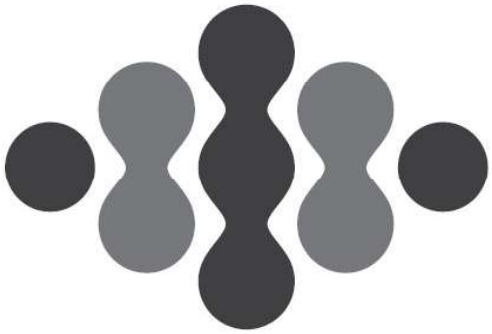

atomera

2023 Annual Report

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Fellow Shareholders,

The first months of 2024 have seen the semiconductor industry transition from last year's pessimism to a more positive outlook. Adoption of artificial intelligence technology across many industries is stimulating corresponding growth in hardware shipments. For Atomera, this creates new opportunities in the advanced nodes, memory, and power technologies needed to manage all the required bandwidth. Innovation in the semiconductor space is a necessary response to the evolving requirements in the new world of AI.

Mears Silicon Technology (MST), our ground-breaking transistor enhancement material, was specifically invented to help semiconductor designers achieve performance gains and cost reductions that are difficult or impossible to achieve with established techniques. As industry players look for ways to create new opportunities, our portfolio is market-ready and prepared to help them. Each year we expand into different product sectors, showcasing the solutions MST can offer, increasing Atomera's addressable market and prospects.

In April of 2023, we announced the execution of a commercial license agreement with ST Microelectronics. The cost-effective benefits of MST made this agreement possible, and as more players in the semiconductor industry come to recognize that value, we believe they will follow ST's lead. When that happens Atomera will realize the sustainable, high-leverage business model that we set out to create when our company was founded.

Thank you for your persistent trust and support as we continue to build Atomera's success,

Scott A. Bibaud
President and Chief Executive Officer
Atomera Incorporated
March 2024

750 University Avenue, Suite 280 | Los Gatos, CA 95032
408-442-5248 | fx. 408-560-9556 | www.atomera.com

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2023

or

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

For the transition period from to

Commission file number: 001-37850

ATOMERA INCORPORATED

(Exact name of registrant as specified in its charter)

Delaware	**30-0509586**
(State or Other jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification Number)

750 University Avenue, Suite 280
Los Gatos, California 95032
(Address, including zip code, of registrant's principal executive offices)

(408) 442-5248
(Registrant's telephone number, including area code**)**

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common stock: Par value $0.001	ATOM	Nasdaq Capital 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 15(d) of the Exchange 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 past 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 (as defined 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 its 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. Yes ☐ No ☒

Indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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

State the aggregate market value of voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold, or the average bid and asked price of such common equity, as of the last business day of the registrant's most recently completed second fiscal quarter: $215,221,176. Shares of the registrant's common stock held by each executive officer, director and holder of 10% or more of the outstanding common stock (as determined based on public filings) have been excluded in that such persons may be deemed to be affiliates. This calculation does not reflect a determination that certain persons are affiliates of the registrant for any other purpose.

As of February 15, 2024, there were 26,619,981 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The registrant intends to file a definitive proxy statement pursuant to Regulation 14A within 120 days after the end of the fiscal year ended December 31, 2023. Portions of such proxy statement are incorporated by reference into Part III of this Form 10-K.

ATOMERA INCORPORATED

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NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, that are intended to be covered by the "safe harbor" created by those sections. The words "believe," "may," "will," "potentially," "estimate," "continue," "anticipate," "intend," "could," "would," "should," "ongoing," "project," "plan," "expect" and similar expressions that convey uncertainty of future events or outcomes are intended to identify forward-looking statements. These forward-looking statements include, but are not limited to, statements concerning the following:

- our future financial and operating results;
- our intentions, expectations and beliefs regarding anticipated growth, technology adoption, market penetration and trends in our business;
- the timing and success of our plan of commercialization;
- our ability to operate our license and royalty-based business model;
- the effects of market conditions on our stock price and operating results;
- our ability to have our technology solutions gain market acceptance;
- the effects of competition in our market and our ability to compete effectively;
- our ability to maintain, protect and enhance our intellectual property;
- costs associated with initiating and defending intellectual property infringement and other claims;
- our expectations concerning our relationships with customers, potential customers, partners and other third parties;
- the attraction and retention of qualified employees and key personnel;
- future acquisitions of or investments in complementary companies or technologies; and
- our ability to comply with evolving legal standards and regulations, particularly concerning requirements for being a public company.

These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described in "Risk Factors" and elsewhere in this Annual Report and our subsequently filed Quarterly Reports on Form 10-Q. Moreover, we operate in a very competitive and rapidly changing environment, and new risks emerge from time to time. It is not possible for us to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this Annual Report may not occur and actual results could differ materially and adversely from those anticipated or implied in our forward-looking statements.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in our forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances described in the forward-looking statements will be achieved or occur. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this Annual Report to conform these statements to actual results or to changes in our expectations, except as required by law.

You should read this Annual Report and the documents that we reference in this Annual Report and have filed with the Securities and Exchange Commission as exhibits with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect.

PART I

Item 1. Business

Company Overview

We are engaged in the business of developing, commercializing and licensing proprietary processes and technologies for the $530+ billion semiconductor industry. Our lead technology, named Mears Silicon Technology™, or MST®, is a thin film of reengineered silicon, typically 100 to 300 angstroms (or approximately 20 to 60 silicon atomic unit cells) thick. MST can be applied as a transistor channel enhancement to CMOS-type transistors, the most widely used transistor type in the semiconductor industry. MST is our proprietary and patent-protected performance enhancement technology that we believe addresses a number of key engineering challenges facing the semiconductor industry. We believe that by incorporating MST, transistors can be made smaller, with increased speed, reliability and power efficiency. In addition, since MST is an additive and low-cost technology, we believe it can be deployed on an industrial scale, with machines commonly used in semiconductor manufacturing. We believe that MST can be widely incorporated into the most common types of semiconductor products, including analog, logic, optical and memory integrated circuits.

We do not intend to design or manufacture integrated circuits directly. Instead, we develop and license technologies and processes that we believe offer the designers and manufacturers of integrated circuits a low-cost solution to the industry's need for greater performance and lower power consumption. Our customers and partners include:

- foundries, which manufacture integrated circuits on behalf of fabless manufacturers;
- integrated device manufacturers, or IDMs, which are the fully-integrated designers and manufacturers of integrated circuits;
- fabless semiconductor manufacturers, which are designers of integrated circuits that outsource the manufacturing of their chips to foundries;
- original equipment manufacturers, or OEMs, that manufacture the epitaxial, or epi, machines used to deposit semiconductor layers, such as the MST film, onto silicon wafers; and
- electronic design automation companies, which make tools used throughout the industry to simulate performance of semiconductor products using different materials, design structures and process technologies.

Our principal business objective is to enter into commercial license agreements that enable our customers to manufacture and sell MST-enabled products, generating license revenues and ongoing royalties. We also license our MSTcad® software to customers, enabling them to simulate the effects of MST on their products using Synopsys, Inc.'s technology computer-aided design, or TCAD, software. In addition, we offer fee-based engineering services to customers evaluating MST. Our goal is that MSTcad licensing and engineering service arrangements will be tools that demonstrate the benefits of MST and will lead customers to enter into full commercial licenses. A "full commercial license" involves a three-stage approach consisting of:

1. An integration license that provides our customer the right to use MST technology (with MST film deposited for the customer by Atomera) in the manufacture of silicon wafers for internal testing and sampling;
2. A manufacturing license, granting our customer the rights to install MST on a tool in their fab and to manufacture MST-enabled products for internal use only; and
3. A distribution license which grants the rights to manufacture and sell MST-enabled products to their customers.

Depending on our customers' business needs and how we initially engaged with them, we may make these license grants in one or more separate contracts. The upfront license fee becomes larger at each stage. Upon the grant of a distribution license our licensees would also be required to make royalty payments to us based on the number and sales price of MST-enabled products they sell to their customers.

Starting in 2019, we began to develop deeper relationships with several potential large-scale customers who were evaluating MST across multiple manufacturing processes and product lines. Accordingly, we have engaged with certain customers under joint development agreements, or JDAs. Our JDAs include development, technology transfer, manufacturing and licensing components.

To date, application of our MST technology has been for power devices, RFSOI devices and advanced CMOS integrated circuits. CMOS integrated circuits are the most widely used type of integrated circuits in the semiconductor industry. As applied to CMOS-type transistors, MST functions as a transistor channel enhancement. We believe MST has the potential to overcome the key challenges found in the implementation of next generation nano-scale semiconductor devices incorporating CMOS type transistors, namely enhancing drive current, reducing gate leakage and reducing variability. In addition, we believe that MST has the potential to deliver these benefits through a single technology that requires relatively minor modifications to the industry-standard CMOS manufacturing flow. Consequently, we believe that by incorporating MST, designers can make transistors with increased speed, reliability and energy efficiency, without significantly altering the current fabrication process or cost of production.

We were organized as a Delaware limited liability company under the name Nanovis LLC on November 26, 2001. On March 13, 2007, we converted to a Delaware corporation under the name Mears Technologies, Inc. On January 12, 2016, we changed our name to Atomera Incorporated. Shares of our common stock are listed on the NASDAQ Capital Market under the symbol "ATOM".

Industry Overview

Semiconductors, Generally

Recent years have seen a remarkable proliferation of consumer and commercial products, especially in wireless, automotive and high-speed devices. Cloud computing and artificial intelligence technologies have provided people with new ways to create, store and share information. At the same time, the increasing use of electronics in cars, buildings, appliances and other consumer products is creating a broad landscape of "smart" devices such as wearable technologies and The Internet of Things. These trends in both enterprise and consumer applications are driving increasing demand for integrated circuits and systems with greater functionality and performance, reduced size, and much less power consumption as key requirements. The COVID-19 pandemic accelerated trends toward remote work, cloud computing and mobile devices. These trends coincided with the rollout of 5G cellular networks and associated devices, augmented and virtual reality technologies, cryptocurrencies, and especially artificial intelligence technology, all of which require high levels of processing power.

These developments depend, in large part, on integrated circuits, or microchips, which are sets of electronic circuits on a single chip of semiconductor material, normally silicon. It is common for a single semiconductor chip to combine many components (processor, communications, memory, custom logic, input/output) resulting in highly complex chip designs. Transistors are the building blocks of integrated circuits and the most complex semiconductor chips today contain more than a billion transistors, each of which may have features that are much less than $1/1{,}000^{th}$ the diameter of a human hair.

The most widely used transistors in semiconductor chips today are based on CMOS technology. Among its many attributes, CMOS allows for a higher density of transistors on a chip and lower power usage than non-CMOS technologies.

The Pursuit of Increased Semiconductor Performance

For years, the semiconductor industry was able to almost double the number of transistors it could pack into a single microchip about every two years, a rate of improvement commonly known as "Moore's Law." The semiconductor industry uses the term "node" to describe the minimum line width or geometry on a semiconductor chip, expressed in nanometers, or nm, for today's technologies. Historically, smaller nodes enable more densely packed designs that produced less costly products on a per-transistor basis. Frequently, smaller nodes also correspond to an improvement in chip performance, making them the mile markers of Moore's Law, with each node marking a new generation of chip-manufacturing technology.

Until recently, the industry succeeded at maintaining the rate of improvement predicted by Moore's Law by scaling the key transistor parameters, such as shrinking feature sizes and reducing operating voltages, thereby allowing more transistors to be packed onto a single microchip. This trend was facilitated in large part by the development of CMOS technologies. However, a discontinuity in the rate of improvement delivered by scaling appeared when transistor technology reached feature sizes below 100 nanometers. The industry responded with advanced materials to supplement the ongoing geometry shrinks. Some of those materials advances included strained silicon, Silicon-on-Insulator and High-K/Metal Gate. Semiconductor makers also attempted to obtain performance improvements through more exotic design architectures which frequently required material innovations to support their manufacturability and reliability.

The designers and manufacturers of integrated circuits and systems — our targeted customers — are facing intense pressure to deliver innovative products while constantly reducing their time-to-market and prices. In other words, innovation in chip and system design today often hinges on "better, sooner and cheaper." We believe that the semiconductor industry has accepted that moving forward in the nano-era will require adoption of new innovations that extend the scaling formula, including those based on the use of new engineered materials, a market opportunity our MST technology seeks to address. Because shrinking geometries at the smaller nodes incurs higher capital and manufacturing costs, only a limited number of companies can afford to continue investing in those nodes. We believe these constraints will cause semiconductor designers and manufacturers to turn to engineered materials, like MST, to solve this problem.

Vertical Disaggregation of the Industry

In trying to keep research and development costs manageable, while attempting to satisfy the demand for increasingly complex semiconductors, certain designers and manufacturers of integrated circuits have transitioned to a more open innovation model in which competing companies and third-party providers actively collaborate to address performance issues through various alliances, joint ventures, and licensing of externally developed technology.

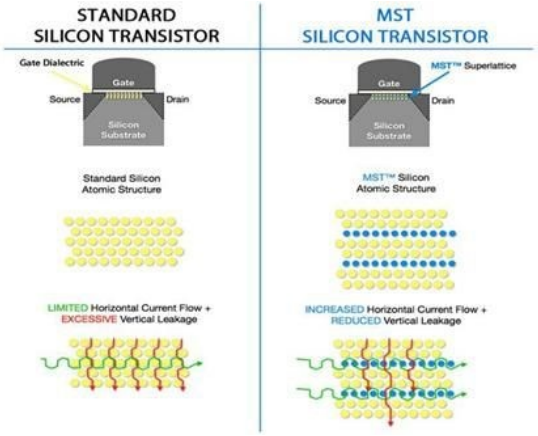
Historically, most semiconductor companies were vertically integrated. They designed, fabricated, packaged and tested their semiconductors using internally developed software design tools and manufacturing processes and equipment. As the cost and skills required for designing and manufacturing complex semiconductors have increased, the semiconductor industry has become disaggregated, with companies concentrating on one or more individual stages of the semiconductor development and production process. This disaggregation has fueled the growth of fabless semiconductor companies, design tool vendors, semiconductor equipment manufacturers, third-party semiconductor manufacturers (or foundries), semiconductor assembly, package and test companies, and intellectual property companies that develop and license technology to others.

While specialization has enabled greater development and manufacturing efficiency, it has also created an opportunity for licensing companies, such as Atomera, that develop and license technology to meet fundamental, industry-wide challenges. These intellectual property companies have been able to gain broad adoption of their technology throughout the industry by working with companies within the semiconductor supply chain to evaluate and integrate their technology. Manufacturers and designers of semiconductors increasingly find it more cost-effective to license technologies from IP-based companies than to develop processes internally that are not their core competence. We believe this collaboration and integration of externally-developed IP benefits semiconductor companies by enabling them to bring new technology to market faster and more cost-effectively.

Applications of Mears Silicon Technology

The initial applications of MST are for power devices, RFSOI devices and advanced CMOS integrated circuits. We offer MST-SP and MST-SPX, which are types of MST-enabled power devices that offer what we believe to be industry-leading on-resistance (also referred to as Rsp) and reduced footprint (enabling smaller devices). We believe that the MST-SP and MST-SPX devices will have immediate application in power management integrated circuits (or PMICs) which are pervasive in hand-held, battery-powered devices and elsewhere. We also believe that insertion of MST can provide higher current and improved control of dopants, leading to improved device scaling.

We believe MST has the potential to overcome the key challenges found in the implementation of next generation nano-scale semiconductor devices incorporating CMOS-type transistors, namely enhancing drive current, reducing gate leakage and reducing variability. In addition, we believe that MST has the potential to deliver these benefits through a single technology that requires relatively minor modifications to the industry standard CMOS manufacturing flow. Consequently, we believe that by incorporating MST, designers can make transistors with increased speed, reliability and energy efficiency, without significantly altering the current fabrication process or cost of production.



As illustrated by the accompanying diagram, MST is a "silicon-on-silicon" solution that provides multiple potential benefits through a relatively simple modification to the standard CMOS manufacturing flow. MST improvements are delivered through our proprietary and patent-protected approach that is based on the quantum mechanics of modern deep sub-micron devices. The MST film allows carriers (electrons and holes) to flow more freely in the plane of the transistor, thereby enhancing drive current, while reducing carrier flow or "leakage" in the transverse direction. Our MST film can also create more controlled doping profiles, which allow dopants to be held in the desired locations, thereby enabling optimized device designs, lower variability and improved production yield.

We believe the enhancements enabled by MST, as demonstrated in simulations and on our own and our customers' test chips, are approximately equivalent to the enhancements enabled by one-half to a full node of improvement and, therefore, can extend the productive life of capital equipment and wafer fabrication facilities. The extent of MST-enabled enhancement depends on the device technology and application. We believe that MST compares favorably to other alternatives for enhancing performance of CMOS-type transistors as follows:

- *Strained Silicon and Silicon-on-Insulator, or SOI*: Unlike strained silicon or SOI, we believe that MST delivers multiple benefits in a single film in a cost-effective manner, including enhanced transistor drive current, reduced leakage, and reduced variability. Also, strained silicon tends to lose much of its effectiveness below 45nm, constraining its scalability, while our results to date indicate that the MST thin-film approach is scalable to the leading-edge nodes used for three-dimensional transistor devices using FinFET and "gate-all-around" structures. Based on our own research and development and third-party evaluations, we believe that MST can deliver improved cost-benefit performance, in most cases in an additive manner, compared to already successful strain technologies, such as dual stress liners and SiGe. Work with our foundry partners and fabless licensee shows potential for additive improvements on specialized SOI wafers used to manufacture radio frequency, or RF, devices, which are also referred to as RFSOI wafers.

- *High-K/Metal Gate, or HKMG*: Unlike HKMG, MST is silicon-based. As a "silicon-on-silicon" solution, MST does not require new materials or equipment, which in our opinion makes it much easier and less costly to adopt than HKMG for devices not requiring ultrathin gate dielectrics. For devices with HKMG, lab tests and simulations indicate that MST benefits transistor performance and variability in a similar manner to the benefits observed in non-HKMG devices. Testing conducted with our university research partners indicates that MST has the potential to provide additive performance benefits in devices using HKMG.

Because of its physical characteristics in the channel region of the transistor, we believe MST has the further benefit of being complementary and additive to the performance-enhancing technologies noted above, making MST broadly applicable across multiple devices and process flows to meet a wide variety of customer design objectives. Given the costs of moving to more advanced technologies, we believe one of the most compelling aspects of MST is its cost/benefit profile. We believe that MST will provide a lower cost of production due to our technology's potential to reduce die size while leveraging existing manufacturing tools, thereby providing chip makers with increased performance at all process nodes with significantly fewer disruptions to manufacturing processes and less incremental cost than other advanced technologies.

We believe MST can improve transistor performance in a variety of device types including microprocessors; logic products; analog, RF, and mixed-signal devices; as well as DRAM, SRAM, and other memory integrated circuits. We have therefore developed different MST product options that can be applied to the critical industry segments and technology nodes. As of the date of this Annual Report, we have done technology simulation work with universities and leading industry players at nodes from 180nm to 5nm. We have also simulated devices with leading industry research facilities and built and electrically verified test chips using MST in customer manufacturing facilities which have produced results that demonstrate many of the benefits described above.

Development Partnerships

Synopsys. Since 2017 we have worked in collaboration with Synopsys, Inc., a provider of the most broadly used TCAD simulation software in the semiconductor industry. As a result of our collaboration, Synopsys' software now supports modeling of MST, which enables semiconductor manufacturers and designers to model the interaction of MST with other process steps. In December 2020, we announced availability of our MSTcad software which runs on Synopsys' Sentaurus TCAD software and enables semiconductor engineers to simulate the benefits of integrating MST in a variety of devices. We continually refine our MSTcad software by calibrating our models against measured silicon results and we regularly release updates to that software. We believe these capabilities are helping us focus integration efforts for potential customers more quickly on those areas most likely to deliver benefits, thus shortening test cycles and, we believe, accelerating the time to a license decision. In the last three years, semiconductor fabs have generally been running at high capacity to keep up with industry supply shortages which has made it challenging for us to run wafers through our customers' fabrication lines. MSTcad has been increasingly used by existing and potential customers to identify applications where MST can have the greatest benefit, without requiring access to customer fabs.

Epi Tool Lease. In August 2021 we entered into a five-year lease for an Applied Materials Centura epitaxial deposition reactor which handles both 200mm and 300mm wafers. We utilize this tool to perform deposition on both customer and internal R&D wafers. The terms of our tool lease include the lessor's maintenance and support as well as access to a cleanroom with advanced cleaning and inspection tools.

MST Commercialization

We do not intend to design or manufacture integrated circuits directly. Instead, we develop and license technologies and processes that offer the designers and manufacturers of integrated circuits increased performance at a lower cost than currently available alternatives. Our customers and partners include foundries, integrated device manufacturers, or IDMs, fabless semiconductor manufacturers, OEMs that manufacture epitaxial deposition, or EPI, machines, and electronic design automation software companies, such as Synopsys.

Our business model is to enter into licensing arrangements whereby foundries and IDMs pay us a license fee for their use of MST technology in the manufacture of silicon wafers as well as a royalty for each silicon wafer (in the case of foundries) or device (in the case of IDMs) that they sell that incorporates MST. In the case of fabless semiconductor licensees, our strategy is to charge a royalty for each device they sell that incorporates our MST technology. The primary beneficiaries of our commercialization activities are the IDMs and fabless semiconductor manufacturers, as they produce and distribute integrated circuit devices which are enhanced when they incorporate MST technology. The foundries and OEMs also play an important role in our commercialization strategy because these parties traditionally seek to provide new and improved technologies to their customers – the fabless semiconductor manufacturers in the case of the foundries, and the IDMs and foundries in the case of the OEMs.

In the semiconductor industry, new technologies are vetted thoroughly and carefully by early adopters who are trying to achieve differentiation over competitors. After the early adopters prove the technology in production, it then tends to be broadly and relatively quickly adopted by "followers" who need to overcome their competitive disadvantage. Due to the cost and complexity of semiconductor manufacturing processes and the desire to maintain a stable and repeatable process flow, new technologies tend to be adopted broadly by the industry and, wherever possible, exploited for several generations until they are fully optimized and adoption costs are fully absorbed.

Although each customer or potential customer follows an evaluation and adoption model that is particular to its business model and product focus, our engagements generally consist of the following phases:

1. *Engineering Planning:* In this phase we engage in a technical exchange of information under a non-disclosure agreement to understand the customer's manufacturing process and to determine how best to integrate the deposition of MST film onto the customer's semiconductor wafers.

2. *Set-up for MST Integration:* We agree upon the technical evaluation details, including the expected rounds of evaluation testing, the parameters to be tested and allocation of costs. Customers provide us with wafers for our internal processing and physical characterization. Some customers work together with us to develop a TCAD model showing possible results of MST integration with their particular manufacturing process.

3. *MST Integration.* Typically, this phase includes several rounds of tests that involve building test devices on a semiconductor wafer using our MST technology within the customer's manufacturing process flow. In this phase, we perform the MST deposition on customer wafers, so wafers must be shipped back and forth between the customer and Atomera. We believe that this phase will continue to be the longest in our customer engagement process because integrating into a customer's flow frequently requires us to conduct subsequent tests based on the result of earlier test runs. This phase also requires investment of time and resources by customers. In order to progress beyond this phase, we must demonstrate benefits at a commercially significant level. It is difficult for both customers and for Atomera to estimate the amount of time a customer will be in the integration phase.

4. *Process Installation*. Prior to enabling a customer to install and use MST technology on epitaxial deposition machines in their own fab, we require execution of a manufacturing license which grants rights limited to manufacturing MST-enabled products for internal R&D and qualification but does not give the customer the right to distribute or sell products that use MST. After installation of MST into the fab, the customer will continue development work to perfect the integration of MST technology into their transistor manufacturing process flow. Upon completion the customer will typically release a new Process Design Kit (PDK) which incorporates MST. Circuit designers will use the new PDK when developing new microchips for production.

5. *Technology qualification*. The customer will conduct additional testing to ensure that the new products developed with the new PDK achieve manufacturing reliability under accelerated test conditions that simulate volume production. Upon successfully completing the qualification phase, products can be built and shipped using this manufacturing process.

6. *Production*. Upon commencement of sales of wafers or devices built using MST, our customer will pay us a royalty that will be a percentage of the selling price of the wafer or device, depending on the type of customer.

While the above steps describe a model customer engagement, we have engaged with some customers in ways that do not follow this precise order. JDAs are an example of an engagement format that may combine engineering service, development, manufacturing, process optimization and other joint activities that do not follow the order described above. In addition, we may from time to time enter into evaluation license agreements with certain customers under which they may install MST in their fabs to run internal tests only and not for commercial use or distribution. Other potential customers may run tests on wafers containing MST prior to further engagement with us to integrate MST into their manufacturing process.

We believe that our success is dependent upon the adoption of our MST technology through to commercial production by at least one IDM, foundry, or fabless semiconductor manufacturer. As of the date of this Annual Report, MST was in the integration phase (Phase Three as described above) on 14 different engagements and two engagements in Phase Four (process installation). Subject to process and subsequent product qualifications that demonstrate, in commercial scale production, the enhancements we believe our MST technology offers, including increased speed, reliability and energy efficiency, we expect that one or more of these companies will obtain licenses from us to take our MST technology to commercial production.

We are also working with OEMs on process development and equipment optimization to ensure that MST can be reliably and predictably deposited using their manufacturing tools. We have successfully deposited MST using tools made by each of the leading epitaxial deposition equipment suppliers and we believe that if we are successful in our commercialization efforts, these tool OEMs will promote the incorporation of our MST technology as an option to their standard offering. By doing so, we believe they will simultaneously stimulate additional sales of their capital equipment and encourage more customers to adopt MST.

Through our collaboration with Synopsys, we enable potential customers of MST to more quickly assess the potential benefits of MST to their semiconductor devices. By creating TCAD software models, we can work with manufacturers to assess which of their product types would most benefit from MST. We believe this modeling capability has shortened the time required for us to engage with new potential customers and should ultimately lead to a faster decision process by the customer regarding licensing MST.

We market our MST technology directly to the semiconductor industry through our significant industry contacts and relationships. We also sponsor academic research and participate in industry conferences and associations. In certain foreign jurisdictions, we engage sales representatives to assist us in establishing relationships with local customers.

Customers

In April 2023, we entered into a full commercial license agreement with STMicroelectronics, or ST, that authorizes ST to manufacture and distribute MST-enabled products to its customers. This agreement provides for payment of license fees payable upon reaching milestones consistent with our standard business model. Under an integration license agreement that we entered into with ST in 2018, we granted them an integration license pursuant to which they performed extensive evaluation of our MST technology. The April 2023 license agreement is based around two major milestones, namely the grant of a manufacturing license upon installation of MST in ST's fab and qualification of an MST-enabled process. After process qualification is completed, ST will have the right to commercially distribute MST-enabled products and, assuming ST brings such products to market, we will receive royalties on all MST-enabled products manufactured for commercial purposes. This license agreement with ST is our first grant of commercial manufacturing and distribution rights and, assuming the successful installation of MST and related process qualification, would result in our first revenue from commercial use of MST-enabled products. In the fourth quarter of 2023, we completed the first major milestone under the ST license agreement by delivering our MST film recipe and ST accepting the film, resulting in our recognizing license revenue associated with that milestone. At that time, ST became our second customer to enter into Phase Four. We expect that ST will now proceed to completing process qualification with MST which would result in additional license fees for the distribution license upon completion of qualification, at which time ST would commence paying royalties on MST-enabled products they sell. There can be no assurance, however, that ST will complete their qualification and proceed to commercial sale of MST-enabled products.

In January 2021, we entered into a JDA with a leading semiconductor provider for integration of our MST technology into their manufacturing process. Under this JDA, we granted our customer a paid manufacturing license pursuant to which the customer installed the recipe for our MST film into a tool in their fab and was authorized to fabricate semiconductor wafers incorporating MST for internal use, resulting in this customer entering Phase Four. This JDA also included development milestones that we achieved in February 2022, resulting in additional revenue to us. Although this JDA does not confer commercial distribution rights, we believe that successful achievement of the JDA milestones is a significant step toward commercialization, as it should facilitate progress toward integrating MST into one or more of our customer's multiple production lines and thus provide opportunities for additional license revenues and potential royalty streams. In April 2022, we entered into a JDA with a major semiconductor foundry which contains technical targets which, if achieved, should result in paid licenses and engineering services revenue. Although this JDA does not confer commercial distribution rights, we believe that achievement of the JDA's technical objectives would be a significant step toward commercialization.

In September and October 2018, respectively, we entered into separate integration license agreements with Asahi Kasei Microdevices, or AKM, and ST, both of which are leading IDMs. In October 2019, we entered into an integration license agreement with a leading fabless RF semiconductor provider. In February 2022, we entered into an integration license agreement with a semiconductor foundry. Under the integration license agreements, these customers have paid us for the right to evaluate MST technology, which is integrated onto their semiconductor wafers. We deposit MST onto the customers' wafers and the customer has the right under the license agreement to complete the manufacturing process, which enables them to evaluate our technology and to provide limited samples to their customers. AKM, our fabless licensee and our foundry licensee are in our Phase Three (MST Integration).

We intend that each of our integration license agreements and JDAs will result in full commercial licenses like our April 2023 agreement with ST which provides for substantially larger upfront license fee payments for grants of manufacturing and distribution rights than the integration licenses and will require royalty payments to us based on sales of MST-enabled products they sell to their customers. However, our ability to enter into royalty-based manufacturing and distribution agreements with licensees under our integration license agreements and JDAs will depend, in large part, on the performance of devices they build using MST and the successful integration of our MST technology on a high-volume production scale. There can be no assurance that our MST technology will deliver the performance, power, cost reduction or other requirements our customers seek for their products or that the integration of our technology with our customers' manufacturing process will be successful in high volume. In addition, even if our MST technology meets our customers' technical objectives one or more of our licensees may decide, for reasons unrelated to the price or performance of our MST technology, not to enter into manufacturing and distribution license agreements.

Competition

Our lead product, MST, is a proprietary and patent-protected performance enhancement technology that we believe addresses a number of key engineering challenges facing the semiconductor industry. Historically, development of a new material technology for the semiconductor industry has taken 10-20 years from conceptualization to volume production. Atomera's MST technology has followed a similar trajectory, from early patents, publications and presentations to the industry to early evaluations and installation at customers.

We compete with IDMs, OEMs, foundries, fabless manufacturers of semiconductors and semiconductor IP licensing companies for the development and commercialization of technologies that improve the performance of semiconductors. Historically, when a new fabrication process proves to be a low-cost improvement to the standard fabrication process, and is additive, rather than in place of other performance technologies, it has been successfully adopted industry-wide. Good examples of such advances have been chemical mechanical polishing (or CMP), strained silicon and High-K/Metal-Gate. We believe that MST has the potential to be one of these low-cost additive technologies, in which case MST would not be subject to significant direct competition from other technologies. We are not aware of another technology being offered in the market which provides the same technical benefits as MST. Nevertheless, in some cases the engineering teams in our customers, who are developing their own process improvements, may view MST as competition to their internally-developed solutions.

Research and Development

The principal focus of our research and development efforts is on enabling existing and prospective customers to integrate MST into their manufacturing processes and enable them to commercialize MST-enabled semiconductor products. We also dedicate research and development resources to evolving and expanding our technology to address new process technologies in the semiconductor industry roadmap. Our research and development is conducted internally, but we work closely with third parties in the semiconductor industry to evaluate and qualify our technology for incorporation into semiconductor products and fabrication equipment. During the years ended December 31, 2023 and 2022, we incurred research and development expenses of approximately $12.5 million and $10.0 million, respectively.

We believe that our success depends in part on our ability to achieve the following in a cost-effective and timely manner:

- enable customers to integrate MST into their products;
- develop new technologies that meet the changing needs of the semiconductor industry;
- improve our existing technologies to enable growth into new application areas; and
- expand our intellectual property portfolio.

Intellectual Property Rights

We regard the protection of our technologies and intellectual property rights as an important element of our business operations and crucial to our success. We rely primarily on a combination of patent laws, trade secret laws, confidentiality procedures, and contractual provisions to protect our proprietary technology. We require our employees, consultants, and advisors to enter into confidentiality agreements. These agreements provide that all confidential information developed or made known to the individual during the course of the individual's relationship with us is to be kept confidential and not disclosed to third parties except under specific circumstances. In the case of our employees and consultants, the agreements provide that all of the technology that is conceived by the individual during the course of employment is our exclusive property. The development of our technology and many of our processes are dependent upon the knowledge, experience, and skills of key scientific and technical personnel.

As of December 31, 2023, we have been granted 103 patents in the U.S. and 113 abroad and we have 35 pending patent applications in the U.S. and 71 abroad. We believe our patents adequately block competitors from using our MST technology without our approval and our patent activity over the past five years has focused on extending the scope of our portfolio through a variety of means, including but not limited to patenting new structures, materials and methods uniquely enabled by MST technology. In addition, our MST film recipe is confidential know-how, which is only disclosed to customers who have been, at a minimum, a manufacturing licensee and who have executed the appropriate legal agreements. Unlike patents, know-how has no expiration and our film recipe is necessary in order to utilize MST technology. However, there can be no assurance that one or more of our patents would survive a legal challenge to their scope, validity, or enforceability, or provide significant protection for us. Protection of our film know-how depends on our licensee's compliance with the terms of their contracts including non-disclosure provisions thereof. The failure of our patents, or the failure of trade secret laws, to adequately protect our technology, might make it easier for our competitors to offer similar products or technologies or for our potential customers to build products with methods and materials similar to MST without paying us a license fee. In addition, patents may not issue from any of our current or future applications.

We also hold registered trademarks in the United States for the marks "Atomera," "MST" and "MSTcad" and in China for the mark "Mears".

Employees and Human Capital Management

As of the date of this Annual Report, we employ 21 people on a full-time basis.

Our human capital resources objectives include, as applicable, identifying, recruiting, retaining, incentivizing and integrating our existing and new employees. The principal purposes of our equity incentive plans are to attract, retain and reward personnel through the granting of stock-based compensation awards that align their compensation with our business objectives and with creation of shareholder value.

Available Information

Our website is located at www.atomera.com. The information on or accessible through our website is not part of this Annual Report on Form 10-K. Copies of our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act are available free of charge, on our investor relations website as soon as reasonably practicable after we file such material electronically with or furnish it to the Securities and Exchange Commission, or the SEC. A copy of this Annual Report on Form 10-K is also located at the SEC's Public Reference Room at 100 F Street, NE, Washington, D.C. 20549. Information on the operation of the Public Reference Room can be obtained by calling the SEC at 1-800-SEC-0330. The SEC also maintains an internet site that contains reports and other information regarding our filings at www.sec.gov.

Item 1A. Risk Factors

We are subject to various risks that may harm our business, prospects, financial condition and results of operation or prevent us from achieving our goals. If any of these risks occur, our business, financial condition or results of operation may be materially adversely affected. In such case, the trading price of our common stock could decline and investors could lose all or part of their investment.

Risks Related to Our Business

We have generated limited revenue to date, so it is difficult for potential investors to evaluate our business. To date, our operations have consisted of technology research and development, testing, and joint development work with customers, potential customers and strategic partners. Our business model is to derive our revenue primarily from license fees and royalties, but to date we have only recognized minimal revenues. Our limited operating history makes it difficult to evaluate the commercial value of our technology, the viability of our licensing model or our prospective operations. As an early-stage company, we are subject to all the risks inherent in the initial organization, financing, expenditures, complications and delays in a new business, including, without limitation:

- the timing and success of our plan of commercialization and the fact that we have entered into only one full commercial license with a customer, ST;
- our ability to replicate on a large commercial scale the benefits of our MST technology that we have demonstrated in preliminary testing;
- our ability to execute joint development agreements with potential customers;
- our ability to structure, negotiate and enforce license agreements that will allow us to operate profitably;
- our ability to advance our license agreement with ST through the qualification phase, complete the distribution license milestone with ST and earn the corresponding license fee and subsequently reach the phase in which ST ships royalty-bearing products, which is core to our business model;
- our ability to advance the licensing arrangements Asahi Kasei Microdevices, our foundry licensee and our RF licensee, to manufacturing and distribution licenses and to shipment of royalty-bearing products;
- our success in capitalizing on the achievement of the technical milestones in our first JDA in order to enter into one or more distribution and royalty agreements with business units of that JDA customer as well as our success in meeting technical milestones in the JDA with our second JDA customer;
- our ability to convert licensees of our MSTcad software to licenses of our MST technology under commercial license agreements and to successfully utilize MSTcad in both internal development and customer evaluations;
- our ability to protect our intellectual property rights; and
- our ability to raise additional capital as and when needed.

Investors should evaluate an investment in us in light of the uncertainties encountered by developing companies in a competitive environment. There can be no assurance that our efforts will be successful or that we will ultimately be able to attain profitability.

We have a history of significant operating losses and anticipate continued operating losses for at least the near term. For the years ended December 31, 2023 and 2022, we have incurred net losses of approximately $19.8 million and $17.4 million, respectively, and our operations have used approximately $14.6 million and $12.5 million of cash, respectively. As of December 31, 2023, we had an accumulated deficit of approximately $203.1 million. We will continue to experience negative cash flows from operations until at least such time as we are able to secure manufacturing and distribution license agreements with one or more foundries, IDMs or fabless semiconductor manufacturers and such customers ship sufficient volumes of royalty-bearing products and pay upfront license fees to support our cash requirements. While management will endeavor to generate positive cash flows from the commercialization of our MST technology, there can be no assurance that we will be successful in doing so. If we are unable to generate positive cash flow within a reasonable period of time, we may be unable to further pursue our business plan or continue operations.

While we have entered into one commercial license agreement, four integration license agreements and two joint development agreements, there can be no assurance that any of these relationships will advance to further licensing stages or to royalty-based distribution license agreements. In September and October 2018, respectively, we entered into separate license agreements with AKM and ST, both of which are leading IDMs. In October 2019, we entered into a license agreement with a leading RF semiconductor supplier. In December 2021, we entered into a JDA with a leading semiconductor manufacturer. In February 2022, we entered into an integration license agreement with a semiconductor foundry. In April 2022 we entered into a JDA with a major semiconductor foundry. Our integration licensees have paid us licensing fees for the right to build products that integrate MST technology onto their semiconductor wafers, but the agreements do not grant the licensees the right to sell products incorporating MST. Such rights require our integration licensees to enter into additional license agreements that, if executed, would allow each licensee or their foundry to manufacture MST-enabled products and to sell them to their customers. Manufacturing and distribution agreements such as our license agreement with ST provide for substantially larger upfront license fee payments than integration license fees and such agreements require licensees to make royalty payments to us based the number and sales price of MST-enabled products they sell to their customers. Our first JDA customer paid us for a manufacturing license in the first quarter of 2021 when we delivered our MST recipe to them. In February 2022, we successfully achieved all the development milestones in the JDA resulting in additional revenue. Nevertheless, neither of our JDAs commits the customers to take MST to production. ST has successfully installed our MST film recipe and they have accepted our film under the license agreement, resulting in the grant of a manufacturing license to them for internal use, but they will now enter a qualification phase and there can be no assurance that our MST technology will deliver the performance, power or other requirements that ST or our other customers seek for their products or that the integration of our technology with our customers' manufacturing process will be successful in high volume. In addition, even if our MST technology is successfully integrated into the licensees' products, any or all of our licensees may decide, for reasons unrelated to the price or performance of our MST technology, not to enter the subsequent license phases or execute the additional license agreements required to take MST to commercial production.

We expect that our product qualification and licensing cycle will be lengthy and costly, and our marketing, engineering and sales efforts may be unsuccessful. We have incurred significant engineering, marketing and sales expenses during customer engagements without entering into license agreements, generating a license fee or establishing a royalty stream from the customer and we expect that such investments ahead of license revenue will continue to be necessary in the future. The introduction of any new process technology into semiconductor manufacturing is a lengthy process and we cannot forecast with any degree of assurance the length of time it takes to establish a new licensing relationship. However, based on our engagements with potential customers to date, we believe the time from initial engagement until our customers incorporate our technologies in their semiconductor products can take 18 to 36 months or longer. Our integration license agreements with our current licensees do not commit them to manufacturing or distribution licenses and we expect those licensees to perform additional tests on evaluation wafers under their respective integration licenses before deciding whether to enter the next stages of licensing MST. As such, we will incur additional expenses in our engagements with our licensees before we receive license fees, if any, for manufacturing and distribution and before any subsequent royalty stream begins. Although we have successfully completed the objectives of our first JDA and granted that customer a manufacturing license, the agreement does not commit our customer to a distribution license. While we believe our JDAs and our integration license agreements should accelerate licensing decisions by other customers, the evaluation process for new technologies in the semiconductor industry is inherently long and complex and there can be no assurance that we will successfully convert other customer prospects into paying customers or that any of these customers will generate sufficient revenue to cover our expenses.

Qualification of our MST technology requires access to our potential customers' manufacturing tools and facilities, as well as to leased tools and facilities, which may not be available on a timely basis or at all. The qualification of a new process technology like MST entails the integration of our MST film into the complex manufacturing processes employed by our potential customers. In order to validate the benefits of MST, our customer engagement process involves fabrication of wafers that incorporate MST deposited by us using our epitaxial deposition tools and then completing the manufacturing of the wafers in our customers' facilities using their tools. The semiconductor industry in 2023 exceeded $530 billion in sales, and over the past three years the industry has been characterized by product shortages as strong demand has outstripped supply, resulting in tight capacity among our potential customers. Although these supply/demand imbalances and tight capacity conditions have eased throughout 2023, we have experienced delays in completing the processing of evaluation wafers by our customers as those customers prioritize utilization of their equipment for production use. If our customers do not dedicate their equipment and facilities to testing our products in a timely fashion, we may experience delays that will increase our expenses and delay our customers' decisions on entering into commercial licenses with us. Additionally, we conduct our ongoing research and development and portions of our customer evaluation activities using leased epitaxial (epi) deposition tools that we believe will accelerate internal development work and customer engagements. However, epi tools require ongoing, complex maintenance and they have been and will continue to be subject to both planned and unplanned downtime. Any interruption in our epi tool availability may negatively impact the progress of customer work as well as our internal research and development and accordingly could delay or prevent customers from entering into commercial licenses.

The long-term success of our business is dependent on a royalty-based business model, which is inherently risky. The long-term success of our business is dependent on future royalties paid to us by licensee-customers, whose business requires them to market products to their end customers. Royalty payments under our licenses are generally expected to be based on a percentage (i) in the case of foundries, the selling price of wafers made using MST and (ii) in the case of IDMs and fabless vendors, the selling price of MST-enabled semiconductor die sold. We will depend upon our ability to structure, negotiate and enforce agreements for the determination and payment of royalties, as well as upon our licensees' compliance with their agreements. We face risks inherent in a royalty-based business model, many of which are outside of our control, such as the following:

- the rate of adoption and incorporation of our technology by semiconductor designers and manufacturers and the manufacturers of semiconductor fabrication equipment;
- customers' willingness to agree to an ongoing royalty model, which may impact their wafer or chip costs and margins;
- our licensee customers' ability to successfully market MST-enabled products to their end customers;
- the length of the design cycle and the ability to successfully integrate our MST technology into integrated circuits;
- the demand for products incorporating semiconductors that use our licensed technology;
- the cyclicality of supply and demand for products using our licensed technology;
- the impact of economic downturns; and
- the timing of receipt of royalty reports and the applicable revenue recognition criteria, which may result in fluctuation in our results of operations.

We may need additional financing to execute our business plan and fund operations, which additional financing may not be available on reasonable terms or at all. As of December 31, 2023, we had total assets of approximately $24.0 million, cash, cash-equivalents and short-term investments of approximately $19.5 million and working capital of approximately $16.6 million. We believe that we have sufficient capital to fund our current business plans and obligations over, at least, the 12 months following the date of this Annual Report. However, even after installation of MST in a customer's fab under a manufacturing license, the full production qualification of a new technology like MST can take more than an additional year, and we have limited ability to influence our customers' testing and qualification processes. Accordingly, we may require additional capital prior to obtaining a royalty-based license or prior to such a license generating sufficient royalty income to cover our ongoing operating expenses. In the event we require additional capital over and above the amount of our presently available working capital, we will endeavor to seek additional funds through various financing sources, including the sale of our equity and debt securities, licensing fees for our technology and joint ventures with industry partners. In addition, we will consider alternatives to our current business plan that may enable us to achieve material revenue with a smaller amount of capital. However, there can be no guarantees that such funds will be available on commercially reasonable terms, if at all. If such financing is not available on satisfactory terms, we may be unable to further pursue our business plan and we may be unable to continue operations.

Unfavorable geopolitical and macroeconomic developments could adversely affect our business, financial condition or results of operations. Our business could be adversely affected by conditions in the U.S. and global economies, the United States and global financial markets and adverse geopolitical and macroeconomic developments, including inflation rates, the COVID-19 pandemic, the Ukrainian/Russian and Israeli/Palestinian conflicts and related sanctions, bank failures, and economic uncertainties related to these conditions.

For example, increased inflation may result in increases in our operating costs (including our labor costs), reduced liquidity and limits on our ability to access credit or otherwise raise capital on acceptable terms, if at all. In response to rising inflation, the U.S. Federal Reserve has raised interest rates, which, coupled with reduced government spending and volatility in financial markets, may have the effect of further increasing economic uncertainty and heightening these risks.

Additionally, financial markets around the world experienced volatility following the invasion of Ukraine by Russia in February 2022 and the eruption of the Israeli/Palestinian conflict in October 2023, including as a result of economic sanctions and export controls against Russia and countermeasures taken by Russia. The full economic and social impact of these sanctions and countermeasures, in addition to the ongoing military conflicts in Ukraine and Gaza, which could conceivably expand, remains uncertain; however, both the conflicts and related sanctions have resulted and could continue to result in disruptions to trade, commerce, pricing stability, credit availability, and/or supply chain continuity, in both Europe and globally, and has introduced significant uncertainty into global markets. While we do not currently operate in Russia, Ukraine or the Middle East, as the adverse effects of these conflicts continue to develop our business and results of operations may be adversely affected.

Recent efforts to create national self-sufficiency of the semiconductor supply chain by various countries around the world creates new competitive and economic dynamics that are difficult to predict and may lead to semiconductor industry instability. Increased restrictions on the availability and use of critical semiconductor IP and equipment by various foreign entities may limit Atomera's ability to license our IP in some parts of the world.

Our internal computer systems, or those of our collaborators or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our development programs. Our internal computer systems and those of our current and any future collaborators and other contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. While we have not experienced any such material system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a disruption of our development programs and our business operations, whether due to a loss of our or our customers' trade secrets or other proprietary information or other similar disruptions. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, our competitive position could be harmed and the further development and commercialization of our technology could be delayed.

We could be subject to risks caused by misappropriation, misuse, leakage, falsification or intentional or accidental release or loss of information maintained in the information systems and networks of our company and our vendors, including personal or confidential information of our employees, customers and vendors. In addition, outside parties may attempt to penetrate our systems or those of our customers or vendors or fraudulently induce our personnel or the personnel of our customers or vendors to disclose sensitive information in order to gain access to our data and/or systems. We may experience threats to our data and systems, including malicious codes and viruses, phishing and other cyberattacks. The number and complexity of these threats continue to increase over time. If a material breach of, or accidental or intentional loss of data from, our information technology systems or those of our customers or vendors occurs, the market perception of the effectiveness of our security measures could be harmed and our reputation and credibility could be damaged. We could be required to expend significant amounts of money and other resources to repair or replace information systems or networks. In addition, we could be subject to regulatory actions and/or claims made by individuals and groups in private litigation involving privacy issues related to data collection and use practices and other data privacy laws and regulations, including claims for misuse or inappropriate disclosure of data, as well as unfair or deceptive practices.

Although we develop and maintain systems and controls designed to prevent these events from occurring, and we have a process to identify and mitigate threats, the development and maintenance of these systems, controls and processes is costly and requires ongoing monitoring and updating as technologies change and efforts to overcome security measures become increasingly sophisticated. Moreover, despite our efforts, the possibility of these events occurring cannot be eliminated entirely. As we outsource more of our information systems to vendors, engage in more electronic transactions with customers and vendors, and rely more on cloud-based information systems, the related security risks will increase and we will need to expend additional resources to protect our technology and information systems. In addition, there can be no assurance that our internal information technology systems or those of our third-party contractors, or our consultants' efforts to implement adequate security and control measures, will be sufficient to protect us against breakdowns, service disruption, data deterioration or loss in the event of a system malfunction, or prevent data from being stolen or corrupted in the event of a cyberattack, security breach, industrial espionage attacks or insider threat attacks which could result in financial, legal, business or reputational harm.

Our revenues may be concentrated in a few customers and if we lose any of these customers, or these customers do not pay us, our revenues could be materially adversely affected. If we are able to secure the adoption of our MST by one or more foundries, IDMs or fabless semiconductor manufacturers, we expect that for at least the first few years substantially all of our revenue will be generated from license fees and engineering services before customers commence royalty-bearing shipments. Due to the concentration and ongoing consolidation within the semiconductor industry, we may also find that over the longer term our royalty-based revenues are dependent on a relatively few customers. If we lose any of these customers, or these customers do not pay us, our revenues could be materially adversely affected.

If we are unable to manage future expansion effectively, our business, operations and financial condition may suffer significantly, resulting in decreased productivity. If our MST proves to be commercially valuable, it is likely that we will experience a rapid growth phase that could place a significant strain on our managerial, administrative, technical, operational and financial resources. Our organization, procedures and management may not be adequate to fully support the expansion of our operations or the efficient execution of our business strategy. If we are unable to manage future expansion effectively, our business, operations and financial condition may suffer significantly, resulting in decreased productivity.

It may be difficult for us to verify royalty amounts owed to us under our licensing agreements, and this may cause us to lose revenues. We will endeavor to provide that the terms of our license agreements require our licensees to document their use of our technology and report related data to us on a regular basis. We will endeavor to provide that the terms of our license agreements give us the right to audit books and records of our licensees to verify this information, however audits can be expensive, time consuming, and may not be cost justified based on our understanding of our licensees' businesses. We will endeavor to audit certain licensees to review the accuracy of the information contained in their royalty reports in an effort to decrease the likelihood that we will not receive the royalty revenues to which we are entitled under the terms of our license agreements, but we cannot give assurances that such audits will be effective to that end.

Our business operations could suffer in the event of information technology systems' failures or security breaches. While we believe that we have implemented adequate security measures within our internal information technology and networking systems, our information technology systems may be subject to security breaches, damages from computer viruses, natural disasters, terrorism, and telecommunication failures. Any system failure or security breach could cause interruptions in our operations, including but not limited to our technology computer-aided design, or TCAD, modeling using Synopsys software, in addition to the possibility of losing proprietary information and trade secrets. To the extent that any disruption or security breach results in inappropriate disclosure of our confidential information, our competitive position may be adversely affected, and we may incur liability or additional costs to remedy the damages caused by these disruptions or security breaches.

If integrated circuits incorporating our technologies are used in defective products, we may be subject to product liability or other claims. If our MST technology is used in defective or malfunctioning products, we could be sued for damages, especially if the defect or malfunction causes physical harm to people. While we will endeavor to carry product liability insurance, contractually limit our liability and obtain indemnities from our customers, there can be no assurance that we will be able to obtain insurance at satisfactory rates or in adequate amounts or that any insurance and customer indemnities will be adequate to defend against or satisfy any claims made against us. The costs associated with legal proceedings are typically high, relatively unpredictable and not completely within our control. Even if we consider any such claim to be without merit, significant contingencies may exist, similar to those summarized in the above risk factor concerning intellectual property litigation, which could lead us to settle the claim rather than incur the cost of defense and the possibility of an adverse judgment. Product liability claims in the future, regardless of their ultimate outcome, could have a material adverse effect on our business, financial condition and reputation, and on our ability to attract and retain licensees and customers.

Effective as of January 31, 2024, we lost access to certain semiconductor manufacturing and engineering services which may be difficult and/or costly to replace. From April 2016 through January 2024, we worked with TSI Technology Development & Commercialization Services LLC, or TSI under a Master R&D Services Agreement and a Manufacturing Agreement. Under these agreements, TSI provided us with foundry services, consisting of engineering and manufacturing services. In August 2023, TSI was acquired by Robert Bosch Semiconductor LLC, or Bosch. In October 2023, Bosch advised us that on January 31, 2024 it would cease providing engineering and manufacturing services to third parties, including Atomera, in order to commence the conversion of the TSI fab to production of Silicon Carbide semiconductor products, As of the date of this Annual Report we are no longer working with TSI. We are in active discussions with potential replacement providers of foundry services. However, there are few foundries that offer R&D services that are comparable to those provided by TSI, so we may face difficulty in replacing the services that TSI had provided. We have utilized TSI's services for a portion of our internal R&D which required complete semiconductor device fabrication. No wafers sold or licensed to any customer have been fabricated at TSI. Accordingly, we do not believe that the loss of TSI's services will have a meaningful impact on any of our ongoing client engagements. However, our access to foundry services was interrupted while we were working to reach an agreement with a replacement foundry and adapt our R&D processes to those used at our replacement foundry. This transition may cause us to incur meaningful startup costs, may divert engineering resources from ongoing R&D activities and may increase our ongoing spending on outsourced engineering services. The potential inability to replace the TSI services in a timely manner may have a material adverse effect on the timing and cost of continuing to develop example applications and devices which exhibit the advantages of our MST technology.

Risks Related to Intellectual Property

If we fail to protect and enforce our intellectual property rights and our confidential information, our business will suffer. We rely primarily on a combination of nondisclosure agreements and other contractual provisions and patent, trade secret and copyright laws to protect our technology and intellectual property. If we fail to protect our technology and intellectual property, our licensees and others may seek to use our technology and intellectual property without the payment of license fees and royalties, which could weaken our competitive position, reduce our operating results and increase the likelihood of costly litigation. The growth of our business depends in large part on our ability to secure intellectual property rights in a timely manner, our ability to convince third parties of the applicability of our intellectual property rights to their products, and our ability to enforce our intellectual property rights. In certain instances, we attempt to obtain patent protection for portions of our technology, and our license agreements typically include both issued patents and pending patent applications as well as our proprietary know-how. If we fail to obtain patents in a timely manner or if the patents issued to us do not cover all of the inventions disclosed in our patent applications, others could use portions of our technology and intellectual property without the payment of license fees and royalties.

We also rely on trade secret laws rather than patent laws to protect other portions of our proprietary technology. However, trade secrets can be difficult to protect. The misappropriation of our trade secrets or other proprietary information could seriously harm our business. We protect our proprietary technology and processes, in part, through confidentiality agreements with our employees, consultants, suppliers and customers. We cannot be certain that these contracts have not been and will not be breached, that we will be able to timely detect unauthorized use or transfer of our technology and intellectual property, that we will have adequate remedies for any breach, or that our trade secrets will not otherwise become known or be independently discovered by competitors. If we fail to use these mechanisms to protect our technology and intellectual property, or if a court fails to enforce our intellectual property rights, our business will suffer. We cannot be certain that these protection mechanisms can be successfully asserted in the future or will not be invalidated or challenged.

Further, the laws and enforcement regimes of certain countries do not protect our technology and intellectual property to the same extent as do the laws and enforcement regimes of the U.S. In certain jurisdictions, we may be unable to protect our technology and intellectual property adequately against unauthorized use, which could adversely affect our business.

A court invalidation or limitation of our key patents could significantly harm our business. Our patent portfolio contains some patents that are particularly significant to our MST technology. If any of these key patents are invalidated, or if a court limits the scope of the claims in any of these key patents, the likelihood that companies will take new licenses and that any current licensees will continue to agree to pay under their existing licenses could be significantly reduced. The resulting loss in license fees and royalties could significantly harm our business. Moreover, our stock price may fluctuate based on developments in the course of ongoing litigation.

We may become involved in material legal proceedings in the future to enforce or protect our intellectual property rights, which could harm our business. From time to time, we may identify products that we believe infringe on our patents. In that event, we expect to initially seek to license the manufacturer of the infringing products, however if the manufacturer is unwilling to enter into a license agreement, we may have to initiate litigation to enforce our patent rights against those products. Litigation stemming from such disputes could harm our ability to gain new customers, who may postpone licensing decisions pending the outcome of the litigation or who may, as a result of such litigation, choose not to adopt our technologies. Such litigation may also harm our relationships with existing licensees, who may, because of such litigation, cease making royalty or other payments to us or challenge the validity and enforceability of our patents or the scope of our license agreements.

In addition, the costs associated with legal proceedings are typically high, relatively unpredictable and not completely within our control. These costs may be materially higher than expected, which could adversely impair our working capital, affect our operating results and lead to volatility in the price of our common stock. Whether or not determined in our favor or ultimately settled, litigation would divert our managerial, technical, legal and financial resources from our business operations. Furthermore, an adverse decision in any of these legal actions could result in a loss of our proprietary rights, subject us to significant liabilities, require us to seek licenses from others, limit the value of our licensed technology or otherwise negatively impact our stock price or our business and financial position, results of operations and cash flows.

Even if we prevail in our legal actions, significant contingencies may exist to their settlement and final resolution, including the scope of the liability of each party, our ability to enforce judgments against the parties, the ability and willingness of the parties to make any payments owed or agreed upon and the dismissal of the legal action by the relevant court, none of which are completely within our control. Parties that may be obligated to pay us royalties could be insolvent or decide to alter their business activities or corporate structure, which could affect our ability to collect royalties from such parties.

Our technologies may infringe on the intellectual property rights of others, which could lead to costly disputes or disruptions. The semiconductor industry is characterized by frequent allegations of intellectual property infringement. Any allegation of infringement could be time consuming and expensive to defend or resolve, result in substantial diversion of management resources, cause suspension of operations or force us to enter into royalty, license, or other agreements rather than dispute the merits of such allegation. Furthermore, third parties making such claims may be able to obtain injunctive or other equitable relief that could block our ability to further develop or commercialize some or all of our technologies, and the ability of our customers to develop or commercialize their products incorporating our technologies, in the U.S. and abroad. If patent holders or other holders of intellectual property initiate legal proceedings, we may be forced into protracted and costly litigation. We may not be successful in defending such litigation and may not be able to procure any required royalty or license agreements on acceptable terms or at all.

Risks Related to Owning Our Common Stock

The market price of our shares may be subject to fluctuation and volatility. You could lose all or part of your investment. The market price of our common stock is subject to wide fluctuations in response to various factors, some of which are beyond our control. Between January 1, 2023 and February 1, 2024, the reported high and low sales prices of our common stock have ranged from $4.96 to $10.72. The market price of our shares on the NASDAQ Capital Market may fluctuate as a result of a number of factors, some of which are beyond our control, including, but not limited to:

- actual or anticipated variations in our results of operations and financial condition;
- market acceptance of our MST technology;
- success or failure of our research and development projects;
- announcements of technological innovations by us;
- failure by us to achieve a publicly announced milestone;
- failure by us to meet expectations of investors, some of which may not be within our control or be related to our public announcements;
- delays between our expenditures to develop and market new or enhanced technological innovations and the generation of licensing revenue from those innovations;
- developments concerning intellectual property rights, including our involvement in litigation brought by or against us;
- changes in the amounts that we spend to develop, acquire or license new technologies or businesses;
- our sale or proposed sale, or the sale by our significant stockholders, of our shares or other securities in the future;
- changes in our key personnel;
- changes in earnings estimates or recommendations by securities analysts, if we continue to be covered by analysts;
- the trading volume of our shares; and
- general economic and financial market conditions and other factors, including factors unrelated to our operating performance.

These factors and any corresponding price fluctuations may materially and adversely affect the market price of our shares and result in substantial losses being incurred by our investors. In the past, following periods of market volatility, public company stockholders have often instituted securities class action litigation. If we were involved in securities litigation, it could impose a substantial cost upon us and divert the resources and attention of our management from our business.

We have not paid dividends in the past and have no immediate plans to pay dividends. We plan to reinvest all of our earnings, to the extent we have earnings, to cover operating costs and otherwise become and remain competitive. We do not plan to pay any cash dividends with respect to our securities in the foreseeable future. We cannot assure you that we would, at any time, generate sufficient surplus cash that would be available for distribution to the holders of our common stock as a dividend. Therefore, you should not expect to receive cash dividends on our common stock.

We expect to continue to incur significant increased costs as a result of being a public company that reports to the Securities and Exchange Commission and our management will be required to devote substantial time to meet compliance obligations. As a public company reporting to the Securities and Exchange Commission, we incur significant legal, accounting and other expenses that we did not incur as a private company. We are subject to reporting requirements of the Exchange Act and the Sarbanes-Oxley Act of 2002, as well as rules subsequently implemented by the Securities and Exchange Commission that impose significant requirements on public companies, including requiring establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. In addition, on July 21, 2010, the Dodd-Frank Wall Street Reform and Protection Act was enacted. There are significant corporate governance and executive compensation-related provisions in the Dodd-Frank Act that increased our legal and financial compliance costs, make some activities more difficult, time-consuming or costly and may also place undue strain on our personnel, systems and resources. Our management and other personnel devote a substantial amount of time to these compliance initiatives.

Our charter documents and Delaware law may inhibit a takeover that stockholders consider favorable. Provisions of our certificate of incorporation and bylaws and applicable provisions of Delaware law may delay or discourage transactions involving an actual or potential change in control or change in our management, including transactions in which stockholders might otherwise receive a premium for their shares, or transactions that our stockholders might otherwise deem to be in their best interests. The provisions in our certificate of incorporation and bylaws:

- limit who may call stockholder meetings;
- do not permit stockholders to act by written consent;
- allow us to issue blank check preferred stock without stockholder approval;
- do not provide for cumulative voting rights; and
- provide that all vacancies may be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum.

In addition, Section 203 of the Delaware General Corporation Law may limit our ability to engage in any business combination with a person who beneficially owns 15% or more of our outstanding voting stock unless certain conditions are satisfied. This restriction lasts for a period of three years following the share acquisition. These provisions may have the effect of entrenching our management team and may deprive you of the opportunity to sell your shares to potential acquirers at a premium over prevailing prices. This potential inability to obtain a control premium could reduce the price of our common stock.

Our bylaws designate 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 the Company. Our bylaws provide that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim against us or any our directors, officers or other employees arising pursuant to any provision of the Delaware General Corporation Law or our certificate of incorporation or bylaws, or (iv) any action asserting a claim against us or any our directors, officers or other employees governed by the internal affairs doctrine. This forum selection provision in our bylaws may limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or any of our directors, officers or other employees.

Our board of directors may issue blank check preferred stock, which may affect the voting rights of our holders and could deter or delay an attempt to obtain control of us. Our board of directors is authorized, without stockholder approval, to issue preferred stock in series and to fix and state the voting rights and powers, designation, preferences and relative, participating, optional or other special rights of the shares of each such series and the qualifications, limitations and restrictions thereof. Preferred stock may rank prior to our common stock with respect to dividends rights, liquidation preferences, or both, and may have full or limited voting rights. If issued, such preferred stock would increase the number of outstanding shares of our capital stock, adversely affect the voting power of holders of our common stock and could have the effect of deterring or delaying an attempt to obtain control of us.

Item 1B. Unresolved Staff Comments

None.

Item 1C. Cybersecurity

Risk Management and Strategy. Our cybersecurity program is built upon the National Institute for Standards and Technology ("NIST"), International Organization for Standardization ("ISO") and other best practice frameworks. We employ processes for assessing, identifying, and managing material risks from cybersecurity threats, including engagement of an independent cybersecurity consultant to audit our systems and procedures, make recommendations for improvement and monitor remediation of any identified risks. We also conduct random vulnerability testing including network penetration, phishing and social engineering tests. In addition, we also request Systems and Organization Control ("SOC") type reports from several of our service providers including our payroll and human resources system provider and stock administration provider.

Although we develop and maintain systems and controls designed to prevent cybersecurity breaches from occurring, and we have a process to identify and mitigate threats, the development and maintenance of these systems, controls and processes is costly and requires ongoing monitoring and updating as technologies change and efforts to overcome security measures become increasingly sophisticated. Moreover, despite our efforts, the possibility of a breach occurring cannot be eliminated entirely. As we outsource more of our information systems to vendors, engage in more electronic transactions with service customers and vendors, and rely more on cloud-based information systems, the related security risks will increase and we will need to expend additional resources to protect our technology and information systems. In addition, there can be no assurance that our internal information technology systems or those of our third-party contractors, or our consultants' efforts to implement adequate security and control measures, will be sufficient to protect us against breakdowns, service disruption, data deterioration or loss in the event of a system malfunction, or prevent data from being stolen or corrupted in the event of a cyberattack, security breach, industrial espionage attacks or insider threat attacks which could result in financial, legal, business or reputational harm.

As of the date of this report, we are not aware of cybersecurity threats, including as a result of any previous cybersecurity incidents, that have materially affected or are reasonably likely to materially affect us, including our business strategy, results of operations, or financial condition.

Governance. Our senior management team conducts the regular assessment and management of material risks from cybersecurity threats, including review with our IT team and third-party service providers. All employees and consultants are directed to report to our senior management any irregular or suspicious activity that could indicate a cybersecurity threat or incident. The Audit Committee of our Board of Directors created a cybersecurity subcommittee in February 2023 which evaluates our cybersecurity assessment and management policies, including quarterly interviews with our senior officers. Our Audit Committee meets at least quarterly with our independent registered accounting firm and communicates with them regarding any cybersecurity related risks.

Item 2. Properties

Our executive offices are presently located in a 4,101 square foot facility in Los Gatos, California pursuant to a five-year lease, expiring on January 31, 2026. As part of the amended lease entered into in August 2020, our current lease payment is $17,701.

Beginning in March 2021, we began leasing 474 square feet of office space in Tempe, Arizona. The original lease had a two-year term, with an option to extend for an additional three years. The renewal option was exercised in January 2023. Effective May 1, 2023, we leased an additional 404 square feet at this location under an amendment to the current lease. Our current monthly lease payment is now $2,365 and will increase to $2,435 in March 2024. The lease ends in February 2026.

Item 3. Legal Proceedings

To our knowledge, as of the date of this Annual Report, there are no pending legal proceedings to which we or our properties are subject.

Item 4. Mine Safety Disclosures

Inapplicable.

PART II

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

Our common stock trades on the NASDAQ Capital Market under the symbol "ATOM".

Holders of Record

As of February 6, 2024, there were 138 holders of record of our common stock.

Dividend Policy

We have never declared or paid cash dividends on our common stock. We presently intend to retain earnings, if any, to finance the operation and expansion of our business.

Equity Compensation Plan Information

Our 2007 Equity Incentive Plan, or 2007 Plan, expired in March 2017, however all options and warrants outstanding at the time of the expiration remained outstanding and exercisable by their term.

In May 2017, we established our 2017 Stock Incentive Plan, or 2017 Plan. The 2017 Plan provides for the grant of non-qualified stock options and incentive stock options to purchase shares of our common stock and for the grant of restricted and unrestricted share grants. We have reserved a total of 3,750,000 shares of common stock for issuance under the 2017 Plan. All employees, officers, directors, consultants, advisors and other persons who provide services to us or any of our subsidiaries are eligible to receive incentive awards under the 2017 Plan. As of December 31, 2023, awards of 3,725,269 shares of common stock had been granted under the 2017 Plan, net of forfeited restricted stock and option awards and a total of 24,731 shares of common stock are reserved for issuance.

In May 2023, we established our 2023 Stock Incentive Plan, or 2023 Plan. The 2023 Plan provides for the grant of non-qualified stock options and incentive stock options to purchase shares of our common stock and for the grant of restricted and unrestricted share grants. We have reserved a total of 2,000,000 shares of common stock for issuance under the 2023 Plan. All employees, officers, directors, consultants, advisors and other persons who provide services to us or any of our subsidiaries are eligible to receive incentive awards under the 2023 Plan. As of December 31, 2023, awards of 78,336 shares of common stock had been granted under the 2023 Plan, net of forfeited restricted stock and option awards and a total of 1,921,664 shares of common stock are reserved for issuance.

As of December 31, 2023, options to purchase 3,369,641 shares of common stock were outstanding under the 2007 Plan, the 2017 Plan and the 2023 Plan. The following table sets forth certain information as of December 31, 2023 about our stock plans under which our equity securities are authorized for issuance (in thousands, except exercise price).

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options (a)	Weighted-Average Exercise Price of Outstanding Options	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected In Column (a))
Equity compensation plans approved by security holders	3,369,641	$ 7.04	1,946,395
Equity compensation plans not approved by security holders	–	–	–
Total	3,369,641	$ 7.04	1,946,395

Item 6. Reserved

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

The following discussion and analysis of the financial condition and results of operations of Atomera Incorporated should be read in conjunction with our financial statements and the accompanying notes that appear elsewhere in this Annual Report. Statements in this Annual Report on Form 10-K include forward-looking statements based upon current expectations that involve risks and uncertainties, such as our plans, objectives, expectations and intentions. We use words such as "anticipate," "estimate," "plan," "project," "continuing," "ongoing," "expect," "believe," "intend," "may," "will," "should," "could," and similar expressions to identify forward-looking statements. Although forward-looking statements in this Annual Report reflect the good faith judgment of our management, such statements can only be based on facts and factors currently known by us. Consequently, forward-looking statements are inherently subject to risks, uncertainties, and changes in condition, significance, value and effect, including those risk factors set forth in this Annual Report. Such risks, uncertainties and changes in condition, significance, value and effect could cause our actual results to differ materially from those expressed herein and in ways not readily foreseeable. Readers are urged not to place undue reliance on these forward-looking statements, which speak only as of the date of this Annual Report and are based on information currently and reasonably known to us. We undertake no obligation to revise or update any forward-looking statements in order to reflect any event or circumstance that may arise after the date of this Annual Report. Readers are urged to carefully review and consider the various disclosures made in this Annual Report, which attempt to advise interested parties of the risks and factors that may affect our business, financial condition, results of operations and prospects.

Overview

We are engaged in the business of developing, commercializing and licensing proprietary processes and technologies for the $530+ billion semiconductor industry. Our lead technology, named Mears Silicon Technology™, or MST®, is a thin film of reengineered silicon, typically 100 to 300 angstroms (or approximately 20 to 60 silicon atomic unit cells) thick. MST can be applied as a transistor channel enhancement to CMOS-type transistors, the most widely used transistor type in the semiconductor industry. MST is our proprietary and patent-protected performance enhancement technology that we believe addresses a number of key engineering challenges facing the semiconductor industry. We believe that by incorporating MST, transistors can be made smaller, with increased speed, reliability and power efficiency. In addition, since MST is an additive and low-cost technology, we believe it can be deployed on an industrial scale, with machines commonly used in semiconductor manufacturing. We believe that MST can be widely incorporated into the most common types of semiconductor products, including analog, logic, optical and memory integrated circuits.

We do not intend to design or manufacture integrated circuits directly. Instead, we develop and license technologies and processes that we believe offer the designers and manufacturers of integrated circuits a low-cost solution to the industry's need for greater performance and lower power consumption. Our customers and partners include:

- foundries, which manufacture integrated circuits on behalf of fabless manufacturers;
- integrated device manufacturers, or IDMs, which are the fully-integrated designers and manufacturers of integrated circuits;
- fabless semiconductor manufacturers, which are designers of integrated circuits that outsource the manufacturing of their chips to foundries;
- original equipment manufacturers, or OEMs, that manufacture the epitaxial, or epi, machines used to deposit semiconductor layers, such as the MST film, onto silicon wafers; and
- electronic design automation companies, which make tools used throughout the industry to simulate performance of semiconductor products using different materials, design structures and process technologies.

Our commercialization strategy is to generate revenue through licensing arrangements whereby foundries, IDMs and fabless semiconductor manufacturers pay us a license fee for their right to use MST technology in the manufacture of silicon wafers as well as a royalty for each silicon wafer or device that incorporates our MST technology. We also license our MSTcad software to our customers for use in simulating the effects of using MST technology on their wafers and/or devices. To date, we have generated revenue from (i) licensing agreements with ST and AKM, both of which are IDMs, one fabless manufacturer and one foundry, (ii) a joint development agreement, or JDA, with a leading semiconductor provider, (iii) engineering services provided to foundries, IDMs and fabless companies and (iv) licensing MSTcad.

We were organized as a Delaware limited liability company under the name Nanovis LLC on November 26, 2001. On March 13, 2007, we converted to a Delaware corporation under the name Mears Technologies, Inc. On January 12, 2016, we changed our name to Atomera Incorporated.

On May 31, 2022, we entered into an Equity Distribution Agreement with Oppenheimer & Co. Inc and Craig-Hallum Capital Group LLC, as agents, under which we may offer and sell, from time to time at our sole discretion, shares of our common stock having aggregate offering proceeds of up to $50.0 million in an "at-the-market" or ATM offering, to or through the agents. During the year ended December 31, 2022, approximately 527,000 shares were sold at an average price per share of approximately $11.68, resulting in approximately $5.8 million of net proceeds to us after deducting commissions and other offering expenses. During the year ended December 31, 2023, approximately 1.8 million shares were sold at an average price per share of approximately $7.97, resulting in approximately $13.5 million of net proceeds to us after deducting commissions and other offering expenses.

Results of Operations for the Years Ended December 31, 2023 and 2022

Revenues. To date, we have only generated limited revenue. In the future, we expect to collect increased fees from license agreements and JDAs as well as royalties from customer sales of products that incorporate our MST technology, subject to our ability (i) to enter into manufacturing and distribution license agreements with our current and future licensees and (ii) to advance such licensees, including ST, through licensing phases to royalty-bearing product shipments.

Our integration services consist of depositing our MST film on semiconductor wafers, delivering such wafers to customers to finalize building devices, and performing tests for customers evaluating MST. The integration license agreements we have entered into to date grant the licensees the right to build products that integrate our MST technology deposited by us onto their semiconductor wafers, but these agreements do not grant the licensees the rights to manufacture on their site or to sell products incorporating MST. Our first JDA included the grant of a manufacturing license to our customer and we were paid for such license upon delivery of our IP transfer package which enabled our customer to install MST in a tool in their facility and to use it to manufacture wafers for internal use. This JDA also contained targeted technical specifications that, if met, would result in payment of a success fee to us. Those technical objectives were met and we have collected the success fee. Our license agreement with ST, which we executed in April 2023, was our first full commercial license agreement and provided for grants of a manufacturing license enabling ST to install MST in a tool in their fab and to manufacture wafers for internal development use only as well as a distribution license granted upon completion of process qualification. The ST license agreement provides for payments of license fees, payable upon reaching milestones for MST installation and acceptance, in the case of the manufacturing license, and upon reaching process qualification milestones. After process qualification is complete and associated payments are made, ST will be required to pay royalties for all products they sell that utilize MST.

For recognizing integration service revenue from integration license agreements, we assess (i) whether the license grant is distinct from or combined with the transfer of goods or services and (ii) whether the license is a right to access intellectual property or a right to use the intellectual property. For licenses that are not distinct, but combined with other goods or services, the revenue is recognized at a point in time or over time as the obligations to perform the combined services and/or deliver the combined goods are satisfied. Integration license agreements contain a technology grant as well as a performance obligation to deliver wafers with our technology deposited on them. We have historically determined the grant of rights in these integration license agreements is not distinct from the integration service. Accordingly, revenue from integration license agreements is recognized as the service is provided to the customer. For manufacturing licenses, revenue is recognized at the point in time when we deliver our MST recipe as the license to manufacture using MST technology is a right to use the Company's technology and not a right to access the technology over time. However, in cases where our manufacturing license grants include a customer acceptance requirement, revenue is recognized over time.

Revenue for the years ended December 31, 2023 and 2022 was approximately $550,000 and $382,000, respectively. Our revenue for 2023 consisted of revenue from a manufacturing license. Our revenue for 2022 consisted of a success fee pursuant to our JDA, a license fee paid under an integration license agreement and MSTcad license revenue.

Cost of Revenue. Cost of revenue consists of costs of materials, as well as direct compensation and expenses incurred to provide integration engineering services, support for customer installation and qualification and MSTcad support. Cost of revenue was approximately $28,000 and $81,000 for the years ended December 31, 2023 and 2022, respectively. We anticipate that our cost of revenue will vary substantially depending on the mix of license and engineering services revenues we receive and the nature of products and/or services delivered in each customer engagement.

Operating Expenses. Operating expenses consist of research and development, general and administrative, and selling and marketing expenses. For the years ended December 31, 2023 and 2022 our operating expenses totaled approximately $21.2 million and $17.8 million, respectively.

Research and development expenses. To date, our operations have focused on the research, development, patent prosecution, and commercialization of our MST technology and related technologies such as MSTcad. Our research and development costs primarily consist of payroll and benefit costs for our engineering staff and costs of outsourced fabrication (including epi tool leases) and metrology of semiconductor wafers incorporating our MST technology.

For the years ended December 31, 2023 and 2022, we incurred approximately $12.5 million and $10.0 million, respectively, of research and development expense, an increase of approximately $2.5 million, or 25%. The increase was primarily due to outsourced research and development costs, which increased by approximately $1.1 million due to price increases and a higher number of wafers processed. The other main factors that drove the increase in research and development expenses were increases of approximately $739,000 in employee costs reflecting new hires and an increase in the annual bonus accrual, an approximately $255,000 increase in stock-based compensation expense and an increase of approximately $266,000 in technical consulting expenses.

General and administrative expenses. General and administrative expenses consist primarily of payroll and benefit costs for administrative personnel, office-related costs and professional fees. General and administrative costs for the years ended December 31, 2023 and 2022 were approximately $7.1 million and $6.4 million, respectively, representing an increase of approximately $634,000, or 10%. The increase in costs was primarily due to an increase in employee-related costs of approximately $166,000, an increase of approximately $116,000 in patent fees and legal fees associated with our patents, an increase of approximately $100,000 in other legal fees and an increase of approximately $301,000 in stock-based compensation expense.

Selling and marketing expenses. Selling and marketing expenses consist primarily of salary and benefits for our sales and marketing personnel and business development consulting services. Selling and marketing expenses for the years ended December 31, 2023 and 2022 were approximately $1.6 million and $1.3 million, respectively, representing an increase of approximately $251,000, or 19%. The increase in costs is primarily related to increased spending on employee-related costs of approximately $72,000, an increase in stock-based compensation of approximately $91,000 and an increase of approximately $62,000 in travel-related expenses.

Interest income. Interest income for the years ended December 31, 2023 and 2022 was approximately $723,000 and $340,000, respectively. Interest income for each period related to interest earned on our cash and cash equivalents and the increase was primarily due to progressively higher interest rates during these periods.

Accretion income. Accretion income for the year ended December 31, 2023 was approximately $283,000. Accretion income relates to the increase in value of our available-for-sale securities from the purchase date through the maturity date. There was no income from accretion for the year ended December 31, 2022 because our active cash management program, which involves investment of a portion of our cash in short-term fixed-income securities commenced in the first quarter of 2023.

Other income/expense, net. Other income for the year December 31, 2023 of approximately $75,000, consisted primarily of a refundable state research and development tax credit, net of filing costs and tax consulting services. There was no other income/expenses for the year ended December 31, 2022.

Interest expense. Interest expense for the years ended December 31, 2023 and 2022 was approximately $194,000 and $255,000, respectively. Interest expense is related to the tool financing lease entered into in August 2021.

Liquidity and Capital Resources

As of December 31, 2023, we had cash, cash equivalents and short-term investments of approximately $19.5 million and working capital of approximately $16.6 million. For the year ended December 31, 2023, we had a net loss of approximately $19.8 million and used approximately $14.6 million of cash and cash equivalents in operations. Since inception, we have incurred recurring operating losses.

During the year ended December 31, 2023, we sold approximately 1.8 million shares pursuant to our ATM at an average price per share of approximately $7.97, resulting in approximately $13.5 million of net proceeds to us after deducting commissions and other offering expenses.

We believe that our available working capital is sufficient to fund our presently forecasted working capital requirements for, at least, the next 12 months following the date of the filing of this report. However, our future capital requirements and the adequacy of our available funds will depend on many factors, including our ability to successfully commercialize our MST technology, competing technological and market developments, and the need to enter into collaborations with other companies or acquire technologies to enhance or complement our current offerings. If we are not able to generate sufficient revenue from license fees and royalties in a time frame that satisfies our cash needs, we will need to raise more capital. In the event we require additional capital, we will endeavor to acquire additional funds through various financing sources, including our ATM Facility, follow-on equity offerings, debt financing and joint ventures with industry partners. In addition, we will consider alternatives to our current business plan that may enable us to achieve revenue-producing operations and meaningful commercial success with a smaller amount of capital. If we are unable to secure additional capital, we may be required to curtail our research and development initiatives and take additional measures to reduce costs in order to conserve its cash.

Cash Flows from Operating, Investing and Financing Activities:

Net cash used in operating activities of approximately $14.6 million for year ended December 31, 2023 resulted primarily from our net loss of approximately $19.8 million, adjusted by approximately $4.0 million of stock-based compensation expense and amortization of right-of-use assets of approximately $1.4 million.

Net cash used in operating activities of approximately $12.5 million for year ended December 31, 2022 resulted primarily from our net loss of approximately $17.4 million, adjusted by approximately $3.4 million of stock-based compensation expense and amortization of right-of-use assets of approximately $1.4 million.

Net cash used in investing activities of approximately $6.8 million and for year ended December 31, 2023 consisted primarily of the purchase of short-term available-for-sale investments, offset by the maturity of short-term available-for-sale investments. Net cash used by investing activities of approximately $39,000 for the year ended December 31, 2022, consisted of the purchase of computers and lab tools for our Tempe office space.

Net cash provided by financing activities of approximately $12.7 million for the year ended December 31, 2023 related primarily to net proceeds from our ATM Facility during the year ended December 31, 2023, offset in part by approximately $918,000 in principal payments on our financing lease.

Net cash provided by financing activities of approximately $5.0 million for the year ended December 31, 2022 related primarily to net proceeds from our ATM Facility during the year ended December 31, 2022, offset in part by approximately $984,000 in principal payments on our financing lease.

Critical Accounting Estimates

Our financial statements are prepared in accordance with accounting principles generally accepted in the United States. The preparation of financial statements in conformity with those accounting principles requires us to use judgement in making estimates and assumptions based on the relevant information available at the end of each period. These estimates and assumptions have a significant effect on reported amounts of assets, liabilities, sales and expenses as well as the disclosure of contingent assets and liabilities because they result primarily from the need to make estimates and assumptions on matters that are inherently uncertain. Actual results could differ from our estimates.

Leases

We account for leases in accordance with Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No 2016-02, *Leases* (Topic 842). We determine if a contract contains a lease in whole or in part at the inception of the contract. Right-of-use ("ROU") assets represent its right to use an underlying asset for the lease term while lease liabilities represent its obligation to make lease payments arising from the lease. All leases greater than 12 months result in the recognition of a ROU asset and a liability at the lease commencement date based on the present value of the lease payments over the lease term. Lease expenses for operating leases is recognized on a straight-line-basis over the lease term. Lease expenses for financing leases is amortization of the ROU assets over the life of the lease and interest expense is recognized on the liability.

Stock-based Compensation

We have stock-based compensation programs, which include restricted stock awards ("RSAs") and stock options and an employee stock purchase plan. We account for stock-based compensation expense, including the expense for grants of RSAs and stock options that may be settled in shares of our common stock, based on the fair values of the equity instruments issued. The fair value is determined on the measurement date, which is the date of grant. The fair value of our RSAs is measured at the market price of our common stock on the measurement date amortized over the vesting period of the award. The fair value for our stock option awards is determined at the grant date using the Black-Scholes Option Pricing Model and amortized over the vesting period of the option.

Assumptions for the Black-Scholes valuation model used for employee stock awards include:

- Expected term – We derived the expected term for employee stock awards using historical information to develop expectations about future exercise patterns and behavior after employment termination.
- Expected volatility – Volatility is estimated using Atomera's historical volatility for similar terms.
- Expected dividend rate – We have not declared or paid dividends to our stockholders and have no plans to pay dividends; therefore, we have assumed an expected dividend yield of 0%.
- Risk-free interest rate – The risk-free interest rate is based on the yields of U.S. Treasury securities with maturities similar to the expected terms of the associated awards.
- The fair value of our common stock is measured at the market price on the measurement date.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Not applicable.

Item 8. Financial Statements and Supplementary Data

Index to Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors of
Atomera Incorporated

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Atomera Incorporated (the “Company”) as of December 31, 2023 and 2022, the related statements of operations, stockholders’ equity and cash flows for each of the two years in the period ended December 31, 2023, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2023, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

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

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the 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 financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ Marcum LLP

Marcum LLP

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

Los Angeles, CA
February 15, 2024

Atomera Incorporated
Balance Sheets
(in thousands, except per share data)

	December 31, 2023	December 31, 2022
ASSETS		
Current Assets:		
Cash and cash equivalents	$ 12,591	$ 21,184
Short-term investments	6,940	–
Unbilled contracts receivable	550	–
Interest receivable	79	–
Prepaid expenses and other current assets	244	418
Total current assets	20,404	21,602
Property and equipment, net	100	158
Long-term prepaid maintenance and supplies	91	91
Security deposit	14	14
Operating lease right-of-use-asset	517	700
Financing lease right-of-use-asset	2,903	4,164
Total assets	$ 24,029	$ 26,729
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 618	$ 397
Accrued expenses	222	173
Accrued payroll related expenses	1,382	967
Current operating lease liability	264	245
Current financing lease liability	1,328	1,126
Total current liabilities	3,814	2,908
Long-term operating lease liability	295	521
Long-term financing lease liability	1,750	2,986
Total liabilities	5,859	6,415
Commitments and contingencies (see Note 11)	–	–
Stockholders' equity:		
Preferred stock, $0.001 par value, authorized 2,500 shares: none issued and outstanding at December 31, 2023 and 2022	–	–
Common stock, $0.001 par value, authorized 47,500 shares; 26,107 shares issued and outstanding at December 31, 2023 and 23,973 issued and outstanding as of December 31, 2022	26	24
Additional paid-in capital	221,229	203,585
Accumulated deficit	(203,085)	(183,295)
Total stockholders' equity	18,170	20,314
Total liabilities and stockholders' equity	$ 24,029	$ 26,729

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

Atomera Incorporated
Statements of Operations
(in thousands, except per share data)

	Years Ended December 31,	
	2023	**2022**
Revenue:	$ 550	$ 382
Cost of revenue	(28)	(81)
Gross margin	522	301
Operating Expenses:		
Research and development	12,525	10,038
General and administrative	7,075	6,441
Selling and marketing	1,599	1,348
Total operating expenses	21,199	17,827
Loss from operations	(20,677)	(17,526)
Other income (expense):		
Interest income	723	340
Accretion income	283	–
Other income (expense), net	75	–
Interest expense	(194)	(255)
Total other income (expense), net	887	85
Net loss	$ (19,790)	$ (17,441)
Net loss per common share, basic	$ (0.80)	$ (0.75)
Net loss per common share, diluted	$ (0.80)	$ (0.75)
Weighted average number of common shares outstanding, basic	24,755	23,157
Weighted average number of common shares outstanding, diluted	24,755	23,157

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

Atomera Incorporated
Statements of Stockholders' Equity
(in thousands)

	Common Stock		Additional Paid-in	Accumulated	Total Stockholders'
	Shares	Amount	Capital	Deficit	Equity
Balance January 1, 2022	23,207	$ 23	$ 194,212	$ (165,854)	$ 28,381
Stock-based compensation	194	–	3,367	–	3,367
Stock option exercises	45	–	244	–	244
At-the-market sale of stock, net of commissions and expenses	527	1	5,762	–	5,763
Net loss	–	–	–	(17,441)	(17,441)
Balance December 31, 2022	23,973	$ 24	$ 203,585	$ (183,295)	$ 20,314
Stock-based compensation	357	–	4,013	–	4,013
Stock option exercises	33	–	128	–	128
Forfeited restricted stock awards	(20)	–	–	–	–
At-the-market sale of stock, net of commissions and expenses	1,764	2	13,503	–	13,505
Net loss	–	–	–	(19,790)	(19,790)
Balance December 31, 2023	26,107	$ 26	$ 221,229	$ (203,085)	$ 18,170

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

Atomera Incorporated
Statements of Cash Flows
(in thousands)

	Years Ended December 31,	
	2023	**2022**
CASH FLOWS FROM OPERATING ACTIVITIES		
Net Loss	$ (19,790)	$ (17,441)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	77	77
Operating lease right of use asset amortization	216	200
Financing lease right of use asset amortization	1,146	1,229
Stock-based compensation	4,013	3,367
Accretion of discounts on available-for-sales securities	(254)	–
Gain on sale of assets	(3)	–
Changes in operating assets and liabilities:		
Unbilled contracts receivable	(550)	–
Interest receivable	(31)	–
Prepaid expenses and other current assets	174	(108)
Accounts payable	221	59
Accrued expenses	49	(30)
Accrued payroll expenses	415	366
Operating lease liability	(240)	(218)
Net cash used in operating activities	(14,557)	(12,499)
CASH FROM INVESTING ACTIVITIES		
Acquisition of property and equipment	(31)	(39)
Proceeds from sale of property and equipment	15	–
Purchase of available-for-sale securities	(19,539)	–
Maturity of available-for-sale securities	12,804	–
Net cash used in investing activities	(6,751)	(39)
CASH FLOWS FROM FINANCING ACTIVITIES		
Proceeds from at-the-market sale of stock, net of commissions and expenses	13,505	5,763
Proceeds from exercise of stock options	128	244
Payments of principal for financing lease	(918)	(984)
Net cash provided by financing activities	12,715	5,023
Net decrease in cash and cash equivalents	(8,593)	(7,515)
Cash and cash equivalents at beginning of year	21,184	28,699
Cash and cash equivalents at end of year	$ 12,591	$ 21,184
Supplemental information:		
Cash paid for interest	$ 194	$ 255
Cash paid for taxes	$ –	$ –

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

Atomera Incorporated
Notes to the Financial Statements

1. NATURE OF OPERATIONS

Atomera Incorporated ("Atomera" or the "Company") was incorporated in the state of Delaware in March 2007 under the name MEARS Technologies, Inc. and is engaged in the development, commercialization and licensing of proprietary processes and technologies for the semiconductor industry. On January 12, 2016, the Company changed its name to Atomera Incorporated.

Atomera is an early-stage company, having only recently begun limited revenue-generating activities, and is devoting substantially all its efforts toward technology research and development and to commercially licensing its technology to designers and manufacturers of integrated circuits. The Company operates as one business segment.

2. LIQUIDITY AND MANAGEMENT PLANS

At December 31, 2023, the Company had cash, cash equivalents and short-term investments of approximately $19.5 million and working capital of approximately $16.6 million. The Company has generated only limited revenues since inception and has incurred recurring operating losses. Accordingly, it is subject to all the risks inherent in the initial organization, financing, expenditures, and scaling of a new business that is not generating positive cashflow.

On May 31, 2022, Atomera entered into an Equity Distribution Agreement with Oppenheimer & Co. Inc. and Craig-Hallum Capital Group LLC, as agents, under which the Company may offer and sell, from time to time at its sole discretion, shares of its $0.001 par value common stock, in "at the market" offerings to or through the agent as its sales agent, having aggregate offering proceeds of up to $50.0 million (the "ATM Facility"). During the year ended December 31, 2023, the Company sold approximately 1.8 million shares pursuant to the ATM at an average price per share of approximately $7.97, resulting in approximately $13.5 million of net proceeds to the Company after deducting commissions and other offering expenses.

Based on the funds it has available as of the date of the filing of this report, the Company believes that it has sufficient capital to fund its current business plans and obligations over, at least, 12 months from the date that these financial statements have been issued. The Company's future capital requirements and the adequacy of its available funds will depend on many factors, including the Company's ability to successfully commercialize its technology, competing technological and market developments, and the need to enter into collaborations with other companies or acquire technologies to enhance or complement its current offerings. The Company's operating plans for the next 12 months include increased research and development expenses.

3. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The financial statements are presented in accordance with accounting principles generally accepted in the United States of America ("GAAP") and reflect the financial position, results of operations and cash flows for all periods presented.

Fair Value of Financial Instruments

Authoritative guidance requires disclosure of the fair value of financial instruments. The Company's financial instruments consist of cash and cash equivalents, short-term investments, accounts receivable and accounts payable, the carrying amounts of which approximate their estimated fair values primarily due to the short-term nature of the instruments or based on information obtained from market sources and management estimates. The Company measures the fair value of certain of its financial assets and liabilities on a recurring basis. A fair value hierarchy is used to rank the quality and reliability of the information used to determine fair values. Financial assets and liabilities carried at fair value which is not equivalent to cost will be classified and disclosed in one of the following three categories:

Level 1 — Quoted prices (unadjusted) in active markets for identical assets and liabilities.

Level 2 — Inputs other than Level 1 that are observable, either directly or indirectly, such as unadjusted quoted prices for similar assets and liabilities, unadjusted quoted prices in the markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3 — Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

Cash and Cash Equivalents

The Company maintains its operating accounts in a single reputable financial institution. The balances are insured by the U.S. Federal Deposit Insurance Corporation ("FDIC") up to specified limits. The Company's cash and cash equivalents are maintained in checking accounts and money market funds with maturities of less than three months when purchased, which are readily convertible to known amounts of cash.

Concentration of Credit Risk and Major Customers

Financial instruments, which potentially subject the Company to concentrations of credit risk, consist principally of cash, cash equivalents, short-term investments and accounts receivable. One customer represented 100% of revenue during the year ended December 31, 2023.

At times, the amounts on deposit at the financial institution exceed the federally insured limits. Management believes that the financial institution which holds the Company's cash is financially sound and, accordingly, that minimal credit risk exists. As of December 31, 2023 and 2022, the Company's cash balances were in excess of insured limits maintained at the financial institution.

Accounts Receivable and Unbilled Contracts Receivable

The Company grants credit to its business customers. Collateral is generally not required for trade receivables. The Company maintains allowances for potential credit losses when necessary. Trade accounts receivable and unbilled contracts receivable are recorded net of allowances for cash discounts for prompt payment, doubtful accounts, and sales returns.

The Company's policy is to reserve for uncollectible accounts based on its best estimate of the amount of probable credit losses in its existing accounts receivable and unbilled contracts receivable accounts under Accounting Standards Update ("ASU") No. 2016-13, *Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*. The Company periodically reviews these receivables to determine whether an allowance for doubtful accounts is necessary based on an analysis of past due accounts and other factors that may indicate that the realization of an account may be in doubt. Other factors that the Company considers include its existing contractual obligations, historical payment patterns of its customers and individual customer circumstances, and an analysis of days sales outstanding by customer. Due to the Company's low volume of customers, management reviews the receivable balances on a customer by customer basis. Account balances deemed to be uncollectible are charged to the allowance after all means of collection have been exhausted and the potential for recovery is considered remote. At December 31, 2023 and 2022, there were no allowances for doubtful accounts since the balances were collected during the year. At December 31, 2023, there was no allowance against the unbilled contracts receivable account as the Company deems the balance fully collectible.

Impairment of Long-lived Assets

The Company reviews long-lived assets for impairment whenever events or changes in circumstances indicate that it is more likely than not that the asset's carrying amount may not be recoverable. The Company conducts its long-lived asset impairment analyses in accordance with authoritative guidance which requires the Company to group assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities and evaluate the asset group against the sum of the undiscounted future cash flows. If the undiscounted cash flows do not indicate the carrying amount of the asset is recoverable, an impairment charge is measured as the amount by which the carrying amount of the asset group exceeds its fair value based on discounted cash flow analysis or appraisals. During the years ended December 31, 2023 and 2022, the Company had noted no indicators of impairment.

Property and Equipment

Items capitalized as property and equipment are stated at cost. Maintenance and routine repairs are charged to operations when incurred, while betterments and renewals are capitalized. Depreciation and amortization are computed using the straight-line method over the estimated useful lives of the respective assets starting when the asset is placed in service.

Revenue

The Company generates revenue from integration engineering services, which it delivers either pursuant to integration license agreements or delivery of engineering services and from the grant of manufacturing licenses to customers to use its technology in the manufacture of semiconductor wafers and/or devices for the customer's internal use. Revenue is recognized based on the following steps: (i) identification of the contract, or contracts, with a customer, (ii) identification of the performance obligations in the contract, (iii) determination of the transaction price, (iv) allocation of the transaction price to the performance obligations of the contract, and (v) recognition of revenue when, or as, the Company satisfies a performance obligation. The Company's integration services generally consist of depositing its proprietary technology onto the customer's semiconductor wafers

and delivering such wafers back to the customer. Revenue from integration services is recognized as the performance obligations are satisfied, which is upon transfer of control of the wafers to the customer (generally upon shipment). Revenue from manufacturing licenses is recognized as the performance obligations are satisfied, which is generally upon delivery of the Company's MST recipe to the customer but is recognized over time if the performance obligation related to the grant of the license includes customer acceptance.

For recognizing integration service revenue from integration license agreements, the Company assesses (i) whether the license grant is distinct from or combined with the transfer of goods or services and (ii) whether the license is a right to access intellectual property or a right to use the intellectual property. For licenses that are not distinct, but combined with other goods or services, the revenue is recognized at a point in time or over time as the obligations to perform the combined services and/or deliver the combined goods are satisfied. The Company's integration license agreements contain a technology grant as well as a performance obligation to deliver wafers with its technology deposited on them. The Company has determined the grant of rights in these integration license agreements is not distinct from the integration service. Accordingly, revenue from integration license agreements is recognized as the service is provided to the customer. For manufacturing licenses, revenue is recognized at the point in time when the Company delivers its MST recipe because this license confers a right to use the Company's technology and not a right to access the technology over time. However, in cases where the Company's grant of a manufacturing license includes a customer acceptance requirement, revenue is recognized over time. The Company's MSTcad licenses grant customers the right to use MSTcad software to simulate the effects of incorporating MST technology into their semiconductor manufacturing process. Such MSTcad licenses are granted on a monthly basis and revenue is recognized over time.

Deferred revenues consist of unearned amounts that have been billed to the customer in advance of the Company's performance obligations. These amounts have not yet been recognized as revenue. Revenue for these items will be recognized in accordance with the Company's revenue policy.

Research and Development Expenses

In accordance with authoritative guidance, the Company charges research and development costs to operations as incurred. Research and development expenses consist of personnel costs for the design, development, testing and enhancement of the Company's technology, and certain other allocated costs, such as depreciation and other facilities related expenditures.

Leases

The Company accounts for leases in accordance with ASU No 2016-02, *Leases* (Topic 842). The Company determines if a contract contains a lease in whole or in part at the inception of the contract. Right-of-use ("ROU") assets represent its right to use an underlying asset for the lease term while lease liabilities represent its obligation to make lease payments arising from the lease. All leases greater than 12 months result in the recognition of a ROU asset and a liability at the lease commencement date based on the present value of the lease payments over the lease term. Leases are accounted for as operating leases unless it meets one of the following criteria: (a) the lease term accounts for most of the remaining economic life of the underlying asset; (b) the present value of the lease payments is over 90% of the fair value of the underlying asset; (c) the underlying asset would have no alternative use for the lessor at the end of the lease; or (d) ownership of the underlying assets transfers to the Company at the end of the lease term. If the lease meets one of these criteria, then it would be accounted for as financing lease and the ROU assets would be amortized over the life of the lease and interest expense is recognized on the liability.

Stock-based Compensation

The Company computes stock-based compensation in accordance with authoritative guidance. The Company uses the Black-Scholes-Merton option-pricing model to determine the fair value of its stock options. The Black-Scholes-Merton option-pricing model includes various assumptions, including the fair market value of the common stock of the Company, expected life of stock options, the expected volatility and the expected risk-free interest rate, among others. These assumptions reflect the Company's best estimates, but they involve inherent uncertainties based on market conditions generally outside the control of the Company. Forfeitures are recorded when they occur.

As a result, if other assumptions had been used, stock-based compensation cost, as determined in accordance with authoritative guidance, could have been materially impacted. Furthermore, if the Company uses different assumptions on future grants, stock-based compensation cost could be materially affected in future periods.

Income Taxes

In accordance with authoritative guidance, deferred tax assets and liabilities are recorded for temporary differences between the financial reporting and tax bases of assets and liabilities using the current enacted tax rate expected to be in effect when the differences are expected to reverse. A valuation allowance is recorded on deferred tax assets unless realization is considered more likely than not.

The Company evaluates its tax positions taken or expected to be taken in the course of preparing the Company's tax returns to determine whether the tax positions are "more-likely-than-not" of being sustained by the applicable tax authority. Tax positions not deemed to meet the "more-likely-than-not" threshold are not recorded as a tax benefit or expense in the current year. The Company recognizes interest and penalties, if any, related to uncertain tax positions in interest expense. No interest and penalties related to uncertain tax positions were accrued at either December 31, 2023 or 2022.

The Company follows authoritative guidance which requires the evaluation of existing tax positions. Management has analyzed all open tax years, as defined by the statute of limitations, for all major jurisdictions, which includes both federal and states where the Company has operations. Open tax years are those that are open for examination by taxing authorities.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires the Company's management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Significant estimates are used when accounting for the fair value of stock-based compensation, borrowing rates used for lease accounting and valuation allowance against deferred tax assets. Actual results could differ from those estimates.

Subsequent Events

Management has evaluated subsequent events and transactions occurring through the date these financial statements were issued. See Note 14.

Adoption of Recent Accounting Standards

In November 2023, the FASB issued ASU, No. 2023-07, *Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures* ("ASU 2023-07"). The new guidance requires the disclosure of significant segment expenses even if the entity is a single reportable segment. This guidance applies to all public entities and is effective for all annual periods beginning after December 15, 2023 and for interim periods beginning after December 15, 2024. The Company adopted this standard on January 1, 2024 and it did not have a material impact on its financial position, results of operations or financial statement disclosure.

Recent Accounting Standards

In December 2023, the FASB issued ASU 2023-09, *Income Taxes (Topic 740): Improvements to Income Tax Disclosures* ("ASU 2023-08"). This new guidance requires entities on an annual basis disclose specific categories in the income tax rate reconciliation and provide additional information for reconciling items that meet a quantitative threshold. The guidance applies to annual periods beginning after December 15, 2024 on a prospective basis, (early adoption is permitted). The Company does not believe ASU 2023-09 will have a material impact on its financial position, results of operations or financial statement disclosure.

4. CASH EQUIVALENTS AND INVESTMENTS

The Company's cash, cash equivalents and short-term investments that were measured at fair value on a recurring basis as Level 1 assets, classified by security type as of December 31, 2023 and 2022 consisted of the following (in thousands):

	December 31,				
	2023			2022	
	Cost	Accretion of Discount	Fair Value	Cost	Fair Value
Cash	$ 157	$ –	$ 157	$ 1	$ 1
Money market funds	12,434	–	12,434	21,183	21,183
US treasury bills	2,931	50	2,981	–	–
US agency bonds	3,938	21	3,959	–	–
Total	$ 19,460	$ 71	$ 19,531	$ 21,184	$ 21,184

5. REVENUE

The Company recognizes revenue in accordance with ASC 606. The amount of revenue that the Company recognizes reflects the consideration it expects to receive in exchange for goods or services and such revenue is recognized at the time when goods or services are transferred and/or delivered to its customers. Revenue is recognized when the Company satisfies a performance obligation by transferring the product or service to the customer, either at a point in time or over time. The Company usually recognizes revenue from integration service agreements and from manufacturing licenses at a point in time unless the agreements provide for customer acceptance in which case revenue is recognized over time. Revenue from integration license agreements and from MSTcad licenses are recognized over a period of time.

The following table provides information about disaggregated revenue by primary geographical markets and timing of revenue recognition for the years ended December 31, 2023 and 2022 (in thousands):

	Year Ended December 31,	
	2023	2022
Primary geographic markets		
North America	$ –	$ 82
Europe	550	–
Asia Pacific	–	300
Total	$ 550	$ 382
Timing of revenue recognition		
Products and services transferred at a point in time	$ –	$ 375
Products and services transferred over time	550	7
Total	$ 550	$ 382

***Unbilled contracts receivable and deferred revenue**:*

Timing of revenue recognition may differ from the timing of invoicing customers. Accounts receivable includes amounts billed and currently due from customers. Unbilled contracts receivable represents unbilled amounts expected to be received from customers in future periods, where the revenue recognized to date exceeds the amount billed, and the right to receive payment is subject to the underlying contractual terms. Unbilled contracts receivable amounts may not exceed their net realizable value and are classified as long-term assets if the payments are expected to be received more than one year from the reporting date.

6. BASIC AND DILUTED LOSS PER SHARE

Basic net loss per share is calculated by dividing the net loss by the weighted-average number of shares outstanding for the period. Diluted net loss per share is computed by dividing the net loss attributable to common stockholders by the sum of the weighted average number of shares of common stock outstanding and the dilutive common stock equivalent shares outstanding during the period. The Company's potentially dilutive common stock equivalent shares, which include incremental common shares issuable upon (i) the exercise of outstanding stock options and warrants and (ii) vesting of restricted stock units and restricted stock awards, are only included in the calculation of diluted net loss per share when their effect is dilutive. Since the Company has had net losses for all periods presented, all potentially dilutive securities are anti-dilutive. Accordingly, basic and diluted net loss per share are equal.

The following potential common stock equivalents were not included in the calculation of diluted net loss per common share because the inclusion thereof would be anti-dilutive (in thousands):

	Year Ended December 31,	
	2023	2022
Stock Options	3,369	3,009
Unvested restricted stock	419	340
Total	3,788	3,349

7. PROPERTY AND EQUIPMENT

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

	December 31,	
	2023	2022
Laboratory equipment	$ 173	$ 210
Computer equipment	165	145
Furniture and fixtures	92	85
Leasehold improvements	24	24
Software	4	4
Office equipment	4	4
	462	472
Less: Accumulated depreciation and amortization	(362)	(314)
Total net assets	$ 100	$ 158

Depreciation and amortization expense relating to property and equipment was approximately $77,000 for each of the years ended December 31, 2023 and 2022. The Company depreciates computer equipment, laboratory equipment and office equipment on straight-line basis over three years. Furniture and fixtures are depreciated on a straight-line basis over five years. The Company amortizes software on straight-line basis over three years. Leasehold improvements are amortized over the remaining life of the lease.

8. LEASES

The Company leases corporate office space in Los Gatos, California. In August 2020, the Company and its landlord amended the lease for this office. The amendment extended the expiration date of the operating lease to January 2026 and increased the space from 3,396 square feet to 4,101 square feet. Under ASC 842, the lease amendment was treated as a separate lease for the new space and a modification of the lease for the original space. In January 2021 the additional space became available for use, and the Company recorded an additional ROU asset and corresponding liability of approximately $144,000. The lease liability is based on the present value of the minimum lease payments, discounted using the Company's estimated incremental borrowing rate at lease inception of 5.25%. The lease contains escalating payments on the anniversary of the original commencement which are included in the measurement of the initial lease liability. Additional payments based on a change in the Company's share of the operating expenses, including property taxes and insurance, are recorded as a period expense when incurred.

In March 2021, the Company began leasing 474 square feet of office space in Tempe, Arizona. The new lease is classified as an operating lease with an initial term of two years and an option to extend for an additional three years through February 2026. The renewal option was exercised in January 2023. The lease also contains a performance standard for research collaboration with Arizona State University. The agreement requires a minimum value of collaborative research in each year of the lease. The lease is accounted for under ASC 842 and accordingly, the research payments are included in the ROU and lease liability at commencement. Effective May 1, 2023, the Company leased an additional 404 square feet at its Tempe office location under an amendment to its current lease. The monthly rent payment increased from $1,277 per month to $2,365 per month and the increased rent under the amended lease is accounted for as a modification to the lease under ASC 842 at the time of commencement. At the effective date of the lease amendment, a right-of-use asset of approximately $33,000 was recorded along with a short-term operating lease liability of approximately $12,000 and long-term operating lease liability of approximately $21,000. The amended lease ends in February 2026.

In October 2019, the Company entered into an agreement to lease a tool for use in the development of the Company's technology. The lease agreement established a monthly lease payment of $150,000 per month. The lease contains a provision for an annual adjustment of lease payments based on tool availability and usage during the preceding 12 months and the adjusted payment is calculated on August 1 of each year of the lease. Effective August 1, 2022, the lease payments for this tool were reduced to $100,824 per month for the period August 1, 2022 through July 31, 2023. This adjustment to the lease payments resulted in a reduction in the ROU and corresponding lease liability. Effective August 1, 2023, the lease payments for this tool were adjusted to $137,650 per month for the period August 1, 2023 through July 31, 2024. This adjustment to the lease payments also resulted in a reduction in the ROU and corresponding lease liability.

In December 2022, the Company entered into a lease agreement for a tool in Tempe, Arizona. The term of this lease is for six months beginning on January 1, 2023 with an option to extend the lease for an additional six months. The initial lease terms were $96,000 per month. In March 2023, the Company elected to extend the lease through December 31, 2023 and in consideration for this extension the remaining lease payments were reduced to $84,000. Since the lease and extension are not for more than one year, the future lease payments are not included in the lease obligations on the Company's condensed balance sheets.

The Company terminated its office lease in Cambridge, Massachusetts as of March 31, 2023. The cost of the lease was $2,942 per month.

Lease expense for operating leases consists of the lease payments recognized on a straight-line basis over the lease term. Expenses for financing leases consists of the amortization expenses recognized on a straight-line basis over the lease term and interest expense. The components of lease costs were as follows (in thousands):

	Year Ended December 31,	
	2023	2022
Financing lease costs:		
Amortization of ROU assets	$ 1,146	$ 1,229
Interest on lease liabilities	194	255
Total financing lease costs	$ 1,340	$ 1,484
Operating lease costs		
Fixed lease costs	$ 257	$ 248
Variable lease costs	2	–
Short-term lease costs	1,045	35
Total operating lease costs	$ 1,304	$ 283

Future minimum payments under non-cancellable leases as of December 31, 2023 were as follows (in thousands):

For the Year Ended December 31,	Financing leases	Operating leases
2024	$ 1,367	$ 271
2025	1,436	298
2026	478	24
Total future minimum lease payments	3,281	593
Less imputed interest	(203)	(34)
Total lease liability	$ 3,078	$ 559

The below table provides supplemental information and non-cash activity related to the Company's operating and financing leases (in thousands):

	Year Ended December 31,	
	2023	2022
Operating cash flow information:		
Cash paid for amounts included in the measurement of operating lease liabilities	$ 272	$ 265
Cash paid for amounts included in the measurement of financing lease liabilities	$ 1,112	$ 1,239
Non-cash activity:		
Right-of-use assets obtained in exchange for operating lease obligations	$ 33	$ –
Remeasurement of right-of use asset and liability in financing lease obligations	$ (115)	$ (458)

The table above does not include short-term leases that are one-year or less. The weighted average remaining discount rate is 5.25% for the Company's financing leases and 5.48% for the Company's operating leases. The weighted average remaining lease term is 2.6 years for the financing lease and 2.1 years for operating leases.

9. COMMITMENTS AND CONTINGENCIES

Legal

The Company may be involved, from time to time, in legal proceedings and claims arising in the ordinary course of its business. Such matters are subject to many uncertainties and outcomes and are not predictable with assurance. While management believes that such matters are currently insignificant, matters arising in the ordinary course of business for which the Company is or could become involved in litigation may have a material adverse effect on its business and financial condition. The Company is not party to any material litigation as of December 31, 2023 or through the date these financial statements have been issued.

10. STOCKHOLDERS' EQUITY

The Company is authorized to issue to up 2,500,000 shares of preferred stock, $.001 par value. As of December 31, 2023, and 2022, no shares have been designated and no shares are issued and outstanding. Preferred stock may rank prior to common stock with respect to dividends rights, liquidation preferences, or both, and may have full or limited voting rights.

On May 31, 2022, Atomera entered into an Equity Distribution Agreement with Oppenheimer & Co. Inc and Craig-Hallum Capital Group LLC, as agents, under which we may offer and sell, from time to time at our sole discretion, shares of our common stock having aggregate offering proceeds of up to $50.0 million in an "at-the-market" or ATM offering, to or through the agents. During the year ended December 31, 2023, approximately 1.8 million shares were sold at an average price per share of approximately $7.97, resulting in approximately $13.5 million of net proceeds to us after deducting commissions and other offering expenses. As of December 31, 2023, the Company has remaining capacity on the ATM of approximately $29.8 million.

As of December 31, 2023, the Company has reserved approximately 3.4 million shares of common stock for issuance pursuant to outstanding stock options.

11. STOCK-BASED COMPENSATION

The Company's 2007 Equity Incentive Plan (the "2007 Plan) expired in March 2017, however all options and warrants outstanding at the time of the expiration remained outstanding and exercisable by their term. As of December 31,2023, options to purchase approximately 1.5 million shares of common stock remain outstanding under the 2007 Plan.

In May 2017, the Company's shareholders approved its 2017 Stock Incentive Plan (the "2017 Plan"). The 2017 Plan provides for the grant of non-qualified stock options and incentive stock options to purchase shares of the Company's common stock and for the grant of restricted and unrestricted share grants. The Company reserved a total of 3,750,000 shares of common stock for issuance under the 2017 Plan. All employees, officers, directors, consultants, advisors and other persons who provide services to the Company or any subsidiaries of the Company are eligible to receive incentive awards under the 2017 Plan. As of December 31, 2023, awards of approximately 3.7 million shares of common stock had been granted under the 2017 Plan, net of forfeited restricted stock and option awards and approximately 25,000 shares of common stock are reserved for issuance.

In May 2023, the Company's shareholders approved its 2023 Stock Incentive Plan (the "2023 Plan"). The 2017 Plan provides for the grant of non-qualified stock options and incentive stock options to purchase shares of the Company's common stock and for the grant of restricted and unrestricted share grants. The Company reserved a total of 2,000,000 shares of common stock for issuance under the 2023 Plan. All employees, officers, directors, consultants, advisors and other persons who provide services to the Company or any subsidiaries of the Company are eligible to receive incentive awards under the 2023 Plan. As of December 31, 2023, awards of approximately 78,000 shares of common stock had been granted under the 2023 Plan, net of forfeited restricted stock and option awards and approximately 1.9 million shares of common stock are reserved for issuance.

The following table summarizes the stock-based compensation expense recorded in the Company's results of operations during the years ended December 31, 2023 and 2022 for stock options and restricted stock (in thousands):

	Year Ended December 31,	
	2023	2022
Research and development	$ 1,408	$ 1,153
General and administrative	2,265	1,965
Selling and Marketing	340	249
Total	$ 4,013	$ 3,367

As of December 31, 2023, there was approximately $6.6 million of total unrecognized compensation expense related to non-vested share-based compensation arrangements that are expected to vest. This cost is expected to be recognized over a weighted-average period of 2.5 years.

The Company records compensation expense for employee awards with graded vesting using the straight-line method. The Company records compensation expense for non-employee awards with graded vesting using the accelerated expense attribution method. The Company recognizes compensation expense over the requisite service period applicable to each individual award, which generally equals the vesting term. The Company estimates the fair value of each option award using the Black-Scholes-Merton option pricing model. Forfeitures are recognized when realized.

The fair value of employee stock options issued was estimated using the following weighted-average assumptions:

	Year Ended December 31,	
	2023	2022
Exercise price:	$ 6.54	$ 14.21
Grant date fair value per share:	$ 4.94	$ 10.37
Assumptions:		
Expected volatility	82.59%	83.18%
Weighted average expected term (in years)	6.82	6.51
Risk-free interest rate	4.03%	1.96%
Expected dividend yield	0.0%	0.0%

The risk-free interest rate was obtained from U.S. Treasury rates for the applicable periods. The Company's expected volatility was based upon the historical volatility of the Company. The expected life of the Company's options was determined using the simplified method as a result of limited historical data regarding the Company's activity. The dividend yield considers that the Company has not historically paid dividends and does not expect to pay dividends in the foreseeable future.

The following table summarizes stock option activity (in thousands except exercise prices and contractual terms):

	Number of Shares	Weighted-Average Exercise Prices	Weighted-Average Remaining Contractual Term (In Years)	Intrinsic Value
Outstanding at January 1, 2023	3,009	$ 7.07		
Granted	393	$ 6.54		
Exercised	(33)	$ 3.90		
Outstanding at December 31, 2023	3,369	$ 7.04	4.66	$ 3,437
Exercisable at December 31, 2023	2,862	$ 6.64	3.95	$ 3,190

During the year ended December 31, 2023, the Company granted options under its 2017 Plan and 2023 Plan to purchase approximately 393,000 shares of its common stock to its employees. The fair value of these options was approximately $1.9 million.

The Company issues restricted stock to employees, directors and consultants and estimates the fair value based on the closing price on the day of grant. The following table summarizes restricted stock activity (in thousands except per share data):

	Number of Shares	Weighted-Average Grant Date Fair Value
Outstanding at January 1, 2023	340	$ 10.78
Granted	357	$ 7.00
Vested	(258)	$ 8.27
Forfeited	(20)	$ 8.63
Outstanding non-vested shares at December 31, 2023	419	$ 9.21

12. 401(k) PLAN

During 2002, the Company established a plan under Section 401(k) of the Internal Revenue Code (the 401(k) Plan). The 401(k) Plan covers substantially all of its employees who have attained 18 years of age. Employees may elect to contribute part of their annual compensation to the 401(k) Plan, up to the maximum deferral allowance for individuals by the Internal Revenue Service under Code Section 401(k), and the Company may make a matching contribution. During the years ended December 31, 2023 and 2022, the Company made matching contributions of approximately $82,000 and $78,000, respectively.

13. INCOME TAXES

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

	Year Ended December 31,	
	2023	2022
Domestic	$ (19,790)	$ (17,441)
International	–	–
Total	$ (19,790)	$ (17,441)

The Company had $0 current income tax expense for the years ended December 31, 2023 and 2022, respectively. The Company accounts for income taxes in accordance with ASC 740, which requires that the tax benefit of net operating losses, temporary differences and credit carryforwards be recorded as an asset to the extent that management assesses that realization is "more likely than not." Realization of the future tax benefits is dependent on the Company's ability to generate sufficient taxable income within the carryforward period. Because of the Company's recent history of operating losses, management believes that recognition of the deferred tax assets arising from the above-mentioned future tax benefits is currently not likely to be realized and, accordingly, has provided a full valuation allowance. The valuation allowance increased by approximately $4.4 million and $4.5 million during the years ended December 31, 2023 and 2022, respectively.

The Company's deferred tax assets are as follows (in thousands):

	Year Ended December 31,	
	2023	2022
Deferred tax assets:		
Net operating loss carryforwards	$ 27,077	$ 25,309
Tax credit	2,559	2,197
Fixed assets and intangibles	603	798
Stock compensation	1,327	1,052
Accruals and other	303	212
Lease liability	802	1,079
Capitalized research and development	3,822	1,797
Total deferred tax assets	36,493	32,444
Deferred tax liabilities:		
Right of use asset	(755)	(1,076)
Total deferred tax assets	(755)	(1,076)
Valuation allowance	(35,738)	(31,368)
Net deferred tax asset	$ –	$ –

Net operating losses and tax credit carryforwards as of December 31, 2023, are as follows (in thousands):

	Amount	Expiration in years
Net operating losses, federal	$ 84,084	No expiration
Net operating losses, federal	$ 34,791	2027-2037
Net operating losses, state	$ 38,509	2030-2043
Tax credits, federal	$ 2,121	2036-2043
Tax credits, state	$ 897	No expiration
Tax credits, state	$ 1,046	2031-2038

The effective tax rate of the Company's provision (benefit) for income taxes differs from the federal statutory rate as follows:

	Year ending December 31,	
	2023	2022
Statutory rate	21.00 %	21.00 %
State rate	1.29 %	3.51 %
Change in valuation allowance	(22.08)%	(25.95)%
Other non-deductible items	(0.02)%	– %
Change in tax credits	0.66 %	0.70 %
Foreign withholding tax	– %	– %
Section 382 limitation	– %	– %
Section 162(m) limitation	(0.11)%	(0.47)%
Stock based compensation excess windfall	(0.74)%	1.20 %
Total	– %	– %

Utilization of U.S. net operating losses and tax credit carryforwards may be limited by "ownership change" rules, as defined in Section 382 and Section 383 of the Internal Revenue Code. Similar rules may apply under state tax laws. Under those sections of the Code, if a corporation undergoes an "ownership change," the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change attributes, such as research tax credits, to offset its post-change income or tax may be limited. In general, an "ownership change" will occur if there is a cumulative change in ownership by "5% stockholders" that exceeds 50 percentage points over a rolling three-year period.

The Company establishes reserves for uncertain tax positions based on the largest amount that is more-likely-than-not to be sustained. An uncertain income tax position will not be recognized if it has less than a 50% likelihood of being sustained. It is the Company's policy to recognize interest and penalties related to income tax matters in income tax expense. As of December 31, 2023 and 2022, respectively, the Company has no accrued interest or penalties related to uncertain tax positions.

The Company files income tax returns in the U.S. federal jurisdiction and various state jurisdictions. In the normal course of business, the Company is subject to examination by their respective taxing authorities. The Company is not currently under audit by the Internal Revenue Service or other similar state or local authority. The statute of limitations remains effectively open for all tax years since inception (2007). Tax years outside the normal statute of limitations remain open to examination by tax authorities due to tax attributes generated in earlier years which have been carried forward and may be examined and adjusted in subsequent years when utilized.

The following table summarizes the activity related to the Company's gross unrecognized tax benefits for the years ended December 31, 2023 and 2022 (in thousands):

	2023	2022
January 1 – unrecognized tax benefits	$ 1,046	$ 896
Increases (decreases) – prior year tax positions	10	(1)
Increases – current year tax positions	163	151
December 31 - unrecognized tax benefits	$ 1,219	$ 1,046

The following table summarizes the activity in the Company's Valuation Allowance and Qualifying Accounts (in thousands):

	Balance at Beginning of Year	Additions	Deductions	Balance at End of Year
Deferred tax assets valuation allowance				
Year ended December 31, 2023	$ 31,368	$ 4,536	$ 166	$ 35,738
Year ended December 31, 2022	$ 26,842	$ 4,636	$ 110	$ 31,368

14. SUBSEQUENT EVENTS

Management has evaluated subsequent events and transactions through the date these financial statements were issued.

Since December 31, 2023, the Company has issued approximately 500,000 additional shares through its ATM offering at an average price per share of $8.08 resulting in additional net proceeds, after deduction of commissions and expenses of approximately $3.9 million.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

(a) *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 disclosure controls and procedures pursuant to Rule 13a-15(e) under the Exchange Act. Based upon that evaluation, our management, including our chief executive officer and chief financial officer, concluded that our disclosure controls and procedures were effective as of December 31, 2023 in ensuring all material information required to be disclosed by us is recorded, processed, summarized and reported, within the time periods specified in the Commission's 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.

(b) Changes in internal control over financial reporting.

There were no changes to our internal control over financial reporting, as defined in Rules 13a-15(f) under the Exchange Act that occurred during the quarter ended December 31, 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

(c) Management's report on internal controls over financial reporting.

Our management is responsible for establishing and maintaining adequate internal controls over financial reporting, as defined under Rule 13a-15(f) under the Exchange Act. Our management has assessed the effectiveness of our internal controls over financial reporting as of December 31, 2023 based on the framework established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework) ("COSO"). Our internal control system was designed to provide reasonable assurance to our management and board of directors regarding the preparation and fair presentation of published financial statements. Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2023, and based on that evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2023.

This report does not include an attestation report of our registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our registered public accounting firm pursuant to the rules of the Securities and Exchange Commission that permit us to provide only management's report in this Annual Report.

Item 9B. Other Information

During the quarter ended December 31, 2023, no director or officer adopted or terminated (i) any contract, instruction or written plan for the purchase or sale of securities of the Company intended to satisfy the affirmative defense conditions of Rule 10b5-1(c) or (ii) any "non-Rule 10b5-1 trading arrangement" as defined in paragraph (c) of item 408 of Regulation S-K.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

PART III

The information required by Part III is omitted from this report because we will file a definitive proxy statement within 120 days after the end of our 2023 fiscal year pursuant to Regulation 14A for our 2024 Annual Meeting of Stockholders, or the 2024 Proxy Statement, and the information to be included in the 2024 Proxy Statement is incorporated herein by reference.

Item 10. Directors, Executive Officers and Corporate Governance

The information required under this item will be contained in the 2024 Proxy Statement and is hereby incorporated by reference.

Item 11. Executive Compensation

The information required under this item will be contained in the 2024 Proxy Statement and is hereby incorporated by reference.

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

The information required under this item will be contained in the 2024 Proxy Statement and is hereby incorporated by reference.

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

The information required under this item will be contained in the 2024 Proxy Statement and is hereby incorporated by reference.

Item 14. Principal Accountant Fees and Services

The information required under this item will be contained in the 2024 Proxy Statement and is hereby incorporated by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) Financial Statements

(1) Financial statements for our company are listed in the index under Item 8 of this document

(2) All financial statement schedules are omitted because they are not applicable, not material or the required information is shown in the financial statements or notes thereto.

Exhibit No.	Description	Method of Filing
3.1	Amended and Restated Certificate of Incorporation of the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
3.2	Amended and Restated Bylaws of the Registrant	Incorporated by reference from the Registrant's Registration Form 8-K filed on October 27, 2021.
3.3	Certificate of Amendment to Amended and Restated Certificate of Incorporation of the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
3.4	Certificate of Amendment to Amended and Restated Certificate of Incorporation of the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
4.1	Description of Capital Stock	Incorporated by reference from the Registrant's Annual Report on Form 10-K filed on February 19, 2021
10.1	Assignment of Patent Rights dated April 3, 2009 between Dr. Robert Mears and the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
10.2+	2007 Stock Incentive Plan	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
10.3	Exclusive License and Collaboration Agreement dated March 3, 2010 between K2 Energy Limited and the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
10.4	Letter Agreement dated June 6, 2014 between K2 Energy Limited and the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
10.5	Lease Agreement dated January 19, 2016 between 750 University, LLC and the Registrant	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
10.6+	Form of Restricted Stock Agreement	Incorporated by reference from the Registrant's Amendment No. 1 to Registration Statement on Form S-1 filed on July 29, 2016

10.7+	2017 Stock Incentive Plan	Incorporated by reference from the Registrant's Definitive Proxy Statement filed on April 10, 2017.
10.8	First Amendment to Lease Agreement dated January 19, 2016 between 750 University, LLC and the Registrant	Incorporated by reference from the Registrant's Form 10-K filed on March 6, 2018.
10.9+	Employment Agreement dated January 26, 2021 between Scott Bibaud and the Registrant	Incorporated by reference from the Registrant's Annual Report on Form 10-K filed on February 19, 2021
10.10+	Employment Agreement dated January 26, 2021 between Frank Laurencio and the Registrant	Incorporated by reference from the Registrant's Annual Report on Form 10-K filed on February 19, 2021
10.11+	Employment Agreement dated January 26, 2021 between Dr. Robert Mears and the Registrant	Incorporated by reference from the Registrant's Annual Report on Form 10-K filed on February 19, 2021
10.12+	Employment Agreement dated January 26, 2021 between Jeffrey Lewis and the Registrant	Incorporated by reference from the Registrant's Registration Form 8-K filed on June 3, 2021
10.13	Second Amendment to Lease Agreement dated January 19, 2016 between 750 University, LLC and the Registrant	Incorporated by reference from the Registrant's Annual Report on Form 10-K filed on February 19, 2021
10.14	Equity Distribution Agreement dated May 31, 2022 between the Company and Oppenheimer & Co. Inc. and Craig-Hallum Capital Group LLC	Incorporated by reference from the Company's Current Report on Form 8-K filed on May 31, 2022
10.15	2023 Stock Incentive Plan	Incorporated by reference from Registrant's Definitive Additional Materials on Schedule 14A filed on April 18, 2023
21.1	List of Subsidiaries	Incorporated by reference from the Registrant's Registration Statement on Form S-1 filed on June 30, 2016.
23.1	Consent of Marcum LLP, Independent Registered Public Accounting Firm	Filed electronically herewith

31.1	Certifications Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	Filed electronically herewith
31.2	Certifications Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	Filed electronically herewith
32.1	Certification of Principal Executive Officer and Principal Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (18 U.S.C. Section 1350)	Filed electronically herewith
97.1	Atomera, Incorporated Executive Officer Clawback Policy	Filed electronically herewith
101.INS	XBRL Instance Document	Filed electronically herewith
101.SCH	XBRL Taxonomy Extension Schema Document	Filed electronically herewith
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	Filed electronically herewith
101.LAB	XBRL Taxonomy Extension Label Linkbase Document	Filed electronically herewith
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	Filed electronically herewith
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	Filed electronically herewith
104	Cover Page Interactive Data File (formatted in IXBRL, and included in exhibit 11	Files electronically herewith

+ Indicated management compensatory plan, contract or arrangement.

Item 16. **Form 10-K Summary**

None provided.

SIGNATURES

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

ATOMERA INCORPORATED.

Date: February 15, 2024

By: */s/ Scott A. Bibaud*
Scott A. Bibaud
Chief Executive Officer,
(Principal Executive Officer)
and Director

Date: February 15, 2024

By: */s/ Francis B. Laurencio*
Francis B. Laurencio
Chief Financial Officer
(Principal Financial and
Accounting Officer)

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

Signature	Title	Date
/s/ *Scott A. Bibaud* Scott A. Bibaud	Chief Executive Officer and Director *(Principal Executive Officer)*	February 15, 2024
/s/ *John D. Gerber* John Gerber	Director and Chairman	February 15, 2024
/s/ *Steven K. Shevick* Steven K. Shevick	Director	February 15, 2024
/s/ *Duy-Loan Le* Duy-Loan Le	Director	February 15, 2024
/s/ *Suja Ramnath* Suja Ramnath	Director	February 15, 2024

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