Revenue Front-end and Back-End	156,624	107,524	74,643

Revenue for 2020 compared to 2019 increased by \$49.1 million. The increase was due to a \$45.4 million increase in revenue from wet cleaning and other front-end processing tools, and a \$3.7 million increase in revenue from advanced packaging and other back-end processing tools, services and spares. Revenue for 2019 compared to 2018 increased by \$32.9 million. The increase was due to a \$22.4 million increase in revenue from wet cleaning and other front-end processing tools, and a \$10.5 million increase in revenue from advanced packaging, other back-end processing tools, services and spares.

Cost of Revenue and Gross Margin

	Year Ended December 31,			% Change 2020 v 2019	% Change 2019 v 2018
	2020	2019	2018		
	(in thousands)				
Cost of revenue	\$ 87,025	\$ 56,870	\$ 40,194	53.0%	41.5%
Gross profit	69,599	50,654	34,449	37.4%	47.0%
Gross margin	44.4%	47.1%	46.2%	-2.7	0.9

Cost of revenue increased \$30.1 million, and gross profit increased \$18.9 million, for 2020 compared to 2019, reflecting the growth in sales at lower gross margin levels. Gross margin decreased by 267 basis points, primarily due to differences in product mix in 2020 versus 2019. Cost of revenue increased \$16.7 million, and gross profit increased \$16.2 million, for 2019 compared to 2018, reflecting the growth in sales. Gross margin increased by 96 basis points, primarily due to differences in product mix in 2019 versus 2018.

Operating Expenses

	Year Ended December 31,			% Change 2020 v 2019	% Change 2019 v 2018
	2020	2019	2018		
	<i>(in thousands)</i>				
Sales and marketing expense	\$ 16,773	\$ 11,902	\$ 9,611	40.9%	23.8%
Research and development expense	19,119	12,900	10,380	48.2%	24.3%
General and administrative expense	12,215	8,061	7,987	51.5%	0.9%
Total operating expenses	<u>\$ 48,107</u>	<u>\$ 32,863</u>	<u>\$ 27,978</u>	46.4%	17.5%

Sales and marketing expense increased by \$4.9 million for 2020 as compared to 2019, primarily due to an increase in employee count, salaries, stock-based compensation, and sales commissions. Sales and marketing expense increased by \$2.3 million for 2019 as compared to 2018, primarily due to an increase in employee count, salaries and sales commissions.

Research and development expense increased \$6.2 million for 2020 as compared to 2019, primarily due to an increase in employee count, salaries and research and development parts. Research and development expense represented 12.2% and 12.0% of our revenue in 2020 and 2019, 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 \$21.2 million, or 13.6% of revenue, in 2020 and \$16.1 million, or 14.9% of revenue, in 2019.

Research and development expense increased \$2.5 million for 2019 as compared to 2018, primarily due to an increase in employee count, salaries and research and development parts. Research and development expense represented 12.0% and 13.9% of our revenue in 2019 and 2018, 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 \$16.1 million, or 14.9% of revenue, in 2019 and \$11.9 million, or 15.9% of revenue, in 2018.

General and administrative expense increased \$4.2 million for 2020 as compared to 2019, primarily due to an increase in stock-based compensation, increased employee count, and an increase in legal, payroll tax and other fees. General and administrative expense increased \$0.1 million for 2019 as compared to 2018.

Change in fair value of financial liability and trading securities

	Year Ended December 31,			% Change 2020 v 2019	% Change 2019 v 2018
	2020	2019	2018		
	<i>(in thousands)</i>				
Change in fair value of financial liability	\$ (11,964)	\$ -	\$ -	100.0%	0.0%
Unrealized gain on trading securities	12,574	-	-	100.0%	0.0%

Change in fair value of financial liability was (\$12.0) million for 2020 as compared to \$0 for 2019 and 2018. The decrease in 2020 was due to the non-cash, non-operating expense related to transactions as described in note 16. Unrealized gain on trading securities was \$12.6 million for 2020 as compared to \$0 for 2019 and 2018, due to an increase in the market value of securities purchased from the original cost basis in July of 2020 to the closing price on December 31, 2020 as described in note 15.

Other Income and Expenses

	Year Ended December 31,			% Change 2020 v 2019	% Change 2019 v 2018
	2020	2019	2018		
	<i>(in thousands)</i>				
Interest Income	\$ 897	\$ 333	\$ 29	169.4%	1048.3%
Interest Expense	(982)	(745)	(498)	31.8%	49.6%
Interest Income (expense), net	<u>\$ (85)</u>	<u>\$ (412)</u>	<u>\$ (469)</u>	-79.4%	-12.2%
Other income (expense), net	\$ (3,377)	\$ 1,393	\$ 1,255	-342.4%	11.0%

Interest expense, net, consists of interest incurred from outstanding short-term borrowings, offset by interest earned on net cash balances. Interest expense, net, decreased to \$85,000 in 2020 from \$412,000 in 2019, principally as a result of increased interest income earned from higher cash balances, partly offset by increased interest expenses incurred from higher short term bank loans. Interest expense, net, decreased to \$412,000 in 2019 from \$469,000 in 2018, principally as a result of increased interest income earned from higher cash balances, partly offset by increased interest expenses incurred from higher short term bank loans.

Other income, 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 (expense) was (\$3.4 million) million in 2020 due primarily to a stronger RMB to U.S. dollar exchange rate, compared to other income of \$1.4 million in 2019 due to a weaker RMB to U.S. dollar exchange rate, and other income of \$1.3 million in 2018 due to a weaker RMB to U.S. dollar exchange rate.

Income Tax Benefit (Expense)

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

	Year Ended December 31,		
	2020	2019	2018
	<i>(in thousands)</i>		
Current:			
U.S. federal	\$ (61)		\$ -
U.S. state	(2)		-
Foreign	(2,014)	(3,176)	(1,149)
Total current tax expense	<u>(2,077)</u>	<u>(3,176)</u>	<u>(1,149)</u>
Deferred:			
U.S. federal	7,325	3,728	-
U.S. state	-		-
Foreign	(2,866)	(34)	343
Total deferred tax benefit	<u>4,459</u>	<u>3,694</u>	<u>343</u>
Total income tax benefit (expense)	<u>\$ 2,382</u>	<u>\$ 518</u>	<u>\$ (806)</u>

As we collect and prepare necessary data, and interpret the Tax Cuts and Jobs Act of 2017 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 2020.

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 three PRC subsidiaries, ACM Shanghai, ACM Wuxi, and ACM Shengwei, are liable for PRC corporate income taxes at the rates of 15%, 25%, 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, in 2016, and again in 2018, 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 1999 through 2020. 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 2020, we funded our technology development and operations principally through our beginning cash balance, short-term borrowings by ACM Shanghai from local financial institutions, and the release of the voluntary restrictions we had applied to cash proceeds from the private placement of ACM Shanghai shares, as described below.

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. 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.

In 2020 ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc., entered into a Grant Contract for State-owned Construction Land Use Right in Shanghai City (Category of R&D Headquarters and Industrial Projects), or the Grant Agreement, with the China (Shanghai) Pilot Free Trade Zone Lin-gang Special Area Administration. Shengwei Research (Shanghai), Inc. obtained rights to use approximately 43,000 square meters (10.6 acres) of land in the Lingang Heavy Equipment Industrial Zone of Lin-gang Special Area of China (Shanghai) Pilot Free Trade Zone for a period of fifty years, commencing on the date of delivery of the land in July 2020, which we refer to as the Delivery Date.

In exchange for its land use rights, Shengwei Research (Shanghai), Inc. paid aggregate grant fees of RMB 61.7 million (\$9.5 million), and a performance deposit of RMB 12.3 million (\$1.9 million), which is equal to 20% of the aggregate grant fees, to secure its achievement of the following performance milestones:

- the start of construction within 6 months after the Delivery Date (60% of the performance deposit);
- the completion of construction within 30 months after the Delivery Date (20% of the performance deposit); and
- the start of production within 42 months after the Delivery Date (20% of the performance deposit).

Upon satisfaction of a milestone, the portion of the performance deposit attributable to that milestone will be repayable to Shengwei Research (Shanghai), Inc. within ten business days. If the achievement of any of the above milestones is delayed or abandoned, Shengwei Research (Shanghai), Inc. may be subject to additional penalties and may lose its rights to both the use of the granted land and any partially completed facilities on that land.

Covenants in the Grant Agreement require that, among other things, Shengwei Research (Shanghai), Inc. will be required to pay liquidated damages in the event that (a) it does not make a total investment (including the costs of construction, fixtures, equipment and grant fees) of at least RMB 450.0 million (\$63.4 million) or (b) within six years after the Delivery Date, we do not (i) generate a minimum specified amount of annual sales of products manufactured on the granted land or (ii) pay to the PRC at least RMB 157.6 million (\$22.2 million) in annual total taxes (including value-added taxes, corporate income tax, personal income taxes, urban maintenance and construction taxes, education surcharges, stamp taxes, and vehicle and shipping taxes) as a result of operations in connection with the granted land.

Sources of Funds

Equity and Equity-related Securities. During the year ended December 31, 2020, we received proceeds of \$2.7 million from sales of Class A common stock pursuant to option exercises.

Release of Voluntarily Restricted Proceeds. During the year ended December 31, 2020, we released the restrictions on \$58.8 million of the cash proceeds received from the private placement investors that purchased ACM Shanghai shares in anticipation of the STAR Listing (see “—Recent Developments—STAR Market Listing and IPO”). Previously, due to the investors’ redemption rights, we had voluntarily chosen to hold the proceeds as restricted cash. These redemption rights were removed upon submission of the STAR Listing application.

Short-Term and Long-Term Loan Proceeds and Facilities. During the year ended December 31, 2020, we received net proceeds of \$12.4 million by increasing net short term borrowing to \$26.1 million as compared to \$13.8 million in 2019, and we received proceeds of \$19.6 million by increasing our long-term borrowing to \$19.6 million as compared to \$0 million in 2019. ACM Shanghai and ACM Korea are party to short-term lines of credit with five banks, and Shengwei Research (Shanghai), Inc., is party to a long-term loan facility with one bank as follows:

Lender	Agreement Date	Maturity Date	Annual Interest Rate	Maximum Borrowing Amount(1)	Amount Outstanding at December 31, 2020
<i>(in thousands)</i>					
Bank of Shanghai Pudong Branch	April 2020	May 2021 - June 2021	3.48%-4.68%	RMB70,000	RMB63,642
				\$ 10,731	\$ 9,756
Bank of Communications	April 2020	April 2021 - May 2021	3.65%-4.65%	RMB20,000	RMB20,000
				\$ 3,066	\$ 3,066
China Everbright Bank	April 2020	April 2021 - June 2021	2.7%-4.7%	RMB80,000	RMB57,922
				\$ 12,264	\$ 8,879
China Merchants Bank	August 2020	August 2021	3.85%	RMB80,000	RMB29,000
				\$ 12,264	\$ 4,446
China Merchants Bank	November 2020	Repayable by installments and the last installments repayable in November 2030	4.65%	RMB128,500	RMB127,657
				\$ 19,699	\$ 19,570
Industrial Bank of Korea	July 2020	July 2021	3.99%	KRW500,000	NIL
				\$ 428	-
				\$ 58,452	\$ 45,717

- (1) Converted from RMB to dollars as of December 31, 2020. All of the amounts owing under the line of credit with China Everbright Bank and Bank of China Pudong Branch are guaranteed by Dr. David Wang, our Chief Executive Officer, President and Chair of the Board. All of the amounts owing under the line of credit with Bank of Shanghai Pudong Branch are guaranteed by Dr. Wang and CleanChip Technologies LTD, a wholly owned subsidiary of ACM Shanghai. All of the amounts owing under the line of credit with Industrial Bank of Korea are guaranteed by YY Kim, Chief Executive Officer of ACM Research (Korea).

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 cash payments of \$6.2 million related to such grants in 2020, as compared to received cash payments of \$3.4 million related to such grants in 2019. 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, 2020
	<i>(in thousands)</i>
Cash and cash equivalents	\$ 71,766
Accounts receivable, less allowance for doubtful amounts	56,441
Inventory	88,639
Working capital	<u>\$ 216,846</u>

Our cash and cash equivalents at December 31, 2020 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

Cash Flow used in Operating Activities. Our operations used cash flow of \$13.5 million during the year ended December 31, 2020. Our cash flow from operating activities is influenced by (a) the level of net income, (b) the amount of cash we invest in personnel and technology development to support anticipated future growth in our business, (c) the number of first tools or 'demo' tools delivered to customers for evaluation, (d) increases in the number of customers using our products, and (e) the amount and timing of payments by customers.

Capital Expenditures. We incurred \$5.9 million in capital expenditures during the year ended 2020, versus \$1.1 in million capital expenditures in 2019.

Lingang-Related Investments. ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc., purchased a land use right for \$9.7 million in the year ended 2020, as described in note 7 to the consolidated financial statements. ACM Shanghai pre-paid \$40.2 million during the year-ended December 31, 2020 for a deposit towards a purchase of housing properties which was recorded in other long term assets in the consolidated balance sheets as described in note 8.

Trading Securities. ACM Shanghai made an indirect investment of \$15.0 million in shares of Semiconductor Manufacturing International Corporation on the STAR Market through ACM Shanghai's investment in Qingdao Limited Partnership Fund, during the year ended December 31, 2020, as is described in note 15 to the consolidated financial statements included in this report.

Off-Balance Sheet Arrangements

As of December 31, 2020 and 2019, 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.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

As a result of our operating, investing and financing activities, we are exposed to market risks such as interest rate risk and foreign currency exchange rate risk. We are also exposed to credit risk as a result of our normal business activities.

Foreign Currency Exchange Risk

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 South Korea is the South Korean Won, or the SKR. 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 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 majority of our business is conducted through our ACM Shanghai subsidiary that manufactures and sells our products in various global markets, and we also have operations in South Korea, the Taiwan Region, the United States, and other countries. We sell the majority of our products in transactions denominated in U.S. dollars; however, we purchase raw materials, pay wages, and make payments to our supply chain in foreign currencies, primarily RMB, and also the SKR. As a result, our earnings, cash flows and cash balances are exposed to fluctuations in foreign currency exchange rates. For example, because of our significant manufacturing operations in the PRC, a weakening RMB is advantageous and a strengthening RMB is disadvantageous to our financial results. At this time, we have not established a formal hedging policy to attempt to reduce the inherent risks of potential currency fluctuations on our global operations. We report the impact of foreign exchange fluctuations in the other income (expense) line item of our Consolidated Statements of Operations and Comprehensive Income statements. For 2020, 2019, and 2018, the effect of fluctuations of foreign currencies contributed realized gains (losses) of (\$4.4 million), \$1.0 million and \$1.1 million respectively.

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.

Interest Rate Risk

As of December 31, 2020 and 2019, the balance of our short term bank borrowings (see note 9 in the Notes to Consolidated Financial Statements included herein under "Item 8. Financial Statements and Supplementary Data."), matured at various dates within the following year and did not expose the Company to interest rate risk. As of December 31, 2020, the balance of our long-term borrowings (see note 12 in the Notes to Consolidated Financial Statements included herein under "Item 8. Financial Statements and Supplementary Data.") carries a fixed interest rate and we may be exposed to fair value interest rate risk.

We have implemented policies and procedures to measure, manage, monitor and report risk exposures, which are reviewed regularly by management and the board of directors. We identify risk exposures and monitor and manage such risks on an ongoing basis.

Item 8. Financial Statements and Supplementary Data

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Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
ACM Research, Inc.
Fremont, California

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of ACM Research, Inc. and subsidiaries (the “Company”) as of December 31, 2020 and 2019, the related consolidated statements of operations and comprehensive income, changes in stockholders’ equity, and cash flows for each of the three years in the period ended December 31, 2020, 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 at December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the Company’s internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”) and our report dated March 1, 2021 expressed an unqualified opinion thereon.

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 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.

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.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Revenue recognition on sale of single-wafer wet cleaning equipment

As described in Note 2 and Note 3 to the consolidated financial statements, the Company derives revenue principally from the sale of single-wafer wet cleaning equipment. Revenue of sale of single-wafer wet cleaning equipment is recognized when the Company satisfies performance obligations by transferring the control over products promised in the contract with customer, which is the point of time when the equipment has been demonstrated to meet the customer's predetermined specifications and is accepted by the customer. For revenue contracts that provide for a lapsing customer acceptance period, the Company recognizes revenue as of the earlier of the expiration of the lapsing acceptance period or customer acceptance.

We identified the timing of revenue recognition as a critical audit matter because the Company's revenue contracts have a variety of specifications, payment terms and customer acceptance clauses. Auditing these elements involved especially challenging auditor judgment in evaluating the appropriateness of the Company's revenue recognition.

The primary procedures we performed to address this critical audit matter included:

- Testing the design and operating effectiveness of controls over revenue recognition including management’s assessment of revenue contract terms.
- Evaluating management’s accounting policies and practices including the reasonableness of management’s judgments and assumptions relating to the Company’s revenue recognition including evaluation of customer acceptance clauses.
- Testing a sample of revenue contracts and underlying order documents to evaluate appropriateness of management’s revenue recognition including assessment of customer acceptance clauses.

Accounting for Financial Liability

As described in Note 16 to the consolidated financial statements, in preparation for the STAR IPO, the Company entered into two agreements relating to outstanding obligations and agreed to deliver certain consideration. The Company accounted for this consideration as a financial liability and applied fair value option to measure the consideration. On July 29, 2020 the Company entered into an amended agreement under which, in settlement of the financial liability, the Company issued a warrant to purchase shares of Class A common stock. The financial liability was remeasured to fair value as of July 29, 2020 and was retired with the issuance of the warrant.

We identified the accounting and measurement of the financial liability as a critical audit matter. Auditing the Company’s accounting assessment of the financial liability involved especially challenging and complex auditor judgment due to the nature and extent of specialized skill and knowledge required.

The primary procedures we performed to address this critical audit matter included:

- Testing the design and operating effectiveness of controls over management’s assessment of accounting and measurement of the financial liability.
- Evaluating the reasonableness of management’s assumptions in determining the fair value of the financial liability.
- Utilizing personnel with specialized knowledge and skill in accounting to evaluate the appropriateness of management’s application of accounting guidance for complex financial instruments.

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 1, 2021

ACM RESEARCH, INC.
Consolidated Balance Sheets
(In thousands, except per share data)

	December 31,	
	2020	2019
Assets		
Current assets:		
Cash and cash equivalents	\$ 71,766	\$ 58,261
Restricted cash	-	59,598
Trading securities (note 15)	28,239	-
Accounts receivable, less allowance for doubtful accounts of \$0 as of December 31, 2020 and December 31, 2019 (note 4)	56,441	31,091
Other receivables	9,679	2,603
Inventories (note 5)	88,639	44,796
Prepaid expenses	5,892	2,047
Total current assets	260,656	198,396
Property, plant and equipment, net (note 6)	8,192	3,619
Land use right, net (note 7)	9,646	-
Operating lease right-of-use assets, net (note 11)	4,297	3,887
Intangible assets, net	554	344
Deferred tax assets (note 21)	11,076	5,331
Long-term investments (note 14)	6,340	5,934
Other long-term assets (note 8)	40,496	192
Total assets	341,257	217,703
Liabilities, Redeemable Non-controlling Interests and Stockholders' Equity		
Current liabilities:		
Short-term borrowings (note 9)	26,147	13,753
Current portion of long-term borrowings (note 12)	1,591	-
Accounts payable	35,603	13,262
Advances from customers	17,888	9,129
Deferred revenue	1,343	-
Income taxes payable (note 21)	31	3,129
FIN-48 payable (note 21)	83	-
Other payables and accrued expenses (note 10)	18,805	12,874
Current portion of operating lease liability (note 11)	1,417	1,355
Total current liabilities	102,908	53,502
Long-term borrowings (note 12)	17,979	-
Long-term operating lease liability (note 11)	2,880	2,532
Deferred tax liability (note 21)	1,286	-
Other long-term liabilities (note 13)	8,034	4,186
Total liabilities	133,087	60,220
Commitments and contingencies (note 23)		
Redeemable non-controlling interests (note 19)	-	60,162
Stockholders' equity:		
Common stock – Class A, par value \$0.0001: 50,000,000 shares authorized as of December 31, 2020 and December 31, 2019; 16,896,693 shares issued and outstanding as of December 31, 2020 and 16,182,151 shares issued and outstanding as of December 31, 2019 (note 18)	2	2
Common stock–Class B, par value \$0.0001: 2,409,738 shares authorized as of December 31, 2020 and December 31, 2019; 1,802,606 shares issued and outstanding as of December 31, 2020 and 1,862,608 shares issued and outstanding as of December 31, 2019 (note 18)	-	-
Additional paid in capital	102,004	83,487
Accumulated surplus	34,287	15,507
Accumulated other comprehensive income (loss)	4,857	(1,675)
Total ACM Research, Inc. stockholders' equity	141,150	97,321
Non-controlling interests	67,020	-
Total stockholders' equity	208,170	97,321
Total liabilities, redeemable non-controlling interests, and stockholders' equity	\$ 341,257	\$ 217,703

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

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

(In thousands, except per share data)

	Year Ended December 31,		
	2020	2019	2018
Revenue (note 3)	\$ 156,624	\$ 107,524	\$ 74,643
Cost of revenue	87,025	56,870	40,194
Gross profit	69,599	50,654	34,449
Operating expenses:			
Sales and marketing	16,773	11,902	9,611
Research and development	19,119	12,900	10,380
General and administrative	12,215	8,061	7,987
Total operating expenses, net	48,107	32,863	27,978
Income from operations	21,492	17,791	6,471
Interest income	897	333	29
Interest expense	(982)	(745)	(498)
Change in fair value of financial liability (note 16)	(11,964)	-	-
Unrealized gain on trading securities	12,574	-	-
Other income (expense), net	(3,377)	1,393	1,255
Equity income in net income of affiliates	655	168	123
Income before income taxes	19,295	18,940	7,380
Income tax benefit (expense) (note 21)	2,382	518	(806)
Net income	21,677	19,458	6,574
Less: Net income attributable to non-controlling interests and redeemable non-controlling interests	2,897	564	-
Net income attributable to ACM Research, Inc.	\$ 18,780	\$ 18,894	\$ 6,574
Comprehensive income:			
Net income	21,677	19,458	6,574
Foreign currency translation adjustment	10,493	(899)	(979)
Comprehensive Income	32,170	18,559	5,595
Less: Comprehensive income attributable to non-controlling interests and redeemable non-controlling interests	6,858	483	-
Comprehensive income attributable to ACM Research, Inc.	\$ 25,312	\$ 18,076	\$ 5,595
Net income attributable to ACM Research, Inc. per common share (note 2):			
Basic	\$ 1.03	\$ 1.12	\$ 0.42
Diluted	\$ 0.89	\$ 0.99	\$ 0.37
Weighted average common shares outstanding used in computing per share amounts (note 2):			
Basic	18,233,361	16,800,623	15,788,460
Diluted	21,183,469	19,135,497	17,912,105

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

ACM RESEARCH, INC.
Consolidated Statement of Changes in Stockholders' Equity
(In thousands, except per share data)

	Common Stock Class A		Common Stock Class B		Additional Paid- in Capital	Accumulated Surplus (Deficit)	Accumulated Other Comprehensive Income (Loss)	Non-controlling interests	Total Stockholders' Equity
	Shares	Amount	Shares	Amount					
Balance at December 31, 2017	12,935,546	\$ 1	2,409,738	\$ -	\$ 49,695	\$ (9,961)	\$ 122	\$ -	\$ 39,857
Net income attributable to ACM Research, Inc.	-	-	-	-	-	6,574	-	-	6,574
Foreign currency translation adjustment	-	-	-	-	-	-	(979)	-	(979)
Exercise of stock options	265,952	-	-	-	528	-	-	-	528
Stock-based compensation	-	-	-	-	3,363	-	-	-	3,363
Conversion of Class B common stock to Class A common stock	511,315	-	(511,315)	-	-	-	-	-	-
Exercise of stock warrants 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
Net income attributable to ACM Research, Inc.	-	-	-	-	-	18,894	-	-	18,894
Foreign currency translation adjustment	-	-	-	-	-	-	(818)	-	(818)
Exercise of stock options	195,297	-	-	-	317	-	-	-	317
Cancellation of stock options	-	-	-	-	(576)	-	-	-	(576)
Stock-based compensation	-	-	-	-	3,572	-	-	-	3,572
Issuance of Class A common stock in connection with public offering	2,053,572	1	-	-	26,434	-	-	-	26,435
Share repurchase	(214,286)	-	-	-	(2,827)	-	-	-	(2,827)
Conversion of Class B common stock to Class A common stock	35,815	-	(35,815)	-	-	-	-	-	-
Exercise of stock warrants issued to HFG	1,438	-	-	-	-	-	-	-	-
Balance at December 31, 2019	16,182,151	\$ 2	1,862,608	\$ -	\$ 83,487	\$ 15,507	\$ (1,675)	\$ -	\$ 97,321
Net income	-	-	-	-	-	18,780	-	2,254	21,034
Foreign currency translation adjustment	-	-	-	-	-	-	6,532	4,808	11,340
Exercise of stock options	832,504	-	-	-	2,745	-	-	-	2,745
Stock-based compensation	-	-	-	-	5,628	-	-	-	5,628
Conversion of class B common shares to Class A common shares	60,002	-	(60,002)	-	-	-	-	-	-
Share cancellation (note 16)	(242,681)	-	-	-	(9,715)	-	-	-	(9,715)
Issuance of warrants (note 16)	-	-	-	-	19,859	-	-	-	19,859
Exercise of stock warrants	64,717	-	-	-	-	-	-	-	-
Reclassification of redeemable non-controlling interest	-	-	-	-	-	-	-	59,958	59,958
Balance at December 31, 2020	16,896,693	2	1,802,606	-	102,004	34,287	4,857	67,020	208,170

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

ACM RESEARCH, INC.
Consolidated Statements of Cash Flows
(In thousands)

	Year Ended December 31,		
	2020	2019	2018
Cash flows from operating activities:			
Net income	\$ 21,677	\$ 19,458	\$ 6,574
Adjustments to reconcile net income from operations to net cash used in operating activities			
Depreciation and amortization	1,055	788	417
Loss on disposals of property, plant and equipment	25	294	-
Equity income in net income of affiliates	(655)	(168)	(123)
Unrealized gain on trading securities	(12,574)	-	-
Deferred income taxes	(4,085)	(3,719)	(405)
Stock-based compensation	5,628	3,572	3,363
Change in fair value of financial liability	11,964	-	-
Net changes in operating assets and liabilities:			
Accounts receivable	(22,085)	(6,961)	883
Other receivables	(6,882)	891	(1,171)
Inventory	(40,768)	(6,658)	(24,083)
Prepaid expenses	(3,518)	(83)	(1,494)
Other long-term assets	(99)	(151)	44
Accounts payable	21,275	(3,058)	9,825
Advances from customers	8,578	705	8,316
Income tax payable	(3,137)	1,952	1,149
FIN-48 payable	(83)	-	-
Other payables and accrued expenses	5,236	2,865	4,954
Deferred revenue	1,343	-	-
Other long-term liabilities	3,558	(324)	(1,340)
Net cash flow (used in) provided by operating activities	(13,547)	9,403	6,909
Cash flows from investing activities:			
Purchase of property and equipment	(5,211)	(971)	(1,830)
Purchase of intangible assets	(324)	(154)	(241)
Purchase of land-use-right	(9,744)	-	-
Purchase of trading securities	(15,020)	-	-
Prepayment for property	(40,206)	-	-
Investments in unconsolidated affiliates	-	(4,406)	-
Dividends from unconsolidated affiliates	555	-	-
Net cash used in investing activities	(69,950)	(5,531)	(2,071)
Cash flows from financing activities:			
Proceeds from short-term borrowings	32,573	18,423	17,726
Repayments of short-term borrowings	(20,234)	(14,005)	(13,131)
Proceeds from long-term borrowings	19,699	-	-
Repayments of long-term borrowings	(129)	-	-
Repayments of notes payable	(1,820)	-	-
Proceeds from stock option exercise to common stock	2,745	317	528
Proceeds from issuance of Class A common stock in connection with public offering, net of direct issuance expenses of \$2,287	-	26,434	-
Payment for repurchase of Class A common stock	-	(2,827)	-
Payment for cancellation of stock option	-	(576)	-
Proceeds from issuance of common stock to redeemable Non-controlling interest	-	59,679	-
Net cash provided by financing activities	32,834	87,445	5,123
Effect of exchange rate changes on cash, cash equivalents and restricted cash	\$ 4,570	\$ (582)	\$ (518)
Net increase (decrease) in cash, cash equivalents and restricted cash	\$ (46,093)	\$ 90,735	\$ 9,443
Cash, cash equivalents and restricted cash at beginning of period	117,859	27,124	17,681
Cash, cash equivalents and restricted cash at end of period	\$ 71,766	\$ 117,859	\$ 27,124
Supplemental disclosure of cash flow information:			
Interest paid	\$ 982	\$ 745	\$ 498
Cash paid for income taxes	\$ 4,971	\$ 1,156	\$ -
Reconciliation of cash, cash equivalents and restricted cash in condensed consolidated statements of cash flows:			
Cash and cash equivalents	71,766	58,261	27,124
Restricted cash	-	59,598	-
Cash, cash equivalents and restricted cash	\$ 71,766	\$ 117,859	\$ 27,124
Non-cash financing activities:			
Warrant conversion to common stock	\$ 399	\$ 9	\$ 3,079
Share cancellation, (note 16)	\$ 9,715	\$ -	\$ -
Issuance of warrant for settlement of financial liability, (note 16)	\$ 19,859	\$ -	\$ -

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

ACM RESEARCH, INC.
Notes to Consolidated Financial Statements
(in thousands, except share and per share data)

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. Based on its electro-chemical plating (“ECP”) technology, the Company introduced in March 2019 its Ultra ECP AP, or “Advanced Packaging,” tool for bumping, or applying copper, tin and nickel to semiconductor wafers at the die-level, and its Ultra ECP MAP, or “Multi-Anode Partial Plating,” tool to deliver advanced electrochemical copper plating for copper interconnect applications in front-end wafer fabrication processes. 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.

ACM RESEARCH, INC.
Notes to Consolidated Financial Statements
(in thousands, except share and per share data)

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 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.

In March 2019 ACM Shanghai formed a wholly owned subsidiary in the PRC, Shengwei Research (Shanghai), Inc., to manage activities related to addition of future long-term production capacity.

In June 2019 Cleanchip formed a wholly owned subsidiary in California, ACM Research (CA), Inc. (“ACM California”), to provide procurement services on behalf of ACM Shanghai.

In June 2019 ACM announced plans to complete over the next three years a listing (the “STAR Listing”) of shares of ACM Shanghai on the Shanghai Stock Exchange’s new Sci-Tech innovAtion boaRd, known as the STAR Market, and a concurrent initial public offering (the “STAR IPO”) of ACM Shanghai shares in the PRC. ACM Shanghai is currently ACM’s primary operating subsidiary, and at the time of announcement, was wholly owned by ACM. To meet a STAR Listing requirement that it have multiple independent stockholders in the PRC, ACM Shanghai completed private placements of its shares in June and November 2019, following which, as of September 30, 2020, the private placement investors held a total of 8.3% of the outstanding shares of ACM Shanghai and ACM Research held the remaining 91.7%. As part of the STAR Listing process, in June 2020 the ownership interests held by the private investors were reclassified from redeemable non-controlling interests to non-controlling interests as the redemption feature was terminated (note 19).

In preparation for the STAR IPO, ACM completed a reorganization in December 2019 that included the sale of all of the shares of Cleanchip by ACM to ACM Shanghai for \$3,500. The reorganization and sale had no impact on ACM’s consolidated financial statements.

The Company has direct or indirect interests in the following subsidiaries:

Name of subsidiaries	Place and date of incorporation	Effective interest held as at	
		December 31,	
		2020	2019
ACM Research (Shanghai), Inc.	China, May 2005	91.7%	91.7%
ACM Research (Wuxi), Inc.	China, July 2011	91.7%	91.7%
CleanChip Technologies Limited	Hong Kong, June 2017	91.7%	91.7%
ACM Research Korea CO., LTD.	Korea, December 2017	91.7%	91.7%
Shengwei Research (Shanghai), Inc.	China, March 2019	91.7%	91.7%
ACM Research (CA), Inc.	USA, June 2019	91.7%	91.7%
ACM Research (Cayman), Inc.	Cayman Islands, April 2019	100.0%	100.0%

ACM RESEARCH, INC.
Notes to Consolidated Financial Statements
(in thousands, except share and per share data)

NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIESBasis of Presentation and Principles of Consolidation

The Company's consolidated financial statements include the accounts of ACM and its subsidiaries, including ACM Shanghai and its subsidiaries, which include ACM Wuxi, ACM Shengwei and CleanChip (the subsidiaries of which include ACM California and ACM Korea). ACM's 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.

COVID-19 Assessment

The outbreak of COVID-19, the coronavirus, has grown both in the United States and globally, and related government and private sector responsive actions have adversely affected the Company's business operations. In December 2019 a series of emergency quarantine measures taken by the PRC government disrupted domestic business activities during the weeks after the initial outbreak of COVID-19. Since that time, an increasing number of countries, including the United States, have imposed restrictions on travel to and from the PRC and elsewhere, as well as general movement restrictions, business closures and other measures imposed to slow the spread of COVID-19. The situation continues to develop, however, and it is impossible to predict the effect and ultimate impact of the COVID-19 outbreak on the Company's business operations and results. While the quarantine, social distancing and other regulatory measures instituted or recommended in response to COVID-19 are expected to be temporary, the duration of the business disruptions, and related financial impact, cannot be estimated at this time. The COVID-19 outbreak has been declared a worldwide health pandemic that could adversely affect the economies and financial markets of many countries, resulting in an economic downturn and changes in global economic policy that could reduce demand for the Company's products and its customers' chips and have a material adverse impact on the Company's business, operating results and financial condition. Through December 31, 2020 the Company did not experience significant negative impact of COVID-19 on its operations, capital and financial resources, including overall liquidity position.

The Company conducts substantially all of its product development, manufacturing, support and services in the PRC, and those activities have been directly impacted by the COVID-19 outbreak and related restrictions on transportation and public appearances. In February 2020 ACM Shanghai's headquarters were closed for an additional six days beyond the normal Lunar New Year Holiday in accordance with Shanghai government restrictions related to the outbreak. The Company cannot assure that further closures or reductions of its PRC operations or production may not be necessary in upcoming months as the result of business interruptions arising from protective measures being taken by the PRC and other governmental agencies or of other consequences of the COVID-19 outbreak.

The Company's corporate headquarters are located in San Mateo County in the San Francisco Bay Area. In order to attempt to mitigate the COVID-19 pandemic, in March 2020 (a) the State of California declared a state of emergency related to the spread of COVID-19, (b) the San Francisco Department of Public Health announced aggressive recommendations to reduce the spread of the disease, (c) the health officers of six San Francisco Bay Area counties, including San Mateo County, issued shelter-in-place orders, which (i) direct all individuals living in those counties to shelter at their places of residence (subject to limited exceptions), (ii) direct all businesses and governmental agencies to cease non-essential operations at physical locations in those counties, (iii) prohibit all non-essential gatherings of any number of individuals, and (iv) order cessation of all non-essential travel, and (d) the Governor of California and the State Public Health Officer and Director of the California Department of Public Health ordered all individuals living in the State of California to stay at their place of residence for an indefinite period of time (subject to limited exceptions). The effects of these types of actions in the future may negatively impact productivity, disrupt the business of the Company and delay timelines, the magnitude of which will depend, in part, on the length and severity of the restrictions and other limitations on the Company's ability to conduct its business in the ordinary course.

The prolonged and broad-based shift to a remote working environment continues to create inherent productivity, connectivity, and oversight challenges and could affect our ability to enhance, develop and support existing products and services, detect and prevent spam and problematic content, hold product sales and marketing events, and generate new sales leads, among others. In addition, the changed environment under which the Company is operating could have an effect on its internal controls over financial reporting as well as our ability to meet a number of its compliance requirements in a timely or quality manner. Additional and/or extended, governmental lockdowns, restrictions or new regulations could significantly impact the ability of our employees and vendors to work productively. Governmental restrictions have been globally inconsistent and it remains unclear when a return to worksite locations or travel will be permitted or what restrictions will be in place in those environments. As the Company prepares to return its workforce in more locations back to the office in 2021, it may experience increased costs as it prepares its facilities for a safe return to work environment and experiment with hybrid work models, in addition to potential effects on its ability to compete effectively and maintain its corporate culture.

ACM RESEARCH, INC.
Notes to Consolidated Financial Statements
(in thousands, except share and per share data)

Extended periods of interruption to our corporate, development or manufacturing facilities due to the COVID-19 outbreak could cause the Company to lose revenue and market share, which would depress its financial performance and could be difficult to recapture. The Company's business may also be harmed if travel to or from the PRC or the United States continues to be restricted or inadvisable or if members of management and other employees are absent because they contract the coronavirus, they elect not to come to work due to the illness affecting others in the Company's office or laboratory facilities, or they are subject to quarantines or other governmentally imposed restrictions.

Use of Estimates

The preparation of the 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 fair value of trading securities, 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 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.

Reclassifications

Certain prior year amounts in the notes to the Consolidated Financial Statements, have been reclassified to conform with the current year presentation. These classifications within the statements had no impact on the Company's results of operations.

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.

Restricted cash

Restricted cash represents deposits not readily available to ACM. Restricted cash as of December 31, 2019 represented cash held in reserve, all of the proceeds received from issuance of common stock to redeemable non-controlling interest in segregated cash and cash-equivalent accounts. There was no restricted cash as of December 31, 2020, as the redemption feature of these proceeds was terminated during the second quarter of 2020 and the Company released restrictions on the cash as described in note 19.

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, current economic trends and reasonable and supportable forecasts. Accounts are written off after all collection efforts have been exhausted. At December 31, 2020, and 2019, 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.

Land use right, net

The land use right represents the cost to purchase a right to use state-owned land in the PRC with lease terms of 50 years expiring in 2070, for which an upfront lump-sum payment was made during the year ended December 31, 2020. The Company classifies the land use right as non-current assets on the consolidated balance sheets (note 7).

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The land use right is carried at cost less accumulated amortization and impairment losses, if any. Amortization is computed using the straight-line method over the term specified in the land use right certificate, which is 50 years.

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, 2020 and 2019.

- 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.
- 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 to 5 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 for between two and ten-years, based on its functionality and useful life in accordance with the policy described above.

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Investments

The Company uses the equity method of accounting for its investment in, and earning or loss of, companies that it does not control but over which it does exert significant influence. The Company considers whether the fair value of its equity method investment has declined below its carrying value whenever adverse events or changes in circumstances indicate that recorded value may not be recoverable. The Company reviews its investments for other-than-temporary impairment whenever events or changes in business circumstances indicate that the carrying value of the investment may not be fully recoverable. Investments identified as having an indication of impairment are subject to further analysis to determine if the impairment is other-than-temporary and this analysis requires estimating the fair value of the investment. The determination of fair value of the investment involves considering factors such as current economic and market conditions, the operating performance of the entities including current earnings trends and forecasted cash flows, and other company and industry specific information. If the Company considers any decline to be other than temporary (based on various factors, including historical financial results and the overall health of the investee), then a write-down would be recorded to estimated fair value. See note 10 for discussion of equity method investment.

All marketable securities are classified as trading securities and trading securities and are stated at fair market value, less a discount applied to reflect the remaining lock-up period when the securities are subject to lock-up period. Fair market value is determined by the most recently traded price of the security at the balance sheet date. Net realized and unrealized gains and losses on trading securities are included in the consolidated statement of operations. The cost of investments sold is based on the average cost method. Interest and dividend income earned are included in other income (expense), net.

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

The Company determines if an arrangement is a lease at inception. Operating leases are included in operating lease right-of-use (“ROU”) assets, other current liabilities and operating lease liabilities in the consolidated balance sheets.

ROU assets represent the Company’s right to use an underlying asset for the lease term, and lease liabilities represent the Company’s obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. As most of the Company’s leases do not provide an implicit rate, the Company uses its incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. It uses the implicit rate when readily determinable. The operating lease ROU asset also includes any lease payments made and excludes lease incentives. The Company’s lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term.

Redeemable Non-controlling Interests

The Company recorded initial carrying amount of redeemable non-controlling interests at fair value on the date of issuance, and presented in temporary equity on the consolidated balance sheets.

As the non-controlling interests would be redeemable at a fixed purchase price, it is classified as common-share non-controlling interests redeemable at other than fair value. The Company applied the entire adjustment method (income classification) for subsequent measurement in accordance with Financial Accounting Standards Board (the “FASB”) Accounting Standards Classification (“ASC”) ASC 480-10-S99.

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Revenue Recognition

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 ASC Topic 606, *Revenue from Contracts with Customers*:

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. 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.

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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.

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. These costs are recorded within sales and marketing expenses.

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 years ended December 31, 2020, 2019 and 2018, shipping and handling costs included in sales and marketing expenses were \$76, \$172 and \$146, 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, 2020, 2019 or 2018.

Warranty

For each of its products, the Company generally provides a standard 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. Warranty obligations are included in other payables and accrued expenses in the consolidated balance sheets. The following table shows changes in the Company's warranty obligations for the years ended December 31, 2020 and 2019, respectively.

	Year Ended December 31,		
	2020	2019	2018
Balance at beginning of period	\$ 2,811	\$ 1,710	\$ 839
Additions	3,101	2,105	1,412
Utilized	(1,937)	(1,004)	(541)
Balance at end of period	<u>\$ 3,975</u>	<u>\$ 2,811</u>	<u>\$ 1,710</u>

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Government Subsidies

ACM Shanghai has received six special government grants from the PRC's Ministry of Science and Technology, the Shanghai Municipal Commission of Economy and Information, and the Shanghai Science and Technology Committee. 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. The fifth grant was made in 2020, and relates to the development of Tahoe single bench cleaning technologies. The sixth grant was made in 2020, and relates to the development of backside cleaning technologies. These governmental authorities provide the majority of the funding, although ACM Shanghai is also required to invest certain amounts in the projects.

The governmental grants contain certain operating conditions, and the Company is 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 the Company is not required to return any funds it receives. Grant amounts are recognized in our statements of operations and comprehensive income as follows:

- 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, 2020, 2019 and 2018, related government subsidies recognized as reductions of relevant expenses in the consolidated statements of operations and comprehensive income were \$2,658, \$3,195 and \$1,486, 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, 2020, 2019 and 2018, related government subsidies recognized as other income in the consolidated statements of operations and comprehensive income were \$149, \$147 and \$144, respectively.

Unearned government subsidies received are deferred for recognition and recorded as other long-term liabilities (note 13) 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*.

Stock-based awards granted to employees and non-employee consultants and directors 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 when there is only service condition attached or the Monte Carlo valuation model when there is performance condition attached. Stock-based compensation expense, when recognized, is charged to the category of operating expense corresponding to the service function of the employees and non-employee consultants and directors.

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.

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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 per Common Share

Basic and diluted net income per common share are calculated as follows:

	Year Ended December 31,		
	2020	2019	2018
Numerator:			
Net income	\$ 21,677	\$ 19,458	\$ 6,574
Net income attributable to non-controlling interests and redeemable non-controlling interests	2,897	564	-
Net income available to common stockholders, basic and diluted	<u>\$ 18,780</u>	<u>\$ 18,894</u>	<u>\$ 6,574</u>
Weighted average shares outstanding, basic	18,233,361	16,800,623	15,788,460
Effect of dilutive securities	2,950,108	2,334,874	2,123,645
Weighted average shares outstanding, diluted	<u>21,183,469</u>	<u>19,135,497</u>	<u>17,912,105</u>
Net income per common share:			
Basic	<u>1.03</u>	<u>1.12</u>	<u>0.42</u>
Diluted	<u>\$ 0.89</u>	<u>\$ 0.99</u>	<u>\$ 0.37</u>

Basic and diluted net income per common share are 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 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. ACM did not have any participating securities outstanding during the three-year period ending December 31, 2020.

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, 2020, 2019 and 2018, the net income 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 and in the above computation of net income per common share.

Diluted and diluted net income per common share are 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 (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. ACM did not have any participating securities outstanding during the three-year period ending December 31, 2020.

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Diluted net income per common share reflects the potential dilution from securities, including stock options and issued warrants, that could share in ACM's earnings. Certain potential dilutive securities were excluded from the net income per share calculation because the impact would be anti-dilutive. The number of potentially dilutive shares that were not included in the calculation of diluted net income per share in the periods presented where their inclusion would be anti-dilutive were 78,000, 606,000 and 241,700 for the years ended December 31, 2020, 2019 and 2018, respectively.

Comprehensive Income 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 attributable to the Company was \$25,312, \$18,076 and \$5,595 for the years ended December 31, 2020, 2019 and 2018, respectively.

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Statutory reserves

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. ACM Shanghai estimated a statutory surplus reserve of \$3,065 and \$1,427 based on an accumulated profit as of December 31, 2020 and 2019, respectively, which is included in the accumulated surplus in the consolidated balance sheets.

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

Trading securities - The fair value of trading securities derives from the on quoted prices for identical securities in active markets at the balance sheet date, less a discount applied to reflect the remaining lock-up period. The Company classifies the valuation techniques that use these inputs as Level 2 fair value measurement (note 15).

Financial liability - The fair value of financial liability are classified within Level 3 as the fair values are measured based on the inputs linked to the choice of settlement by the counter party that are unobservable in the market.

Other financial items for disclosure purpose—The fair value of other financial items of the Company, other than long-term borrowings for disclosure purpose, including cash and cash equivalents, accounts receivable, other receivables, short-term borrowings, accounts payable, advances from customers, and other payables and accrued expenses, approximate their carrying value due to their short-term nature. The carrying value of the long-term borrowings which are subject to fixed interest rate approximates its fair value as the market interest rate did not significantly change from the borrowing date to December 31, 2020.

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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, restricted cash 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. In each of the years ended December 31, 2020 and 2019, a total of three customers individually accounted for greater than ten percent of the Company's revenue:

	December 31,	
	2020	2019
Customer A	36.93%	26.46%
Customer B	*	19.84%
Customer C	26.77%	27.50%
Customer D	12.10%	*
Total	75.80%	73.79%

Interest Rate Risk

As of December 31, 2020 and 2019, the balance of the Company's short term bank borrowings (note 9), matured at various dates within the following year and did not expose the Company to interest rate risk. As of December 31, 2020, the balance of the Company's long-term borrowings (note 12) carried a fixed interest rate and the Company may have been exposed to fair value interest rate risk.

Liquidity Risk

The Company's working capital at December 31, 2020 and 2019 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 PRC 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 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 fluctuations as marked to market at year-end are included in the consolidated statements of operations and comprehensive income. Total foreign currency translation adjustment was \$10,493, (\$899) and (\$979) for the years ended December 31, 2020, 2019 and 2018, respectively.

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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:

	At December 31,		
	2020	2019	2018
Consolidated balance sheets:			
RMB to \$1.00	6.5232	6.9784	6.8634
KRW to \$1.00	1,088.14	1,156.07	1,114.83
Year Ended December 31,			
	2020	2019	2018
Consolidated statements of operations and comprehensive income:			
RMB to \$1.00	6.8966	6.8966	6.6181
KRW to \$1.00	1,179.25	1,165.50	1,100.11

Recently Adopted Accounting Pronouncements

On March 27, 2020, the U.S. Coronavirus Aid, Relief and Economic Security ("CARES") Act was enacted and signed into law. Certain provisions of the CARES Act impact the 2019 income tax provision computations of the Company and were reflected in 2020, or the period of enactment. The CARES Act contains modifications on the limitation of business interest for tax years beginning in 2019 and 2020. The modifications to §163(j) increase the allowable business interest deduction from 30% of adjusted taxable income to 50% of adjusted taxable income. The modification to the interest expense limitation did not have an impact on the Company's taxable income or net operating losses for the year ended December 31, 2020.

In August 2018, the FASB issued Accounting Standards Update ("ASU") 2018-13, *Fair Value Measurement (Topic 820)*, which eliminates, adds and modifies certain disclosure requirements for fair value measurements. The modified standard eliminates the requirement to disclose changes in unrealized gains and losses included in earnings for recurring Level 3 fair value measurements and requires changes in unrealized gains and losses be included in other comprehensive income for recurring Level 3 fair value measurements of instruments. The standard also requires the disclosure of the range and weighted average used to develop significant unobservable inputs and how weighted average is calculate for recurring and nonrecurring Level 3 fair value measurements. The amendment is effective for fiscal years beginning after December 15, 2019 and interim periods within that fiscal year, with early adoption permitted. The adoption of ASU 2018-13 did not have a material impact on the Company's consolidated financial statements.

Recent Accounting Pronouncements Not Yet Adopted

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*. ASU 2016-13 replaced the pre-existing incurred loss impairment methodology with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. ASU 2016-13 requires use of a forward-looking expected credit loss model for accounts receivables, loans and other financial instruments. ASU 2016-13 is effective for fiscal years beginning after December 15, 2019, with early adoption permitted. In October 2019, the FASB issued ASU 2019-10, *Financial Instruments – Credit Losses (Topic 326), Derivatives and Hedging (Topic 815) and Leases (Topic 842)*, which defers the effective date for public filers that are considered small reporting companies ("SRC") as defined by the Securities and Exchange Commission ("SEC") to fiscal years beginning after December 15, 2022, including interim periods within those fiscal years.

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Since the Company was eligible to be an SRC based on the Company’s most recent SRC determination as of November 15, 2019 (which is the issuance date of ASU 2019-10) in accordance with SEC regulations, the Company will adopt the standards for the year beginning January 1, 2023. Adoption of the standard requires using a modified retrospective approach through a cumulative-effect adjustment to retained earnings as of the effective date to align existing credit loss methodology with the new standard. The Company is evaluating the impact of this standard on its consolidated financial statements, including accounting policies, processes and systems and expects the standard will have a minor impact on its consolidated financial statements.

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes*. ASU 2019-12 will simplify the accounting for income taxes by removing certain exceptions to the general principles in Topic 740. The amendments also improve consistent application of and simplify GAAP for other areas of Topic 740 by clarifying and amending existing guidance. For public business entities, the amendments in this Update are effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020. ASU 2019-12 will be effective for the Company in the first quarter of 2021. The Company does not expect the adoption of the new accounting rules to have a material impact on the Company’s financial condition, results of operations, cash flows or disclosures.

In March 2020, the FASB issued ASU No. 2020-04, *Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting*. ASU 2020-04 provide optional expedients and exceptions for applying GAAP to contracts, hedging relationships, and other transactions affected by reference rate reform. The amendments in this standard can be applied anytime between the first quarter of 2020 and the fourth quarter of 2022. The Company is currently in the process of evaluating the impact of adoption of the new rules on the Company’s financial condition, results of operations, cash flows and disclosures.

NOTE 3 – REVENUE FROM CONTRACTS WITH CUSTOMERS

The Company assesses revenues based upon the nature or type of goods or services it provides and the geographic location of the related businesses. The following tables present disaggregated revenue information:

	Year Ended December 31,		
	2020	2019	2018
Single Wafer Cleaning, Tahoe and Semi-Critical Cleaning Equipment	\$ 131,248	\$ 90,501	\$ 68,341
ECP (front-end and packaging), Furnace and Other Technologies	13,343	6,900	-
Advanced Packaging (exclude ECP), Services & Spares	12,033	10,124	6,302
Total Revenue By Product Category	\$ 156,624	\$ 107,524	\$ 74,643
Wet cleaning and other front-end processing tools	136,317	90,935	68,366
Advanced packaging, other back-end processing tools, services and spares	20,307	16,590	6,277
Total Revenue Front-End and Back-End	\$ 156,624	\$ 107,524	\$ 74,643

	Year Ended December 31,		
	2020	2019	2018
Mainland China	\$ 154,359	\$ 103,467	\$ 69,866
Other Regions	2,265	4,057	4,777
	\$ 156,624	\$ 107,524	\$ 74,643

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NOTE 4 – ACCOUNTS RECEIVABLE

At December 31, 2020 and 2019, accounts receivable consisted of the following:

	December 31,	
	2020	2019
Accounts receivable	\$ 56,441	\$ 31,091
Less: Allowance for doubtful accounts	-	-
Total	\$ 56,441	\$ 31,091

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, 2020 and 2019. At December 31, 2020 and 2019, accounts receivable of \$0 and \$1,433, respectively, were pledged as collateral for borrowings from financial institutions (note 9).

NOTE 5 – INVENTORIES

At December 31, 2020 and 2019, inventory consisted of the following:

	December 31,	
	2020	2019
Raw materials	\$ 32,391	\$ 15,105
Work in process	23,871	10,407
Finished goods	32,377	19,284
Total inventory	\$ 88,639	\$ 44,796

At December 31, 2020 and 2019, the Company held an inventory reserve of \$1,140 and \$0, respectively. 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 6 – PROPERTY, PLANT AND EQUIPMENT, NET

At December 31, 2020 and 2019, property, plant and equipment consisted of the following:

	December 31,	
	2020	2019
Manufacturing equipment	\$ 5,966	\$ 3,902
Office equipment	1,047	627
Transportation equipment	216	124
Leasehold improvement	2,398	1,442
Total cost	9,627	6,095
Less: Total accumulated depreciation	(3,745)	(3,077)
Construction in progress	2,310	601
Total property, plant and equipment, net	\$ 8,192	\$ 3,619

Depreciation expense was \$826, \$713 and \$350 for the years ended December 31, 2020, 2019 and 2018, respectively. During the years ended December 31, 2020 and 2019, the Company retired certain fully depreciated manufacturing equipment with cost of \$446 and \$5,824, respectively.

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NOTE 7 – LAND USE RIGHT, NET

A summary of land use right is as follows:

	December 31,	
	2020	2019
Land use right purchase amount	\$ 9,744	\$ -
Less: Accumulated amortization	(98)	-
Land use right, net	<u>\$ 9,646</u>	<u>\$ -</u>

In 2020 ACM Shanghai, through its wholly owned subsidiary Shengwei Research (Shanghai), Inc., entered into an agreement for a 50-year land use right in the Lingang region of Shanghai. In July 2020, Shengwei Research (Shanghai), Inc. began a multi-year construction project for a new 1,000,000 square foot development and production center that will incorporate new manufacturing systems and automation technologies, and will provide floor space to support significantly increase production capacity and related research and development activities.

The amortization for the year ended December 31, 2020 was \$98.

The annual amortization of land use right for each of the five succeeding years is as follows:

Year ending December 31,	
2021	\$ 195
2022	195
2023	195
2024	195
2025	195

NOTE 8 – OTHER LONG-TERM ASSETS

At December 31, 2020 and 2019, other long-term assets consisted of the following:

	December 31,	
	2020	2019
Prepayment for property	\$ 39,450	\$ -
Security deposit for land use right	756	-
Others	290	192
Total other long-term assets	<u>\$ 40,496</u>	<u>\$ 192</u>

The prepayment for property is for the housing in Lingang, Shanghai. The property is pledged for a long-term loan from China Merchants Bank (note 12).

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NOTE 9 – SHORT-TERM BORROWINGS

At December 31, 2020 and December 31, 2019, short-term and long-term borrowings consisted of the following:

	December 31, 2020	December 31, 2019
Line of credit up to RMB 50,000 from Bank of Shanghai Pudong Branch, due on January 23, 2020 with an annual interest rate of 5.22%. It was fully repaid on January 23, 2020. *1	-	5,057
Line of credit up to RMB 20,000 from Shanghai Rural Commercial Bank, due on February 21, 2020 with an annual interest rate of 5.66%, guaranteed by and pledged by accounts receivable. It was fully repaid on February 21, 2020.	-	1,433
Line of credit up to RMB 20,000 from Bank of Communications,		
1) due on January 18, 2020 with an annual interest rate of 5.66% and fully repaid on January 19, 2020.	-	1,433
2) due on January 22, 2020 with an annual interest rate of 5.66% and fully repaid on January 22, 2020.	-	717
3) due on February 14, 2020 with an annual interest rate of 5.66% and fully repaid on February 14, 2020.	-	717
Line of credit up to RMB 50,000 from China Everbright Bank,		
1) due on March 25, 2020 with an annual interest rate of 4.94% and fully repaid on March 24, 2020. *2	-	3,250
2) due on April 17, 2020 with an annual interest rate of 5.66% and fully repaid on April 2, 2020. *2	-	1,146
Line of credit up to RMB 80,000 from China Everbright Bank,		
1) due on April 1, 2021 with an annual interest rate of 4.70%. *2	4,599	-
2) due on June 27, 2021 with an annual interest rate of 4.25%. *2	1,380	-
3) due on April 29, 2021 with an annual interest rate of 2.80%. *2	820	-
4) due on June 27, 2021 with an annual interest rate of 2.70%. *2	2,080	-
Line of credit up to RMB 20,000 from Bank of Communications,		
1) due on April 12, 2021 with an annual interest rate of 4.65%.	1,533	-
2) due on May 24, 2021 with an annual interest rate of 3.65%.	1,533	-
Line of credit up to RMB 70,000 from Bank of Shanghai Pudong Branch,		
1) due on May 27, 2021 with an annual interest rate of 4.68%. *1	2,575	-
2) due on June 27, 2021 with an annual interest rate of 4.68%. *1	1,380	-
3) due on May 28, 2021 with an annual interest rate of 3.48%. *1	2,442	-
4) due on June 7, 2021 with an annual interest rate of 3.50%. *1	1,521	-
5) due on June 16, 2021 with an annual interest rate of 3.50%. *1	1,838	-
Line of credit up to RMB 80,000 from China Merchants Bank,		
1) due on August 10, 2021 with annual interest rate of 3.85%.	1,380	-
2) due on August 25, 2021 with annual interest rate of 3.85%.	3,066	-
Total	\$ 26,147	\$ 13,753

*1 guaranteed by ACM's Chief Executive Officer and Cleanchip Technologies Limited

*2 guaranteed by ACM's Chief Executive Officer

For the years ended December 31, 2020, 2019 and 2018, interest expense related to short-term borrowings amounted to \$897, \$745 and \$498, respectively.

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NOTE 10 – OTHER PAYABLE AND ACCRUED EXPENSES

At December 31, 2020 and 2019, other payable and accrued expenses consisted of the following:

	December 31,	
	2020	2019
Accrued commissions	\$ 7,127	\$ 4,082
Accrued warranty	3,975	2,811
Accrued payroll	3,068	2,092
Accrued professional fees	384	165
Accrued machine testing fees	1,595	1,456
Others	2,656	2,268
Total	\$ 18,805	\$ 12,874

NOTE 11 – LEASES

The Company leases space under non-cancelable operating leases for several office and manufacturing locations. These leases do not have significant rent escalation holidays, concessions, leasehold improvement incentives, or other build-out clauses. Further, the leases do not contain contingent rent provisions.

Most leases include one or more options to renew. The exercise of lease renewal options is typically at the Company's sole discretion; therefore, the majority of renewals to extend the lease terms are not included in the Company's right-of-use assets and lease liabilities as they are not reasonably certain of exercise. The Company regularly evaluates the renewal options, and when they are reasonably certain of exercise, the Company includes the renewal period in its lease term.

As most of the Company's leases do not provide an implicit rate, the Company uses its incremental borrowing rate based on the information available at the lease commencement date in determining the present value of the lease payments. The Company has a centrally managed treasury function; therefore, based on the applicable lease terms and the current economic environment, it applies a portfolio approach for determining the incremental borrowing rate.

The components of lease expense were as follows:

	Year Ended December 31,	
	2020	2019
Operating lease cost	\$ 1,541	\$ 1,432
Short-term lease cost	236	165
Lease cost	\$ 1,777	\$ 1,597

Supplemental cash flow information related to operating leases was as follows for the years ended December 31, 2020 and 2019:

	Year Ended December 31,	
	2020	2019
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash outflow from operating leases	\$ 1,777	\$ 1,597

Maturities of lease liabilities for all operating leases were as follows as of December 31, 2020:

	December 31,
2021	\$ 1,642
2022	1,617
2023	912
2024	872
2025	22
Total lease payments	5,065
Less: Interest	(768)
Present value of lease liabilities	\$ 4,297

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The weighted average remaining lease terms and discount rates for all operating leases were as follows as of December 31, 2020 and 2019:

	December 31,	
	2020	2019
Remaining lease term and discount rate:		
Weighted average remaining lease term (years)	2.11	3.02
Weighted average discount rate	5.14%	5.43%

NOTE 12 – LONG-TERM BORROWINGS

At December 31, 2020 and 2019, long-term borrowings consisted of the following:

	December 31,	
	2020	2019
Loan from China Merchants Bank	\$ 19,570	\$ -
Less: Current portion	(1,591)	-
	<u>\$ 17,979</u>	<u>\$ -</u>

The loan from China Merchants Bank is for the purpose of purchasing property in Lingang, Shanghai. The loan is repayable in 120 installments with the last installment due in November 2030, with an annual interest rate of 4.65%. The loan is pledged by the property of Shengwei Research (Shanghai) Inc. and guaranteed by ACM Research (Shanghai) Inc. As of December 31, 2020, the right certificate of the pledged property has not been obtained and the procedures of the formal pledge registration in the bank had not been completed.

Scheduled principal payments for the outstanding long-term loan as of December 31, 2020 are as follows:

Year ending December 31,	
2021	\$ 1,591
2022	1,666
2023	1,745
2024	1,828
2025 and onwards	12,740
	<u>\$ 19,570</u>

For the year ended December 31, 2020, interest expense related to long-term borrowings amounted to \$72.

NOTE 13 – 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, 2020 and 2019, other long-term liabilities consisted of the following unearned government subsidies:

	December 31,	
	2020	2019
Subsidies to Stress Free Polishing project, commenced in 2008 and 2017	\$ 1,266	\$ 1,251
Subsidies to Electro Copper Plating project, commenced in 2014	2,156	2,666
Subsidies to Polytetrafluoroethylene, commenced in 2018	130	135
Subsidies to Tahoe-Single Bench Clean, commenced in 2020	1,544	-
Subsidies to Backside Clean-YMTC National Project, commenced in 2020	2,591	-
Other	347	134
Total	<u>\$ 8,034</u>	<u>\$ 4,186</u>

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NOTE 14 – LONG-TERM INVESTMENT

On September 6, 2017, ACM and Ninebell Co., Ltd. (“Ninebell”), a Korean company that is one of the Company’s principal material 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.

On June 27, 2019, ACM Shanghai and Shengyi Semiconductor Technology Co., Ltd. (“Shengyi”), a company based in Wuxi, China that is one of the Company’s component suppliers, entered into an agreement pursuant to which Shengyi issued to ACM Shanghai shares representing 15% of Shengyi’s post-closing equity for a purchase price of \$109. The investment in Shengyi is accounted for under the equity method.

On September 5, 2019, ACM Shanghai, entered into a Partnership Agreement with six other investors, as limited partners, and Beijing Shixi Qingliu Investment Co., Ltd., as general partner and manager, with respect to the formation of Hefei Shixi Chanheng Integrated Circuit Industry Venture Capital Fund Partnership (LP), a Chinese limited partnership based in Hefei, China. Pursuant to such Partnership Agreement, on September 30, 2019, ACM Shanghai invested RMB 30,000 (\$4,200), which represented 10% of the partnership’s total subscribed capital. The investment in Hefei Shixi Chanheng Integrated Circuit Industry Venture Capital Fund Partnership (LP) is accounted for under the equity method in accordance with ASC 323-30-S99-1.

The Company treats the equity investment in the consolidated financial statements under the equity method. Under the equity method, the investment is initially recorded at cost, adjusted for any excess of the Company’s share of the incorporated-date fair values of the investee’s identifiable net assets over the cost of the investment (if any). Thereafter, the investment is adjusted for the post incorporation change in the Company’s share of the investee’s net assets and any impairment loss relating to the investment. For the years ended December 31, 2020 and 2019, the Company’s share of equity investees’ net income was \$655 and \$168, respectively, which was included in income on equity method investment in the accompanying consolidated statements of operations and comprehensive income. For the year ended December 31, 2020, dividends received from its equity investee was \$555, which was offsetting in part the carrying value of the Company’s share of equity investees’ net income.

	December 31,	
	2020	2019
Ninebell	\$ 1,666	\$ 1,538
Shengyi	134	107
Hefei Shixi	4,540	4,289
Total	\$ 6,340	\$ 5,934

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NOTE 15 – TRADING SECURITIES

Pursuant to a Partnership Agreement dated June 9, 2020 (the “Partnership Agreement”) and a Supplementary Agreement thereto dated June 15, 2020 (the “Supplementary Agreement”), ACM Shanghai became a limited partner of Qingdao Fortune-Tech Xinxing Capital Partnership (L.P.), a Chinese limited partnership based in Shanghai, China (the “Partnership”) of which China Fortune-Tech Capital Co., Ltd serves as general partner and thirteen unaffiliated entities serve, with ACM Shanghai, as limited partners. The Partnership was formed to establish a special fund that would purchase, in a strategic placement, shares of Semiconductor Manufacturing International Corporation, (“SMIC”) to be listed on the STAR Market. SMIC is a Shanghai-based foundry that has been a customer of the Company’s single-wafer wet-cleaning tools. The limited partners of the Partnership contributed to the fund a total of RMB 2.224 billion (\$315,000), of which ACM Shanghai contributed RMB 100 million (\$14.2 million), or 4.3% of the total contribution, on June 18, 2020.

Upon the closing of the SMIC offering in July 2020, the initial number of SMIC shares owned by the Partnership was apportioned to all of the limited partners in proportion to their respective capital contributions (4.3% in the case of ACM Shanghai). All of the SMIC shares acquired by the Partnership are subject, under applicable Chinese laws, to lock-up restrictions that prevent sales of the shares for one year after the shares were acquired. Thereafter an individual limited partner will be able to instruct the general partner to sell, on behalf of the limited partner, all or a portion of the limited partner’s apportioned shares, subject to compliance with all laws, regulations, trading rules, the Partnership Agreement and the Supplementary Agreement. Alternatively, following the lock-up period, limited partners holding at least thirty percent of the total SMIC shares held by the Partnership will be able, pursuant to a call auction in accordance with the Supplementary Agreement, to cause the general partner to arrange to sell all of the shares desired to be offered by each of the limited partners that complies with procedural requirements provided in the Supplementary Agreement.

As SMIC was listed on the STAR Market in July 2020, ACM Shanghai’s investment is accounted for as trading securities and is stated at fair market value, which is classified as Level 2 of the hierarchy established under ASC 820 with valuations based on quoted prices for identical securities in active markets, less a discount applied to reflect the remaining lock-up period.

The components of trading securities were as follows:

	December 31,	
	2020	2019
Trading securities listed in Shanghai Stock Exchange		
Cost	\$ 15,020	\$ -
Market value	\$ 28,239	\$ -

Unrealized gain on trading securities, net of exchange difference amounted to \$12,574 for the year ended December 31, 2020.

NOTE 16 – FINANCIAL LIABILITY CARRIED AT FAIR VALUE

In December 2016 Shengxin (Shanghai) Management Consulting Limited Partnership (“SMC”) paid 20,123,500 RMB (\$2,981 as of the date of funding) (the “SMC Investment”) to ACM Shanghai for investment pursuant to terms to be subsequently negotiated. SMC is a PRC limited partnership partially owned by employees of ACM Shanghai.

In March 2017 (a) ACM issued to SMC a warrant (the “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 \$2,981, and (b) ACM Shanghai agreed to repay the SMC Investment within 60 days after the exercise of the Warrant. In March 2018 SMC exercised the Warrant in full, as a result of which (1) ACM issued 397,502 shares of Class A common stock to SMC, (2) SMC borrowed the funds to pay the Warrant exercise price pursuant to a senior secured promissory note (the “SMC Note”) in the principal amount of \$2,981 issued to ACM Shanghai, which in turn issued to ACM a promissory note (the “Intercompany Note”) in the principal amount of \$2,981 in payment of the Warrant exercise price. Each of the SMC Note and the Intercompany Note bore interest at a rate of 3.01% per annum and matured on August 17, 2023. The SMC Note was secured by a pledge of the shares issued upon exercise of the Warrant.

In connection with its follow-on public offering of Class A common stock in August 2019, ACM agreed to purchase a total of 154,821 of the Warrant shares from SMC at a per share price of \$13.195, of which (a) \$1,161 was applied to reduce SMC’s obligations to ACM Shanghai under the SMC Note, and which ACM then withheld for its own account and applied to reduce ACM Shanghai’s obligations to ACM under the Intercompany Note, and (b) the remaining \$882 was paid to SMC. In a separate transaction, ACM Shanghai repaid \$1,161 of the SMC Investment in cash, which reduced the amount of the SMC Investment due to SMC to \$1,820.

The SMC Note and SMC Investment are offsetting items in the Company’s consolidated balance sheet in accordance with ASC 210-20-45-1 up to April 30, 2020.

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In preparation for the STAR IPO, ACM Shanghai was required to terminate its financial relationship with SMC. In order to facilitate such termination, on April 30, 2020, ACM entered into two agreements relating to outstanding obligations among ACM Research, ACM Shanghai and SMC. Pursuant to such agreements: (i) ACM Shanghai assigned to ACM its rights under the SMC Note, including the right to receive payment of the \$1,820 payable thereunder; (ii) ACM cancelled the outstanding \$1,820 obligation of ACM Shanghai under the Intercompany Note; (iii) SMC surrendered its remaining 242,681 Warrant shares to ACM Research; and (iv) in exchange for such 242,681 Warrant shares, ACM agreed to deliver to SMC certain consideration (“SMC Consideration”) agreed upon by ACM Research and SMC, subject to obtaining certain PRC regulatory approvals. Under the agreements, if the required approvals were not obtained by December 31, 2023, ACM would cancel the SMC Note as consideration for the 242,681 Warrant shares. In a separate transaction in April 2020, ACM Shanghai repaid the remaining \$1,820 of the SMC Investment in cash.

For the period beginning April 30, 2020, the SMC Consideration is accounted for as a financial liability, and the Company applies fair value option to measure the SMC Consideration in accordance with ASC 825-10-15-4a. On April 30, 2020, the SMC Consideration was \$9,715 which was for cancellation of the Warrant shares and recorded in the equity. The financial liability was remeasured to fair value as of the end of each of the reporting periods.

On July 29, 2020, ACM and SMC entered into an amended agreement under which, in settlement of the SMC Consideration, ACM issued to SMC a warrant (the “SMC 2020 Warrant”) to purchase 242,681 shares of Class A common stock at a purchase price of \$7.50 per share, and ACM cancelled the SMC Note. The financial liability was remeasured to fair value of \$21,679 as of July 29, 2020, and was retired with the issuance of the SMC 2020 Warrant. The Company recognized a change in fair value of financial liability of \$11,964 for the year ended December 31, 2020, which was reflected in the consolidated statement of operations. The Company recorded the difference of \$19,859 between the SMC 2020 Warrant of \$21,679 and the SMC Note of \$1,820 into the equity.

The SMC 2020 Warrant was initially measured at fair value at the issuance date and classified as equity permanently in accordance with ASC 815. The fair value of the SMC 2020 Warrant amounted to \$21,679, based on the grant date using the Black-Scholes valuation model with the following assumptions:

	July 29, 2020
Fair value of common share(1)	\$ 89.28
Expected term in years(2)	3.42
Volatility(3)	47.42%
Risk-free interest rate(4)	0.15%
Expected dividend(5)	0%

- (1) Fair value of Class A common stock was the closing market price of the Class A common stock on July 29, 2020.
- (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 the stock of companies comparable to ACM 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.

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NOTE 17 – RELATED PARTY BALANCES AND TRANSACTIONS

Prepaid expenses	December 31, 2020	December 31, 2019
Ninebell	\$ 1,607	\$ 348

Accounts payable	December 31, 2020	December 31, 2019
Ninebell	\$ 2,898	\$ 727
Shengyi	1,195	488
Total	\$ 4,093	\$ 1,215

Purchase of materials	Year Ended December 31		
	2020	2019	2018
Ninebell	\$ 15,251	\$ 8,572	\$ 7,785
Shengyi	2,300	856	-
Total	\$ 17,551	\$ 9,428	\$ 7,785

Service fee charged by	Year Ended December 31		
	2020	2019	2018
Shengyi	\$ 322	\$ -	\$ -
Ninebell	22	-	-
Total	344	-	-

NOTE 18 – COMMON STOCK

ACM is authorized to issue 50,000,000 shares of Class A common stock and 2,409,738 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.

On March 30, 2018, SMC exercised the SMC Warrant in full (note 16) to purchase 397,502 shares of Class A common stock. During the year ended December 31, 2020, SMC transferred and cancelled its ownership of 242,681 shares of Class A common stock to ACM in exchange for the SMC 2020 Warrant (note 16).

During the year ended December 31, 2020, ACM issued 832,504 shares of Class A common stock upon option exercises by employees and non-employees and an additional 60,002 shares of Class A common stock upon conversion of an equal number of shares of Class B common stock. During the year ended December 31, 2019, ACM issued 195,297 shares of Class A common stock upon option exercises by employees and non-employees and an additional 35,815 shares of Class A common stock upon conversion of an equal number of shares of Class B common stock. 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 and an additional 511,315 shares of Class A common stock upon conversion of an equal number of shares of Class B common stock.

During the year ended December 31, 2020, ACM issued 64,717 shares of Class A common stock upon cashless warrant exercises by non-employees. During the year ended December 31, 2019, ACM issued 1,438 shares of Class A common stock upon cashless warrant exercises by non-employees.

In August 2019, ACM sold a total of 2,053,572 shares of Class A common stock to the public at a price of \$14.00 per share for aggregate gross proceeds of \$28,750. Net proceeds to ACM excluded an underwriting discount and offering expenses totaling \$2,287. ACM repurchased outstanding shares from certain directors, employees and SMC upon the exercise of the underwriters' over-allotment option using a portion of ACM's net proceeds from the public offering for the purpose of share constructive retirement. A total of 214,286 repurchased shares were accounted for share retirement during the year ended December 31, 2019.

At December 31, 2020 and 2019, the number of shares of Class A common stock issued and outstanding was 16,896,693, and 16,182,151, respectively. At December 31, 2020 and 2019, the number of shares of Class B common stock issued and outstanding was 1,802,606 and 1,862,608, respectively.

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NOTE 19 – REDEEMABLE NON-CONTROLLING INTERESTS

As discussed in note 1, during the quarter ended September 30, 2019, ACM Shanghai issued to certain private placement investors (the “First Tranche Investors”) equity in the form of redeemable non-controlling interests, representing 4.2% of the outstanding shares of ACM Shanghai. Two of the First Tranche Investors were entities owned by certain employees of ACM Shanghai (the “Employee Entities”), and the purchase price paid by the Employee Entities represented a discount of 20% from the purchase price paid by the other First Tranche Investors. The discount granted to the Employee Entities is classified as stock-based compensation, as further discussed in note 20.

In addition to the capital increase agreement with the First Tranche Investors, ACM Shanghai entered into a supplemental agreement (a “First Tranche Supplemental Agreement”) with each of the First Tranche Investors. Under each First Tranche Supplemental Agreement, ACM Shanghai and the First Tranche Investor party thereto agreed to use their respective best efforts to facilitate the completion of the STAR Listing and the STAR IPO within three years from the date on which ACM Shanghai shares were issued to the First Tranche Investors. If, by the end of such three-year period, the STAR Listing and the STAR IPO have not been completed and the China Securities Regulatory Commission has not otherwise approved the registration of the STAR Listing registration application, each First Tranche Investor and ACM Shanghai would have the right to require that ACM Shanghai repurchase the First Tranche Investor’s shares for a price equal to the initial purchase price paid by the First Tranche Investor, without interest. The Supplemental Agreements automatically terminated on the date that ACM Shanghai formally submitted the STAR Listing registration application document to the Shanghai Stock Exchange.

In the quarter ended December 31, 2019, ACM Shanghai issued to certain private placement investors (the “Second Tranche Investors”) equity in the form of redeemable non-controlling interests. Following the issuance of shares to the Second Tranche Investors, 91.7% of the outstanding shares of ACM Shanghai was owned by ACM, 3.8% was owned by the First Tranche Investors, and 4.5% was owned by the Second Tranche Investors.

In addition to the capital increase agreement with the Second Tranche Investors, ACM Shanghai entered into a supplemental agreement (a “Second Tranche Supplemental Agreement”) with each of the Second Tranche Investors. Under each Second Tranche Supplemental Agreement, if ACM Shanghai did not officially submit application documents for the STAR Listing to the Shanghai Stock Exchange by December 31, 2022, each Second Tranche Investor would have the right to require that ACM Shanghai repurchase, and ACM Shanghai will have the right to require that each Second Tranche Investor sell to ACM Shanghai, such Second Tranche Investor’s ACM Shanghai shares for a price equal to the initial purchase price paid by the Second Tranche Investor, without interest. The Second Tranche Supplemental Agreements automatically terminated on the date that ACM Shanghai formally submitted the STAR Listing registration application document to the Shanghai Stock Exchange. Because the First Tranche Investors and the Second Tranche Investors had the right to require ACM Shanghai to repurchase their ownership interests in ACM Shanghai at a fixed purchase price, those ownership interests were classified as redeemable non-controlling interests under ASC 480 Distinguishing Liabilities From Equity. The Company had elected to apply the entire adjustment method (income classification) for subsequent measurement in accordance with ASC 480-10-S99.

Upon the submission of application documents by ACM Shanghai for the STAR Listing and the STAR IPO to the Shanghai Stock Exchange during the second quarter of 2020, the redemption feature of the private placement funding (note 1) terminated and the aggregate proceeds of the funding therefore were reclassified from redeemable non-controlling interests to non-controlling interests. Further, upon the termination of such redemption feature, the Company released the aggregate proceeds of the private placement funding from reserved cash, which the Company previously had voluntarily imposed in light of a potential redemption.

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The components of the change in the redeemable non-controlling interests for the year ended December 31, 2020 and 2019 are presented in the following table:

Balance at January 1, 2019	\$ -
Increase in redeemable non-controlling interests due to issuance of common stock	
Tranche 1:	27,264
Tranche 2:	32,415
Net income attributable to redeemable non-controlling interests	564
Effect of foreign currency translation loss attributable to redeemable non-controlling interests	(81)
Balance at December 31, 2019	\$ 60,162
Net income attributable to redeemable non-controlling interests	643
Effect of foreign currency translation gain attributable to redeemable non-controlling interests	(847)
Reclassification of redeemable non-controlling interest	(59,958)
Balance at December 31, 2020	\$ -

NOTE 20 – STOCK-BASED COMPENSATION

In January 2020 ACM Shanghai adopted a 2019 Stock Option Incentive Plan (the “Subsidiary Stock Option Plan”) that provides for, among other incentives, the granting to officers, directors, employees of options to purchase shares of ACM Shanghai’s common stock. The fair value of the stock options granted is estimated at the date of grant based on the Black-Scholes option pricing model using assumptions generally consistent with those used for ACM’s stock options. Because ACM Shanghai shares are not currently publicly traded, the expected volatility is estimated with reference to the average historical volatility of a group of publicly traded companies that are believed to have similar characteristics to ACM Shanghai.

ACM’s stock-based compensation consists of employee and non-employee awards issued under the 1998 Stock Option Plan and the 2016 Omnibus Incentive Plan and as standalone options. ACM granted stock options to employees under the 2016 Omnibus Incentive Plan during the twelve months ended December 31, 2020. The vesting condition may consist of service period determined by the Board of Directors for a grant or certain performance conditions determined by the Board of Directors for a grant. The fair value of the stock options granted with service period based condition is estimated at the date of grant using the Black-Scholes option pricing model. The fair value of the stock options granted with market based condition is estimated at the date of grant using the Monte Carlo simulation model.

The following table summarizes the components of stock-based compensation expense included in the consolidated statements of operations:

	Year Ended December 31,		
	2020	2019	2018
Stock-Based Compensation Expense:			
Cost of revenue	\$ 175	\$ 250	\$ 71
Sales and marketing expense	1,199	328	120
Research and development expense	763	1,093	255
General and administrative expense	3,491	1,901	2,917
	<u>\$ 5,628</u>	<u>\$ 3,572</u>	<u>\$ 3,363</u>

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	Year Ended December 31,		
	2020	2019	2018
Stock-based compensation expense by type:			
Employee stock purchase plan	\$ 4,900	\$ 2,265	\$ 712
Non-employee stock purchase plan	396	1,307	2,651
Subsidiary option grants	332	-	-
	\$ 5,628	\$ 3,572	\$ 3,363

Employee Awards

The following table summarizes the Company's employee share option activities during the years ended December 31, 2018, 2019 and 2020:

	Number of Option Share	Weighted Average Grant Date Fair Value	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term
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
Granted	656,000	6.29	16.21	
Exercised	(106,768)	0.60	2.09	
Expired	(2,757)	3.34	8.16	
Forfeited/cancelled	(55,817)	2.38	6.23	
Outstanding at December 31, 2019	2,994,063	2.59	6.77	7.05 years
Granted	786,399	12.17	29.17	
Exercised	(547,189)	1.34	3.78	
Forfeited/cancelled	(41,862)	4.80	12.65	
Outstanding at December 31, 2020	3,191,411	\$ 5.13	\$ 12.73	7.13 years
Vested and exercisable at December 31, 2020	1,959,387			

As of December 31, 2020 and 2019, \$8,733 and \$4,712, respectively, of total unrecognized employee stock-based compensation expense, net of estimated forfeitures, related to stock-based awards for ACM were expected to be recognized over a weighted-average period of 1.89 years and 1.47 years, respectively. Total recognized compensation cost may be adjusted for future changes in estimated forfeitures.

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Non-employee Awards

The following table summarizes the Company's non-employee share option activities during the years ended December 31, 2018, 2019 and 2020:

	Number of Option Shares	Weighted Average Grant Date Fair Value	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term
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
Granted	-	-	-	
Exercised	(88,529)	0.45	1.06	
Expired	-	-	-	
Forfeited/cancelled	(22,232)	0.55	3.00	
Outstanding at December 31, 2019	1,101,613	0.82	2.69	5.85 years
Granted	20,000	10.29	25.60	
Exercised	(285,315)	0.88	3.17	
Expired	-	-	-	
Forfeited/cancelled	(260)	0.30	0.75	
Outstanding at December 31, 2020	836,038	\$ 1.02	\$ 3.07	4.92 years
Vested and exercisable at December 31, 2020	806,677			

As of December 31, 2020 and 2019, \$195 and \$406, respectively, of total unrecognized non-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 0.09 years and 0.23 years, respectively. Total recognized compensation cost may be adjusted for future changes in estimated forfeitures.

The fair value of options granted to employee and non-employee with a service period based condition is estimated on the grant date using the Black-Scholes valuation model with the following assumptions:

	Year Ended December 31,		
	2020	2019	2018
Fair value of common share(1)	\$ 25.60	\$ 18.45	\$ 10.88
Expected term in years(2)	6.25	1.58-3.60	2.58-5.36
Volatility(3)	42.17%	40.24%-45.48%	40.24%-45.48%
Risk-free interest rate(4)	0.78%	2.39%-2.94%	2.39%-2.94%
Expected dividend(5)	0.00%	0.00%	0.00%

- (1) Fair value of Class A common stock value was the closing market price of the Class A common stock on the grant date.
- (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 the stock of companies comparable to ACM 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.

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The fair value of option granted to employee with market based condition is estimated on the grant date using the Monte Carlo simulation model with the following assumptions:

	Year Ended December 31, 2020
Fair value of common share(1)	\$ 22.07
Expected term in years(2)	9.20 - 9.80
Volatility(3)	45.10%
Risk-free interest rate(4)	2.68%
Expected dividend(5)	0%

- (1) Fair value of Class A common stock value was the closing market price of the Class A common stock on the grant date.
- (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 the stock of companies comparable to ACM 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.

ACM Shanghai Option Grants

The following table summarizes the ACM Shanghai employee stock option activities during the year ended December 31, 2020:

	Number of Option Shares in ACM Shanghai	Weighted Average Grant Date Fair Value	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term
Outstanding at December 31, 2019	-	\$ -	\$ -	-
Granted	5,869,808	0.23	1.89	
Exercised	-	-	-	
Expired	-	-	-	
Forfeited/cancelled	(446,154)	0.23	1.89	
Outstanding at December 31, 2020	5,423,654	\$ 0.23	\$ 1.89	3.50 years
Vested and exercisable at December 31, 2020	-			

During the year ended December 31, 2020, the Company recognized stock-based compensation expense of \$332, related to stock option grants of ACM Shanghai. As of December 31, 2020, \$822 of total unrecognized non-employee stock-based compensation expense, net of estimated forfeitures, related to ACM Shanghai stock-based awards were expected to be recognized over a weighted-average period of 2.5 years. Total recognized compensation cost may be adjusted for future changes in estimated forfeitures.

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NOTE 21 – INCOME TAXES

The following represent components of the income tax benefit (expense) for the years ended December 31, 2020, 2019 and 2018:

	Year Ended December 31,		
	2020	2019	2018
Current:			
U.S. federal	\$ (61)	\$ -	\$ -
U.S. state	(2)	-	-
Foreign	(2,014)	(3,176)	(1,149)
Total current tax expense	<u>(2,077)</u>	<u>(3,176)</u>	<u>(1,149)</u>
Deferred:			
U.S. federal	7,325	3,728	-
U.S. state	-	-	-
Foreign	(2,866)	(34)	343
Total deferred tax benefit	<u>4,459</u>	<u>3,694</u>	<u>343</u>
Total income tax benefit (expense)	<u>\$ 2,382</u>	<u>\$ 518</u>	<u>\$ (806)</u>

Tax effects of temporary differences that give rise to significant portions of the Company's deferred tax assets at December 31, 2020 and 2019 are presented below:

	Year Ended December 31,	
	2020	2019
Deferred tax assets:		
Net operating loss carry forwards (offshore)	\$ 323	\$ 216
Net operating loss carry forwards (U.S.) and credit	9,981	3,218
Deferred revenue (offshore)	556	1,181
Accruals (U.S.)	22	15
Reserves and other (offshore)	884	426
Stock-based compensation (U.S.)	1,599	1,168
Property and equipment (U.S.)	164	3
Lease liability	659	-
Total gross deferred tax assets	<u>14,188</u>	<u>6,227</u>
Less: valuation allowance	(848)	(896)
Total deferred tax assets	<u>13,340</u>	<u>5,331</u>
Deferred tax liabilities:		
Fixed assets	(697)	-
Deferred revenue (offshore)	(967)	-
Unrealized gain on trading securities	(1,886)	-
Total deferred tax liabilities	<u>(3,550)</u>	<u>-</u>
Translation difference	-	-
Deferred tax assets, net	<u>\$ 9,790</u>	<u>\$ 5,331</u>

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, 2020 and 2019, 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 \$151 and \$4,465 for the years ended December 31, 2020 and 2019, respectively. The valuation allowance in the PRC increased by \$102 and \$207 for the years ended December 31, 2020 and 2019, respectively.

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As of December 31, 2020 and 2019, the Company had net operating loss carry-forwards of, respectively, \$45,031 and \$12,158 for U.S. federal purposes, \$545 and \$634 for U.S. state purposes and \$1,294 and \$66 for PRC income tax purposes. Such losses begin expiring in 2022, 2032 and 2021 for U.S. federal, U.S. state and PRC income tax purposes, respectively.

As of December 31, 2020 and 2019, the Company had research credit carry-forwards of, respectively, \$359 and \$479 for U.S. federal purposes and \$377 and \$377 for U.S. state purposes. Such credits begin expiring in 2021 for U.S. federal carry-forwards. There is no expiration date for U.S. state carry-forwards.

Under provisions of the U.S. Internal Revenue Code (the “IRC”), a limitation applies to the use of the U.S. net operating loss and credit carry-forwards that would be applicable if ACM experiences an “ownership change,” as defined in IRC Section 382. ACM conducted an analysis of its stock ownership under IRC Section 382 and \$12,118 of the net operating loss carryforwards are subject to annual limitation as a result of the ownership change in 2017. The net operating loss carryforwards are not expected to expire before utilization.

The Company’s effective tax rate differs from statutory rates of 21% for U.S. federal income tax purposes and 15% to 25% for PRC income tax purpose due to the effects of the valuation allowance and certain permanent differences as they pertain to book-tax differences in employee stock-based compensation and 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 each of 2012, 2016 and 2018 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, 2020, 2019 and 2018.

Income tax expense for the years ended December 31, 2020, 2019 and 2018 differed from the amounts computed by applying the statutory U.S. federal income tax rate of 21% to pretax income as a result of the following:

	Year Ended December 31,		
	2020	2019	2018
Effective tax rate reconciliation:			
Income tax provision at statutory rate	21.00%	21.00%	21.00%
State taxes, net of Federal benefit			
Foreign rate differential	(13.87)	(12.26)	(20.88)
Other permanent difference	(19.23)	8.71	15.59
Effect of tax reform			
Change in valuation allowance	(0.25)	(20.19)	(4.78)
Total income tax expense (benefit)	(12.35)%	(2.74)%	10.93%

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, 2020 and 2019, were as follows:

	Year Ended December 31,	
	2020	2019
Beginning balance	\$ 44	\$ 44
Increase of unrecognized tax benefits taken in prior years	116	-
Increase of unrecognized tax benefits related to current year	410	-
Increase of unrecognized tax benefits related to settlements	-	-
Reductions to unrecognized tax benefits related to lapsing statute of limitations	-	-
Ending balance	\$ 570	\$ 44

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The Company is subject to taxation in the United States, California 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, 1999 through December 31, 2020. 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 or by state or foreign tax authorities to the extent utilized in a future period.

The Company had \$570 and \$44 of unrecognized tax benefits as of December 31, 2020 and 2019, respectively.

The Company recognizes interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2020 and 2019, respectively, the Company had \$0 and \$44 of accrued penalties related to uncertain tax positions, all of which was recognized in the Company's consolidated statements of operations and comprehensive income for the year then ended. The amount of the unrecognized tax benefit that, if recognized, would impact the effective tax rate was \$422 as of December 31, 2020. There were no ongoing examinations by taxing authorities as of December 31, 2020 or 2019.

The Company intends to indefinitely reinvest the PRC earnings outside of the United States as of December 31, 2020 and 2019. Thus, deferred taxes are not provided in the United States for unremitted earnings in the PRC.

NOTE 22 – SEGMENT INFORMATION

The Company is engaged in the developing, manufacture and sale of single-wafer wet cleaning equipment, which have been organized as one reporting segment as the equipment has substantially similar nature and economic characteristics. The Company's principal operating decision maker, ACM's Chief Executive Officer, receives and reviews the results of the operations for all major type of equipment as a whole when making decisions about allocating resources and assessing performance of the Company. In accordance with FASB ASC 280-10, the Company is not required to report segment information.

NOTE 23 – COMMITMENTS AND CONTINGENCIES

The Company leases offices under non-cancelable operating lease agreements. See note 8 for future minimum lease payments under non-cancelable operating lease agreements with initial terms of one year or more.

As of December 31, 2020, the Company had \$1,173 of open capital commitments.

In the normal course of business, the Company is subject to contingencies, including legal proceedings and environmental claims arising out of the normal course of businesses that relate to a wide range of matters, including among others, contracts breach liability. The Company records accruals for such contingencies based upon the assessment of the probability of occurrence and, where determinable, an estimate of the liability. Management may consider many factors in making these assessments including past history, scientific evidence and the specifics of each matter. Some of these contingencies involve claims that are subject to substantial uncertainties and unascertainable damages.

The Company's management has evaluated all such proceedings and claims that existed as of December 31, 2020 and 2019. In the opinion of management, no provision for liability nor disclosure was required as of December 31, 2020 related to any claim against the Company because: (a) there is not a reasonable possibility that a loss exceeding amounts already recognized (if any) may be incurred with respect to such claim; (b) a reasonably possible loss or range of loss cannot be estimated; or (c) such estimate is immaterial.

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As of December 31, 2020, the Company had one outstanding legal proceeding regarding securities class action. On December 21, 2020, a putative class action lawsuit against ACM and three of its current executive officers was filed in the U.S. District Court for the Northern District of California under the caption *Kain v. ACM Research, Inc., et al.*, No. 3:20-cv-09241. The complaint asserts claims under Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder, and seeks monetary damages in an unspecified amount as well as costs and expenses incurred in the litigation. The court has not yet appointed a lead plaintiff. ACM's management believes the claims are without merit and intend to vigorously defend this litigation. The Company is currently unable to predict the outcome of this lawsuit and therefore cannot determine the likelihood of loss or estimate a range of possible loss.

NOTE 24 – RESTRICTED NET ASSETS

In accordance with the PRC's Foreign Enterprise Law, ACM Shanghai Shengwei Research (Shanghai), Inc., 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 Shengwei Research (Shanghai), Inc. and ACM Wuxi). Amounts restricted included paid-in capital and statutory reserve funds, as determined pursuant to PRC accounting standards and regulations, were \$119,377, \$113,168 and \$32,076 as of December 31, 2020, 2019 and 2018, respectively.

NOTE 25 – 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, 2020 or 2019.

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The following represents condensed unconsolidated financial information of ACM only as of December 31, 2020 and 2019, and for the years ended December 31, 2020, 2019 and 2018:

CONDENSED BALANCE SHEET

	December 31,	
	2020	2019
Assets		
Current assets:		
Cash and cash equivalents	\$ 30,188	\$ 27,733
Inventory	-	444
Due from intercompany	-	4,542
Other receivable	5	5
Prepaid expenses	359	-
Total current assets	30,552	32,724
Deferred tax assets	11,076	-
Investment in unconsolidated subsidiaries	102,455	68,527
Total assets	<u>144,083</u>	<u>101,251</u>
Liabilities and Stockholders' Equity		
Accounts payable	1,278	1,138
Other payable	255	589
Income taxes payable	31	3,129
FIN-48 payable	83	-
Deferred tax liability	1,286	-
Total liabilities	2,933	4,856
Total stockholders' equity	141,150	96,395
Total liabilities and stockholders' equity	<u>\$ 144,083</u>	<u>\$ 101,251</u>

CONDENSED STATEMENT OF OPERATIONS

	Year Ended December 31,		
	2020	2019	2018
Revenue	\$ 1,776	\$ 10,683	\$ 25,506
Cost of revenue	(1,707)	(10,036)	(23,927)
Gross profit	69	647	1,579
Operating expenses:			
Sales and marketing expenses	(1,361)	(490)	(301)
General and administrative expenses	(5,010)	(3,639)	(5,083)
Research and development expenses	-	(476)	(255)
Loss from operations	(6,302)	(3,958)	(4,060)
Equity in earnings of unconsolidated subsidiaries	36,273	22,510	10,360
Change in fair value of financial liability	(11,964)	-	-
Interest income, net	90	231	166
Interest expense, net	-	(67)	-
Other income, net	683	178	108
Income before income taxes	18,780	18,894	6,574
Income tax expense	-	-	-
Net income	<u>\$ 18,780</u>	<u>\$ 18,894</u>	<u>\$ 6,574</u>

CONDENSED STATEMENT OF CASH FLOWS

	Year Ended December 31,		
	2020	2019	2018
Net cash used in operating activities	\$ (290)	\$ (7,957)	\$ (1,189)
Net cash provided by investing activities	-	-	946
Net cash provided by financing activities	2,745	23,347	3,510
Net increase in cash and cash equivalents	2,455	15,390	3,267
Cash and cash equivalents, beginning of year	27,733	13,161	10,874
Effect of exchange rate changes on cash and cash equivalents	-	(818)	(980)
Cash and cash equivalents, end of year	<u>\$ 30,188</u>	<u>\$ 27,733</u>	<u>\$ 13,161</u>

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our company's disclosure controls and procedures pursuant to Rule 13a-15 under the Securities Exchange Act of 1934, or the Exchange Act, as of December 31, 2020. 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. The effectiveness of the disclosure controls and procedures is also necessarily limited by the staff and other resources available to management and the geographic diversity of our company's operations. As a result of the COVID-19 pandemic, in 2020 we have faced additional challenges in operating and monitoring our disclosure controls and procedures as a result of employees working remotely and management travel being limited. In addition, we face potential heightened cybersecurity risks as our level of dependence on our IT networks and related systems increases, stemming from employees working remotely, and the number of malware campaigns and phishing attacks preying on the uncertainties surrounding the COVID-19 pandemic increases.

Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that, as of December 31, 2020, our company's disclosure controls and procedures were 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 Financial 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. The company's internal control over financial reporting includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of our company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of our company are being made only in accordance with authorizations of management and directors of our company; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, assessed the effectiveness of our internal control over financial reporting as of December 31, 2020. 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, 2020.

BDO China Shu Lun Pan Certified Public Accountants LLP, an independent registered public accounting firm, has issued an attestation report on our internal control over financial reporting, which is included herein.

Changes in Internal Control over Financial Reporting and Remediation Efforts

No changes were identified to our internal control over financial reporting during the three months ended December 31, 2020 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. We will continue to review and document our disclosure controls and procedures, including our internal control over financial reporting and may from time to time make changes to enhance their effectiveness and ensure that our systems evolve with our business.



Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
ACM Research, Inc.
Fremont, California

Opinion on Internal Control over Financial Reporting

We have audited ACM Research, Inc. and subsidiaries' (the "Company's") internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (the "COSO criteria"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of the Company as of December 31, 2020 and 2019, the related consolidated statements of operations and comprehensive income, changes in stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2020, and the related notes and our report dated March 1, 2021 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying "Item 9A, Management's Report on Internal Control over Financial Reporting". Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit of internal control over financial reporting in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

BDO China Shu Lun Pan Certified Public Accountants LLP

Shenzhen, The People's Republic of China

March 1, 2021

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 2020 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 2020 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 2020 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 2020 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 2020 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” of Part II above and “Exhibit Index” below.
- (b) Exhibits.

Exhibit No.	Description
3.01	Restated Certificate of Incorporation of ACM Research, Inc.
3.02	Restated Bylaws of ACM Research, Inc.
4.01	Senior Secured Promissory Note dated March 30, 2018 issued by Shengxin (Shanghai) Management Consulting Limited Partnership to ACM Research (Shanghai), Inc.
4.02	Intercompany Promissory Note dated March 30, 2018 issued by ACM Research (Shanghai), Inc. to ACM Research, Inc.
4.03	Warrant Exercise Agreement dated March 30, 2018 by and among ACM Research, Inc., ACM Research (Shanghai), Inc., and Shengxin (Shanghai) Management Consulting Limited Partnership
4.04	Warrant to Purchase Class A Common Stock issued to Shengxin (Shanghai) Management Consulting Limited Partnership dated July 29, 2020
4.05	Description of ACM Research, Inc.’s Securities
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	Form of Capital Increase Agreement between ACM Research, Inc. and certain investors
10.15(a)	Schedule identifying agreements substantially identical to the form of Capital Increase Agreement filed as Exhibit 10.15 hereto
10.16	Form of Agreement between ACM Research, Inc. and certain Investors

10.16(a)	Schedule identifying agreements substantially identical to the form of Agreement filed as Exhibit 10.16 hereto
10.17	Equity Purchase Agreement dated August 4, 2019 between ACM Research, Inc. and certain of its directors and executive officers and an officer affiliate
10.18	Underwriting Agreement dated August 14, 2019 between ACM Research, Inc. and Stifel, Nicolaus & Company, Incorporated as Representative of the several Underwriters
10.19	Partnership Agreement of Hefei Shixi Chanheng Integrated Circuit Industry Venture Capital Fund Partnership (LP) dated September 5, 2019 by and among Infotech National Emerging Industry Venture Investment Guidance Fund (LP), Hefei Guozheng Asset Management Co, Ltd., Hefei Economic and Technological Development Zone Industrial Investment Guidance Fund Co., Ltd., ACM Research (Shanghai), Inc., Hefei Tongyi Equity Investment Partnership (LP), Shenzhen Waitan Technology Development Co., Ltd., and Beijing Shixi Qingliu Investment Co., Ltd.
10.20+	2016 Omnibus Incentive Plan of ACM Research, Inc.
10.20(a)+	Form of Incentive Stock Option Grant Notice and Agreement under 2016 Omnibus Incentive Plan
10.20(b)+	Form of Non-qualified Stock Option Grant Notice and Agreement under 2016 Omnibus Incentive Plan
10.20(c)+	Form of Restricted Stock Unit Grant Notice and Agreement under 2016 Omnibus Incentive Plan
10.21+	Form of Nonstatutory Stock Option Agreement of ACM Research, Inc.
10.22+	1998 Stock Option Plan of ACM Research, Inc.
10.22(a)+	Form of Incentive Stock Option Agreement under 1998 Stock Option Plan
10.22(b)+	Form of Non-statutory Stock Option Agreement under 1998 Stock Option Plan
10.23	Form of Indemnification Agreement entered into between ACM Research, Inc. and certain of its directors and officers
10.24+	Letter agreement dated June 12, 2019 between ACM Research, Inc. and Mark McKechnie
10.25+†	Employment Agreement dated January 8, 2018 between ACM Research (Shanghai), Inc and Lisa Feng
10.26	Note Assignment and Cancellation Agreement dated April 30, 2020 by and among ACM Research, Inc., ACM Research (Shanghai), Inc. and Shengxin (Shanghai) Management Consulting Limited Partnership
10.27(a)	Share Transfer and Note Cancellation Agreement dated April 30, 2020 between ACM Research, Inc. and Shengxin (Shanghai) Management Consulting Limited Partnership
10.27(b)	Amendment No. 1 to Share Transfer and Note Cancellation Agreement dated July 29, 2020 between ACM Research, Inc. and Shengxin (Shanghai) Management Consulting Limited Partnership
10.28††	Grant Contract for State-owned Construction Land Use Right in Shanghai City (Category of R&D Headquarters and Industrial Projects) dated as of May 7, 2020 between ACM Research (Lingang), Inc. and China (Shanghai) Pilot Free Trade Zone Lin-gang Special Area Administration
10.29†	Commitment Letter Regarding the Lock-up of Shares, effective as of May 26, 2020, of ACM Research, Inc.
10.30†	Commitment Letter Regarding Shareholding Intent and Intent to Reduce Shareholding, effective as of May 26, 2020, of ACM Research, Inc. and David H. Wang
10.31†	Commitment Letter Regarding the Plan and Binding Measures for Stabilizing the Stock Price of ACM Research (Shanghai), Inc. Within Three Years After Listing, effective as of May 26, 2020, of ACM Research, Inc., ACM Research (Shanghai), Inc., and certain individuals named therein
10.32†	Commitment Letter Regarding Fraudulent Issuance of Listed Shares, effective as of May 26, 2020, of ACM Research, Inc., ACM Research (Shanghai), Inc. and David H. Wang
10.33††	Commitment Letter Regarding the Lack of False Records, Misleading Statements or Major Omissions in the Preliminary Information Document, effective as of May 26, 2020, of ACM Research, Inc.
10.34†	Commitment Letter Regarding Making Up for Diluted Immediate Returns, effective as of May 26, 2020, of ACM Research, Inc.
10.35††	Commitment Letter Regarding Unfulfilled Commitment on Binding Measures, effective as of May 26, 2020, of ACM Research, Inc. and David H. Wang
10.36†	Commitment Letter Regarding the Avoidance of Competition in the Same Industry, effective as of May 26, 2020, of ACM Research, Inc.
10.37†	Commitment Letter Regarding the Standardization and Reduction of Related Transactions, effective as of May 26, 2020, of ACM Research, Inc.

10.38†	Commitment Letter Regarding the Avoidance of Funds Occupation and Illegal Guarantee, effective as of May 26, 2020, of ACM Research, Inc.
10.39‡†	Statement and Commitment Letter, effective as of May 26, 2020, of ACM Research, Inc.
10.40†	Commitment Letter Regarding Property Lease Matters, effective as of May 26, 2020, of ACM Research, Inc.
10.41†	Commitment Letter Regarding Social Insurance and Housing Provident Fund Matters, effective as of May 26, 2020, of ACM Research, Inc.
10.42†	Commitment Letter Regarding Foreign Exchange Matters, effective as of May 26, 2020, of ACM Research, Inc.
10.43†	Confirmation and Commitment Letter Regarding the Historical Evolution Related Matters Regarding ACM Research (Shanghai), Inc., effective as of May 26, 2020, of ACM Research, Inc.
10.44†	Confirmation Letter, effective as of May 26, 2020, of ACM Research, Inc.
10.45††	Qingdao Fortune-Tech Xinxing Capital Partnership (L.P.) Partnership Agreement, dated June 9, 2020, among China Fortune Tech Capital Co., Ltd., as general partner, and the several limited partners named therein, including ACM Research (Shanghai), Inc.
10.46††	Supplementary Agreement to Partnership Agreement of Qingdao Fortune-Tech Xinxing Capital Partnership (L.P.), dated June 15, 2020, among China Fortune Tech Capital Co., Ltd., as general partner, and the several limited partners named therein, including ACM Research (Shanghai), Inc.
10.47	Adoption Agreement dated July 29, 2020 between ACM Research, Inc. and Shengxin (Shanghai) Management Consulting Limited Partnership (amending the Second Amended and Restated Registration Rights Agreement between ACM Research, Inc. and certain of its stockholders filed with the SEC on October 18, 2017 as Exhibit 10.09 to Amendment No. 1 to Registration Statement on Form S-1)
10.48††	Facilities Agreement dated August 3, 2020 between China Merchants Bank Co., Ltd. Shanghai Branch and ACM Research (Shanghai), Inc.
10.49†*	Form of Shanghai Public Rental Housing Overall Pre-Sale Contract
10.49(a)	Schedule identifying agreements substantially identical to the form of Shanghai Public Rental Housing Overall Pre-Sale Contract filed as Exhibit 10.01 hereto
10.50†	Loan and Mortgage Contract dated November 19, 2020 between China Merchants Bank Co., Ltd., Shanghai Pilot Free Trade Zone Lin-Gang Special Area Sub-branch and Shengwei Research (Shanghai), Inc.
10.51†	Irrevocable Letter of Guarantee dated November 19, 2020 between China Merchants Bank Co., Ltd., Shanghai Pilot Free Trade Zone Lin-Gang Special Area Sub-branch and ACM Research (Shanghai), Inc.
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	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in exhibit 101)

+ Indicates management contract or compensatory plan.

‡ Certain information in this exhibit was omitted by means of redacting a portion of the text and replacing it with [***]

† Unofficial English translation of original document prepared in Mandarin Chinese.

* Certain appendices have been omitted pursuant to Item 601(a)(5) of Regulation S-K. We hereby undertake to furnish copies of the omitted appendices upon request by the Securities and Exchange Commission, provided that we may request confidential treatment pursuant to Rule 24b-2 of the Securities Exchange Act of 1934 for the appendices so furnished.

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 1, 2021.

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 as of March 1, 2021:

Signature	Title
<u>/s/ David H. Wang</u> David H. Wang	Chief Executive Officer, President and Director (<i>Principal Executive Officer</i>)
<u>/s/ Mark A. McKechnie</u> Mark A. McKechnie	Chief Financial Officer, Executive Vice President and Treasurer (<i>Principal Financial and Accounting Officer</i>)
<u>/s/ Haiping Dun</u> Haiping Dun	Director
<u>/s/ Chenming Hu</u> Chenming Hu	Director
<u>/s/ Tracy Liu</u> Tracy Liu	Director
<u>/s/ Yinan Xiang</u> Yinan Xiang	Director
<u>Zhengfan Yang</u>	Director

Description of ACM Research, Inc. Securities

The following information constitutes the “Description of Securities” required by Item 202(a) of Regulation S-K. As of March 1, 2021, ACM Research, Inc. has one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended, which is its Class A common stock, \$0.0001 par value per share.

References herein to “we,” “our,” “us,” or “our company” refer to ACM Research, Inc., a Delaware corporation. The following information summarizes the material terms of our common and preferred stock and warrants, as well as relevant provisions of our charter, which includes certificates of designations relating to each series of our preferred stock, and bylaws, the Delaware General Corporation Law and the Warrant (as defined below). For a complete description of the terms of our common stock and other securities, please refer to our charter and bylaws and the Warrant.

Authorized Capital Stock

Our authorized capital stock consists of 50,000,000 shares of Class A common stock, \$0.0001 par value per share, 2,409,738 shares of Class B common stock, \$0.0001 par value per share, and 10,000,000 shares of preferred stock, \$0.0001 par value per share. Class A common stock and Class B common stock are referred to collectively as common stock. Authorized but unissued shares of Class B Common Stock are not available for reissuance.

Common Stock

Voting Rights

Except as otherwise required by Delaware law, at every annual or special meeting of stockholders, holders of Class B common stock are entitled to twenty votes per share and holders of Class A common stock are entitled to one vote per share. The holders of Class A common stock and Class B common stock vote together as a single class, unless otherwise required by law.

Dividends

Subject to preferences that may be applicable to any then outstanding preferred stock, the holders of our outstanding shares of common stock are entitled to receive dividends, if any, as may be declared from time to time by the board of directors out of legally available funds. The holders of Class A common stock and Class B common stock are entitled to share equally, identically and ratably, on a per share basis, with respect to any dividend or distribution unless different treatment of the shares of each such class is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class A common stock and Class B common stock, each voting separately as a class. At present, we have no plans to issue dividends.

Liquidation

In the event of our liquidation, dissolution or winding up, holders of common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities, subject to the satisfaction of any liquidation preference granted to the holders of any outstanding shares of preferred stock.

Conversion

Each outstanding share of Class B common stock is convertible into one share of Class A common stock (a) at any time, at the option of the holder, or (b) upon any transfer of such share of Class B common stock, whether or not for value, except for certain transfers described in our charter, including transfers to family members, trusts solely for the benefit of the stockholder or their family members, and partnerships, corporations, and other entities exclusively owned by the stockholder or their family members. Once converted or transferred and converted into Class A common stock, shares of Class B common stock will not be reissued.

Other Rights and Preferences

Other than as described above, holders of common stock have no preemptive, conversion or subscription rights, and there are no redemption or sinking fund provisions applicable to common stock. The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Preferred Stock

Under the terms of our charter, the board of directors is authorized to issue up to 10,000,000 shares of preferred stock in one or more series, to establish the number of shares to be included in each such series, and to fix the designation, powers, preferences and rights of such shares and any qualifications, limitations or restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and other provisions, any or all of which may be greater than the rights of common stock. The issuance of preferred stock with voting and conversion rights may adversely affect the voting power of the holders of common stock, including the loss of voting control to others, and the likelihood that such holders will receive dividend payments and payments upon our liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of our company or other corporate action.

Anti-Takeover Provisions

So long as the outstanding shares of Class B common stock represent a majority of the combined voting power of common stock, the holders of Class B common stock will effectively control all matters submitted to our stockholders for a vote, as well as the overall management and direction of our company, which will have the effect of delaying, deferring or discouraging another person from acquiring control of our company.

After such time as the shares of Class B common stock no longer represent a majority of the combined voting power of common stock, the provisions of Delaware law, and our charter and our bylaws may have the effect of delaying, deferring or discouraging another person from acquiring control of our company.

Delaware Law

Section 203 of the Delaware General Corporation Law prevents some Delaware corporations from engaging, under some circumstances, in a business combination, which includes a merger or sale of at least 10% of the corporation's assets with any interested stockholder, meaning a stockholder who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of the corporation's outstanding voting stock, unless:

- the transaction is approved by the board of directors prior to the time that the interested stockholder became an interested stockholder;
- upon consummation of the transaction, which resulted in the stockholder's becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding stock owned by directors who are also officers of the corporation; or
- subsequent to such time that the stockholder became an interested stockholder the business combination is approved by the board and authorized at an annual or special meeting of stockholders by at least two-thirds of the outstanding voting stock that is not owned by the interested stockholder.

A Delaware corporation may "opt out" of these provisions with an express provision in its original charter or an express provision in its charter or bylaws resulting from a stockholders' amendment approved by at least a majority of the outstanding voting shares. We have not opted out of these provisions. As a result, mergers or other takeover or change in control attempts of us may be discouraged or prevented.

Warrants

On July 29, 2020 we issued a warrant to purchase 242,681 shares of our Class A common stock at a purchase price of \$7.50 per share for an aggregate exercise price of \$1,820,107.50, which we refer to as the Warrant. The Warrant may be exercised during the period beginning immediately after the receipt by the warrant holder, as confirmed by us, of all approvals required of the governmental department and other regulatory bodies of the People's Republic of China and ending at 5 p.m., Eastern standard time, on December 31, 2023.

The exercise price and the number of warrant shares are subject to appropriate adjustment from time to time in order to prevent dilution of the purchase rights granted under the Warrant. Such adjustment will occur in the event that we:

- pay a dividend or makes any other distribution upon any capital stock payable either in Class A common stock or in securities that are convertible into Class A common stock without payment of any consideration; or
- subdivide (by any stock split, recapitalization or otherwise) outstanding Class A common stock into a greater number of shares.

Such adjustment will also occur in the event of any of any of the following actions, in each case that entitles the holders of Class A common stock to receive (either directly or upon subsequent liquidation) stock, securities or assets with respect to or in exchange for Class A common stock:

- a reorganization of our company;
- reclassification of our stock (other than a change in par value or from par value to no par value or from no par value to par value or as a result of a stock dividend or subdivision, split-up or combination of shares);
- our consolidation or merger;
- a sale of all or substantially all of our assets; or
- other similar transaction.

Charter and Bylaw Provisions

Our charter and bylaws include a number of provisions that may have the effect of deterring hostile takeovers or delaying or preventing changes in control of our company, even after such time as the shares of Class B common stock no longer represent a majority of the combined voting power of common stock, including the following:

- *Separate Class B Vote for Certain Transactions.* Until the first date on which the outstanding shares of Class B common stock represent less than 35% of the combined voting power of common stock, any transaction that would result in a change in control of our company will require the approval of a majority of our outstanding Class B common stock voting as a separate class. This provision could delay or prevent the approval of a change in control that might otherwise be approved by a majority of outstanding shares of Class A and Class B common stock, voting together on a combined basis.

- *Dual Class Stock.* As described above in “—Common Stock—Voting Rights” above, our charter provides for a dual class common stock structure, which provides certain members of our senior management with the ability to control the outcome of matters requiring stockholder approval, even if they collectively own significantly less than a majority of the shares of our outstanding Class A and Class B common stock, including the election of directors and significant corporate transactions, such as a merger or other sale of our company or its assets.

- *Supermajority Approvals.* Our charter and bylaws provide that when the outstanding shares of Class B common stock represent less than a majority of the combined voting power of common stock, certain 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. This will have the effect of making it more difficult to amend our charter or bylaws to remove or modify certain provisions.

- *Board of Directors Vacancies.* Our charter and bylaws provide that stockholders may fill vacant directorships. When the outstanding shares of Class B common stock represent less than a majority of the combined voting power of common stock, our charter and bylaws authorize only the board of directors to fill vacant directorships. In addition, the number of directors constituting the board is set only by resolution adopted by a majority vote of our entire board. These provisions restricting the filling of vacancies will prevent a stockholder from increasing the size of the board and gaining control of the board by filling the resulting vacancies with its own nominees. Our charter provides that directors may be removed with or without cause only by the affirmative vote of the holders of at least two-thirds of the votes that all of the stockholders would be entitled to cast in any annual election of directors.

- *Classified Board.* The board of directors is not currently classified. Our charter and bylaws provide that when outstanding shares of Class B common stock represent less than a majority of the combined voting power of common stock, the board will be classified into three classes of directors, each of which will hold office for a three-year term. In addition, thereafter, directors may be removed from the board with or without cause only by the affirmative vote of the holders of at least two-thirds of the voting power of the then-outstanding shares of Class A and Class B common stock. The existence of a classified board could delay a successful tender offeror from obtaining majority control of the board, and the prospect of that delay might deter a potential offeror.

- *Stockholder Action; Special Meeting of Stockholders.* Our charter provides that stockholders will be able to take action by written consent. When the outstanding shares of Class B common stock represent less than a majority of the combined voting power of common stock, our stockholders will no longer be able to take action by written consent, and will only be able to take action at annual or special meetings of our stockholders. Stockholders will not be permitted to cumulate their votes for the election of directors. The absence of cumulative voting may make it more difficult for stockholders who own less than a majority in voting power to elect any directors to the board of directors. Our bylaws further provide that special meetings of our stockholders may be called only by the board, the chair of the board or our chief executive officer. A stockholder may not call a special meeting, which may delay the ability of our stockholders to force consideration of a proposal or for holders controlling a majority in voting power of our capital stock to take any action, including the removal of director.

- *Advance Notice Requirements for Stockholder Proposals and Director Nominations.* Our bylaws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders, or to nominate candidates for election as directors at any meeting of stockholders. Our bylaws also specify certain requirements regarding the form and content of a stockholder's notice. These provisions may preclude our stockholders from bringing matters before our annual meeting of stockholders or from making nominations for directors at our meetings of stockholders.

- *Issuance of Undesignated Preferred Stock.* The board of directors has the authority, without further action by the stockholders, to issue shares of undesignated preferred stock with rights and preferences, including voting rights, designated from time to time by the board. The existence of authorized but unissued shares of preferred stock enables the board to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise.

Choice of Forum

Our charter provides that the Court of Chancery of the State of Delaware will be the exclusive forum for: any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, or our charter or bylaws; any action to interpret, apply, enforce, or determine the validity of our charter or bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could find these types of provisions to be inapplicable or unenforceable. The choice of forum provision summarized above is not intended to, and would not, apply to suits brought to enforce any liability or duty created by (i) the Securities Act of 1933 or the rules and regulations thereunder, jurisdiction over which is vested in concurrently vested in federal and state courts, or (ii) the Securities Exchange Act of 1934 or the rules and regulations thereunder, jurisdiction over which is exclusively vested by statute in the U.S. federal courts.

Transfer Agent and Registrar

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

Nasdaq Global Market

The Class A common stock is listed on the Nasdaq Global Market under the symbol "ACMR."

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 S-3 (No. 333-228734) and Form S-8 (Nos. 333-222702 and 333-232780) of ACM Research, Inc. of our reports dated March 1, 2021, relating to the consolidated financial statements and the effectiveness of the Company's internal control over financial reporting, which appears in this Form 10-K for the year ended December 31, 2020.

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

March 1, 2021

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

I, David H. Wang, certify that:

1. I have reviewed this Annual Report on Form 10-K of ACM Research, Inc.
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this annual report.
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report.
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)), for the registrant and have:
 - (a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (e) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of this annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2021

/s/ David H. Wang

David H. Wang
Chief Executive Officer and President
(Principal Executive Officer)

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

I, Mark A. McKechnie, certify that:

1. I have reviewed this annual report on Form 10-K of ACM Research, Inc.
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this annual report.
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report.
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)), for the registrant and have:
 - (a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of this annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):
 - (a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2021

/s/ Mark A. McKechnie

Mark A. McKechnie

Chief Financial Officer, Executive Vice President and Treasurer
(Principal Financial Officer)

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

In connection with the Annual Report on Form 10-K of ACM Research, Inc. for the year ended December 31, 2020, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to his or her knowledge on the date hereof:

1. the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of ACM Research, Inc. for the period presented therein.

Date: March 1, 2021

/s/ David H. Wang
David H. Wang
Chief Executive Officer and President
(Principal Executive Officer)

Date: March 1, 2021

/s/ Mark A. McKechnie
Mark A. McKechnie
Chief Financial Officer, Executive Vice President and Treasurer
(Principal Financial Officer)

The foregoing certification is being furnished solely pursuant to 18 U.S.C. § 1350 and is not being filed as part of the Report or as a separate disclosure document.
