

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

**FORM S-1**  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

**Avinger, Inc.**  
(Exact Name of Registrant as Specified in Its Charter)

**Delaware**  
(State or Other Jurisdiction of  
Incorporation or Organization)

**3841**  
(Primary Standard Industrial  
Classification Code Number)

**20-8873453**  
(I.R.S. Employer  
Identification Number)

**400 Chesapeake Drive  
Redwood City, California 94063  
(650) 241-7900**

(Address, including zip code, and telephone number, including area code, of Registrant's principal executive offices)

**Jeffrey M. Soinski  
Chief Executive Officer  
Avinger, Inc.  
400 Chesapeake Drive  
Redwood City, CA 94063  
(650) 241-7900**

(Name, address, including zip code, and telephone number, including area code, of agent for service )

**With copies to:**  
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Salt Lake City, UT 84111  
(801) 933-7360

**Approximate date of commencement of proposed sale to the public:** From time to time after this Registration Statement becomes effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933 check the following box:

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

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If this form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

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

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 7(a)(2)(B) of the Securities Act.

**The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.**

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The information in this preliminary prospectus is not complete and may be changed. These securities may not be sold until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell nor does it seek an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

**PRELIMINARY PROSPECTUS (Subject to Completion)**

**Dated May 24, 2024**

Up to Shares of Common Stock  
Up to Pre-Funded Warrants to purchase up to Shares of Common Stock  
Up to Common Warrants to purchase up to Shares of Common Stock  
Up to Placement Agent Warrants to purchase up to Shares of Common Stock  
Up to Shares of Common Stock Underlying the Common Warrants, the Pre-Funded Warrants and the Placement Agent Warrants



**Avinger, Inc.**

We are offering up to shares of common stock, par value \$0.001 ("Common Stock") together with common warrants to purchase up to shares of our Common Stock (the "Common Warrants"). The assumed combined public offering price for each share of Common Stock and accompanying Common Warrant is \$ , which was the last sale price of our Common Stock on the Nasdaq Capital Market ("Nasdaq") on, 2024. Each Common Warrant is assumed to have an exercise price of \$ per share ( % of the combined public offering price per share of Common Stock and accompanying Common Warrant), will be exercisable upon issuance, and will expire from the date of issuance. The shares of Common Stock and Common Warrants will be issued separately and will be immediately separable upon issuance but will be purchased together in this offering.

We are also offering to each purchaser whose purchase of shares of our Common Stock in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at the election of the holder, 9.99%) of our outstanding shares of Common Stock immediately following consummation of this offering, the opportunity to purchase, if the purchaser so chooses, pre-funded warrants (the "Pre-Funded Warrants") to purchase shares of Common Stock, in lieu of shares of Common Stock. Each Pre-Funded Warrant will be exercisable for one share of Common Stock. The purchase price of each Pre-Funded Warrant and accompanying Common Warrant will equal the price per share of Common Stock and accompanying Common Warrant being sold to the public in this offering, minus \$0.001, and the exercise price of each Pre-Funded Warrant will be \$0.001 per share. For each Pre-Funded Warrant that we sell, the number of shares of our Common Stock that we are offering will be decreased on a one-for-one basis. This offering also relates to the shares of Common Stock issuable upon exercise of the Pre-Funded Warrants, Placement Agent Warrants (as defined below) and Common Warrants.

We refer to the shares of Common Stock, the Pre-Funded Warrants, Placement Agent Warrants and Common Warrants to be issued in this offering collectively as the "Securities."

This offering will terminate on , 2024, unless we decide to terminate the offering (which we may do at any time in our discretion) prior to that date. We will have a single closing for all Securities purchased in this offering and the combined public offering price per share of Common Stock (or Pre-Funded Warrant in lieu thereof) and accompanying Common Warrant will be fixed for the duration of this offering. We will deliver the Securities to be issued in connection with this offering delivery versus payment or receipt versus payment, as the case may be, upon receipt of investor funds received by us.

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Our Common Stock is listed on Nasdaq under the symbol "AVGR." We have assumed a combined public offering price of \$ per share of Common Stock and accompanying Common Warrants, which was the last reported sale price on Nasdaq of our shares of Common Stock on , 2024. The actual combined public offering price per share of Common Stock (or Pre-Funded Warrant in lieu thereof) and accompanying Common Warrant will be negotiated between us and the investors, in consultation with the placement agent based on, among other things, the trading price of our Common Stock prior to the offering, our history and our prospects, the industry in which we operate, our past and present operating results, the previous experience of our executive officers and the general condition of the securities markets at the time of this offering, and may be at a discount to the current market price. Therefore, the assumed combined public offering price used throughout this prospectus may not be indicative of the final offering price. In addition, there is no established public trading market for the Pre-Funded Warrants or Common Warrants, and we do not expect a market for the Pre-Funded Warrants or Common Warrants to develop. We do not intend to apply for a listing of the Pre-Funded Warrants or Common Warrants on any national securities exchange. Without an active trading market, the liquidity of the Pre-Funded Warrants and Common Warrants will be limited.

We have engaged (the "Placement Agent"), to act as our exclusive placement agent in connection with this offering. The Placement Agent has agreed to use its reasonable best efforts to arrange for the sale of the securities offered by this prospectus. The Placement Agent is not purchasing or selling any of the securities we are offering and the Placement Agent is not required to arrange the purchase or sale of any specific number of securities or dollar amount. We have agreed to pay to the Placement Agent the Placement Agent fees set forth in the table below, which assumes that we sell all of the securities offered by this prospectus. We have also agreed to issue to the Placement Agent or its designees as compensation in connection with this offering, warrants to purchase up to shares of Common Stock as compensation in connection with this offering. There is no minimum number of securities or amount of proceeds required as a condition to closing in this offering. Because there is no minimum offering amount required as a condition to closing this offering, we may sell fewer than all of the securities offered hereby, which may significantly reduce the amount of proceeds received by us, and investors in this offering will not receive a refund in the event that we do not sell an amount of securities sufficient to pursue our business goals described in this prospectus. In addition, because there is no escrow trust or similar arrangement and no minimum offering amount, investors could be in a position where they have invested in our company, but we are unable to fulfill all of our contemplated objectives due to a lack of interest in this offering. Further, any proceeds from the sale of securities offered by us will be available for our immediate use, despite uncertainty about whether we would be able to use such funds to effectively implement our business plan. We will bear all costs associated with the offering. See "Plan of Distribution" on page 53 of this prospectus for more information regarding these arrangements.

**Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties referenced under the heading "Risk Factors" contained in this prospectus beginning on page 12 and under similar headings in the other documents that are incorporated by reference into this prospectus.**

	Per Share and Accompanying Common Warrant	Per Pre- Funded Warrant and Accompanying Common Warrant	Total
Combined public offering price	\$	\$	\$
Placement Agent's fees (1)	\$	\$	\$
Proceeds to us, before expenses (2)	\$	\$	\$

(1)We have agreed to pay the Placement Agent a total cash fee equal to % of the gross proceeds of the offering. In addition, we have agreed to issue to the Placement Agent, or its designees, as compensation in connection with this offering warrants to purchase a number of shares of our Common Stock equal to % of the aggregate number of shares of Common Stock being offered at an exercise price equal to % of the combined public offering price per share of Common Stock and accompanying Common Warrants. We have also agreed to reimburse the Placement Agent for its accountable offering-related legal and other expenses in an amount up to \$ . See "Plan of Distribution" on page 53 of this prospectus for a description of the fees and expenses to be paid to the Placement Agent for services performed in connection with the offering.

(2)The amount of the proceeds to us presented in this table does not give effect to any exercise of the Common Warrants.

**Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities, or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.**

Delivery of the Securities to the purchasers is expected to be made on or about       , 2024, subject to satisfaction of customary closing conditions.

The date of this Prospectus is       , 2024

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## ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we have filed with the Securities and Exchange Commission (the "SEC"). You should rely only on the information contained in this prospectus or any related prospectus supplement.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below. You should read this prospectus in its entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the section of the prospectus entitled "Where You Can Find More Information."

We have not authorized anyone to provide any information or to make any representations other than those contained in this prospectus. We take no responsibility for and can provide no assurance as to the reliability of any other information that others may give you. This prospectus is an offer to sell only the Securities offered by this prospectus, but only under circumstances and in jurisdictions where it is lawful to do so. The information contained in this prospectus is current only as of its date. Our business, financial condition, results of operations, and prospects may have changed since that date.

Neither we nor the Placement Agent have authorized anyone to provide you with information other than that contained in this prospectus, or any free writing prospectus prepared by or on our behalf or to which we have referred you. We and the Placement Agent take no responsibility for and can provide no assurance as to the reliability of, any other information that others may give you. We and the Placement Agent are offering to sell, and seeking offers to buy, securities only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date on the front cover page of this prospectus, or other earlier date stated in this prospectus, regardless of the time of delivery of this prospectus or of any sale of our securities. Our business, financial condition, results of operations and future prospects may have changed since that date.

No action is being taken in any jurisdiction outside the United States to permit a public offering of our securities or possession or distribution of this prospectus in that jurisdiction. Persons who come into possession of this prospectus in jurisdictions outside the United States are required to inform themselves about and to observe any restrictions as to this offering and the distribution of this prospectus applicable to that jurisdiction.

For investors outside the United States: We have not done anything that would permit the sale of our Securities in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the Securities and the distribution of this prospectus outside the United States.

Unless the context otherwise indicates, references in this prospectus to "Avinger" the "Company," "we," "us," and "our" refer, collectively, to Avinger, Inc., a Delaware corporation, and its subsidiaries.

"Avinger," "Pantheris," "Lumivascular," and "Tigereye" are trademarks of our company. Our logo and our other trade names, trademarks and service marks appearing in this prospectus are our property. Other trade names, trademarks and service marks appearing in this prospectus are the property of their respective owners. Solely for convenience, our trademarks and tradenames referred to in this prospectus appear without the ™ symbol, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights, or the right of the applicable licensor to these trademarks and tradenames.

## PROSPECTUS SUMMARY

*This summary highlights selected information contained elsewhere in this prospectus or in filings we make with the SEC that are incorporated herein by reference. This summary does not contain all of the information that you should consider before deciding to invest in our securities. You should read the entire prospectus, including the documents and information incorporated by reference herein, carefully, including the section titled "Risk Factors," included elsewhere in this prospectus, and in the sections entitled "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and the related notes included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2023, and our Quarterly Report on Form 10-Q for the quarter ended March 31, 2024, which are incorporated herein by reference. Some of the statements in this prospectus constitute forward-looking statements. See "Special Note Regarding Forward-Looking Statements."*

### Overview

We are a commercial-stage medical device company that designs, manufactures, and sells real-time high-definition image-guided, minimally invasive catheter-based systems that are used by physicians to treat patients with peripheral artery disease ("PAD"). Patients with PAD have a build-up of plaque in the arteries that supply blood to areas away from the heart, particularly the pelvis and legs. Our mission is to significantly improve the treatment of vascular disease through the introduction of products based on our Lumivascular platform, the only intravascular real-time high-definition image-guided system available in this market.

We design, manufacture, and sell a suite of products in the United States and select international markets. We are located in Redwood City, California. Our current Lumivascular platform consists of products including our Lightbox imaging console, the Ocelot and Tigereye family of devices, which are image-guided devices designed to allow physicians to penetrate a total blockage in an artery, known as a chronic total occlusion ("CTO"), and the Pantheris family of catheters, our image-guided atherectomy catheters which are designed to allow physicians to precisely remove arterial plaque in PAD patients.

We are in the process of developing CTO crossing devices to target the coronary CTO market. However, the market for medical devices in the coronary artery disease ("CAD") space is highly competitive, dynamic, and marked by rapid and substantial technological development and product innovation and there is no guarantee that we will be successful in developing and commercializing any new CAD product. At this stage, we are working on understanding market requirements, and initiated the development process for the new CAD product, which we anticipate will require additional expenses.

We obtained CE Marking for our original Ocelot product in September 2011 and received from the U.S. Food and Drug Administration ("FDA"), 510(k) clearance in November 2012. We also received 510(k) clearance from the FDA for commercialization of Pantheris in October 2015. We received an additional 510(k) clearance for an enhanced version of Pantheris in March 2016 and commenced sales of Pantheris in the United States and select European countries promptly thereafter. In May 2018, we received 510(k) clearance from the FDA for our current next-generation version of Pantheris. In April 2019, we received 510(k) clearance from the FDA for our Pantheris Small Vessel ("SV"), a version of Pantheris targeting smaller vessels, and commenced sales in July 2019. In September 2020, we received 510(k) clearance for Tigereye, a next-generation CTO crossing system utilizing Avinger's proprietary image-guided technology platform. Tigereye is a product line extension of Avinger's Ocelot family of image-guided CTO crossing catheters. In January 2022, we received 510(k) clearance from the FDA for our Lightbox 3 imaging console, an advanced version of our Lightbox that allows for easy portability and offers significant reductions in size, weight, and production cost in comparison to the incumbent version.

In April 2023, we received 510(k) clearance from the FDA for Tigereye Spinning Tip ("ST"), a next-generation image-guided CTO crossing system. Tigereye ST is a line extension of our Ocelot and Tigereye family of CTO crossing catheters. This new image-guided catheter incorporates design upgrades to the tip configuration and catheter shaft to increase crossing power and procedural success in challenging lesions, as well as design enhancements for ease of image interpretation during the procedure. The low-profile Tigereye ST has a working length of 140 cm and 5 French sheath. We initiated a limited launch of Tigereye ST in the second quarter of 2023 and subsequently expanded to full commercial availability within the United States during the third quarter of 2023.

In June 2023, we received 510(k) clearance from the FDA for Pantheris Large Vessel ("LV"), a next generation image guided atherectomy system for the treatment of larger vessels, such as the superficial femoral artery ("SFA") and popliteal arteries. Pantheris LV is a line extension of our Pantheris and Pantheris SV family of atherectomy products. This catheter offers higher speed plaque excision for efficient removal of challenging occlusive tissue and multiple features to streamline and simplify user-operation, including enhanced tissue packing and removal, a radiopaque gauge to measure volume of plaque excised during the procedure, and enhanced guidewire management. We initiated a limited launch of the Pantheris LV during the third quarter of 2023 and expect to expand to full commercial availability within the United States around mid-year 2024.

Current treatments for PAD, including bypass surgery, can be costly and may result in complications, high levels of post-surgery pain, and lengthy hospital stays and recovery times. Minimally invasive, or endovascular, treatments for PAD include stenting, angioplasty, and atherectomy, which is the use of a catheter-based device for the removal of plaque. These treatments all have limitations in their safety or efficacy profiles and frequently result in recurrence of the disease, also known as restenosis. We believe one of the main contributing factors to high restenosis rates for PAD patients treated with endovascular technologies is the amount of vascular injury that occurs during an intervention. Specifically, these treatments often disrupt the membrane between the outermost layers of the artery, which is referred to as the external elastic lamina ("EEL").

We believe our Lumivascular platform is the only technology that offers radiation-free, high-definition real-time visualization of the inside of the artery during PAD treatment through the use of optical coherence tomography ("OCT"), a high resolution, light-based, radiation-free imaging technology. Our Lumivascular platform provides physicians with high-definition real-time OCT images from the inside of an artery, and we believe Ocelot and Pantheris are the first products to offer intravascular visualization during CTO crossing and atherectomy, respectively. We believe this approach will significantly improve patient outcomes by providing physicians with a clearer picture of the artery using radiation-free image guidance during treatment, enabling them to better differentiate between plaque and healthy arterial structures. Our Lumivascular platform is designed to improve patient safety by enabling physicians to direct treatment towards the plaque, while avoiding damage to healthy portions of the artery.

During the first quarter of 2015, we completed enrollment of patients in VISION, a clinical trial designed to support our August 2015 510(k) submission to the FDA for our Pantheris atherectomy device. VISION was designed to evaluate the safety and efficacy of Pantheris to perform atherectomy using intravascular imaging and successfully achieved all primary and secondary safety and efficacy endpoints. We believe the data from VISION allows us to demonstrate that avoiding damage to healthy arterial structures, and in particular disruption of the external elastic lamina, which is the membrane between the outermost layers of the artery, reduces the likelihood of restenosis, or re-narrowing, of the diseased artery. Although the original VISION study protocol was not designed to follow patients beyond six months, we worked with 18 of the VISION sites to resolicit consent from previous clinical trial patients in order for them to evaluate patient outcomes through 12 and 24 months following initial treatment. Data collection for the remaining patients from participating sites was completed in May 2017, and we released the final 12- and 24-month results for a total of 89 patients in July 2017.

During the fourth quarter of 2017, we began enrolling patients in INSIGHT, a clinical trial designed to support a submission to the FDA to expand the indication for our Pantheris atherectomy device to include the treatment of in-stent restenosis. Patient enrollment began in October 2017 and was completed in July 2021. Patient outcomes were evaluated at thirty days, six months and one year following treatment. In November 2021, we received 510(k) clearance from the FDA for this new clinical indication for treating in-stent restenosis with Pantheris using the data collected and analyzed from INSIGHT. We expect this will expand our addressable market for Pantheris to include a high-incidence disease state for which there are few available indicated or effective treatment options.

We are pursuing additional clinical data programs including a post-market study, IMAGE-BTK, that is designed to evaluate the safety and efficacy of Pantheris SV in the treatment of PAD lesions below-the-knee. We completed enrollment in 2023. Patient outcomes are being evaluated at thirty days, six months and one year following treatment. We expect this will bolster the application of Pantheris SV as a primary interventional tool to address below-the-knee lesions for which there are few available effective treatment options.

We focus our direct sales force, marketing efforts and promotional activities on interventional cardiologists, vascular surgeons and interventional radiologists. We also work on developing strong relationships with physicians and hospitals that we have identified as key opinion leaders. Although our sales and marketing efforts are directed at these physicians because they are the primary users of our technology, we consider the hospitals and medical centers where the procedure is performed to be our customers, as they typically are responsible for purchasing our products. We are designing additional future products to be compatible with our Lumivascular platform, which we expect to enhance the value proposition for hospitals to invest in our technology. Pantheris qualifies for existing reimbursement codes currently utilized by other atherectomy products, further facilitating adoption of our products.

We have assembled a team with extensive medical device development and commercialization experience in both start-up and large, multi-national medical device companies. We assemble all of our catheter products at our manufacturing facility but certain critical processes, such as coating and sterilization, are performed by outside vendors. Our Lightbox 3 imaging console is assembled through a qualified contract manufacturer. We expect our current manufacturing facility in California, will be sufficient through at least 2024.

We generated revenues of \$10.1 million in 2021, \$8.3 million in 2022 and \$7.7 million in 2023. Revenues during these years were tangentially affected by COVID-19 as hospitals continued to defer elective procedures in certain jurisdictions while increasing volume to accommodate previously deferred procedures in others, which among other things, created unpredictability in case volume. This unpredictability created more volatility in our revenues which continued to affect our business in the aforementioned years. The decline in revenue in 2022 and 2023 was primarily attributable to the adverse effects of staffing shortages, resource constraints on our customers as hospitals deferred elective procedures, and the impact of a very competitive market for talent on the retention of our commercial team.

## **Recent Developments**

### *CRG Loan Exchange and Nasdaq Listing*

On May 16, 2024, the Company and CRG Partners III L.P. and certain of its affiliated funds (collectively, "CRG") entered into a Securities Purchase Agreement pursuant to which the Company issued 11,000 shares of a newly authorized Series H convertible preferred stock, par value \$0.001 ("Series H Preferred Stock"), in exchange for CRG surrendering for cancellation \$11 million of outstanding principal and accrued interest of the senior secured term loan under the Loan Agreement (as defined below) (the "Exchange"). Each share of Series H Preferred Stock has a stated value of \$1,000 per share and is convertible into 259 shares of the Company's Common Stock at a conversion price of \$3.86 per share, provided that the shares of Series H Preferred Stock cannot be converted into Common Stock to the extent the applicable holder would beneficially own in excess of 9.99% of the Company's outstanding voting power, unless approved by the Company's stockholders in accordance with Nasdaq Listing Rule 5635(b).

### *Nasdaq Delisting Notice – Minimum Bid Price Requirement*

On April 25, 2023, we received notice (the "Bid Price Deficiency Letter") from the Listing Qualifications Department (the "Staff") of The Nasdaq Stock Market, LLC notifying us that we were not in compliance with Nasdaq Listing Rule 5550(a)(2) (the "Bid Price Requirement"), as the minimum bid price for our listed securities was less than \$1.00 for the previous 30 consecutive business days. We had a period of 180 calendar days, or until October 23, 2023, to regain compliance with the rule referred to in this paragraph. As part of our efforts to regain compliance with the aforementioned rule, we effected a 1-for-15 reverse stock split on September 12, 2023.

On September 27, 2023, we received a letter from Nasdaq notifying us that the Staff had determined that the closing bid price of our Common Stock had been at \$1.00 per share or greater for at least 10 consecutive business days and, accordingly, that we had regained compliance with the Bid Price Requirement. While we have regained compliance with the Bid Price Requirement, there can be no assurance that we will be able to maintain compliance with the Bid Price Requirement, or other continued listing requirements of Nasdaq, in the future.

#### *Nasdaq Delisting Notice – Minimum Stockholders' Equity Requirement*

On May 18, 2023, we received notice (the "Stockholders' Equity Deficiency Letter") from the Staff that we no longer satisfy the \$2.5 million stockholders' equity requirement for continued listing on Nasdaq, or the alternatives to that requirements – a \$35 million market value of listed securities or \$500,000 in net income in the most recent fiscal year or two of the last three fiscal years – as required by Nasdaq Listing Rule 5550(b) (the "Equity Requirement").

As with the Bid Price Deficiency Letter, the Stockholders' Equity Deficiency Letter had no immediate effect on our continued listing on Nasdaq. In accordance with the Nasdaq Listing Rules, we were provided 45 calendar days, or until July 3, 2023, to submit a plan to regain compliance with the Equity Requirement (the "Compliance Plan"). We submitted the Compliance Plan to Nasdaq on July 3, 2023. On July 31, 2023, we received a letter from Nasdaq notifying us that the Staff had determined to grant us an extension of 180 calendar days from the date of the Staff's notice, or November 14, 2023, to regain compliance with the Equity Requirement.

On November 21, 2023, the Staff formally notified us that the Staff had determined that we were unable to demonstrate compliance with the Equity Requirement and that our securities would be delisted at the open of business on November 30, 2023, unless we timely requested a hearing before the Nasdaq Hearings Panel (the "Panel"). On November 28, 2023, we requested and were granted a hearing before the Panel which took place on February 20, 2024. At the hearing, we presented a plan to regain and sustain compliance with the Equity Requirement and requested an extension to do so. On March 14, 2024, the results from the hearing were rendered in which we were granted an extension by the Panel. This extension stayed any further action by Nasdaq with respect to our continued listing until May 20, 2024.

#### *Strategic Collaboration*

On March 4, 2024, we entered into a License and Distribution Agreement (the "License Agreement") with Zylox-Tonbridge, pursuant to which we will license and distribute certain of our products (including consumables) in the Greater China region, including mainland China, Hong Kong, Macao, and Taiwan (the "Territory"). Zylox-Tonbridge will lead all regulatory activities for the registration of our products in the Territory. We will also license our intellectual property and know-how related to our products to Zylox-Tonbridge so that Zylox-Tonbridge can manufacture the localized products in the Territory. All sales of our products locally manufactured by Zylox-Tonbridge with regulatory approval by the regulatory authorities in the Territory and commercialized in the Territory will be royalty bearing to us at varying percentages depending on the amount of gross revenue and product gross margin.

In connection with the License Agreement, we also entered into a Strategic Cooperation and Framework Agreement with Zylox-Tonbridge (the "Collaboration Agreement" and, together with the License Agreement, the "Strategic Collaboration"), which provides the opportunity for us to access certain Zylox-Tonbridge peripheral vascular products for distribution in the U.S. and Germany. The agreement also provides the option for us to source finished goods inventory from Zylox-Tonbridge following registration of Zylox-Tonbridge's manufacturing facility with the FDA.

#### *Financing Agreements*

On March 4, 2024, in connection with the Strategic Collaboration, we and Zylox-Tonbridge Medical Limited, a wholly-owned subsidiary of Zylox-Tonbridge (the "Purchaser"), entered into a Securities Purchase Agreement (the "Purchase Agreement"), pursuant to which the Purchaser agreed to purchase, in two tranches, up to an aggregate of \$15 million in shares of our Common Stock, par value \$0.001 per share (the "Common Stock"), and shares of two new series of our preferred stock (the "Private Placement"). On March 5, 2024, (the "Initial Closing"), we issued to the Purchaser 75,327 shares of the Common Stock at a purchase price per share of \$3.664 (the "Purchase Price"), and 7,224 shares of a newly authorized Series F convertible preferred stock, par value \$0.001 per share (the "Series F Preferred Stock"), at a purchase price per share of \$1,000, for an aggregate purchase price of \$7.5 million.

Each share of Series F Preferred Stock has a stated value of \$1,000 and is initially convertible into approximately 273 shares of Common Stock at a conversion price equal to the Purchase Price, subject to the terms of the Certificate of Designation of Preferences, Rights, and Limitations of the Series F Preferred Stock (the "Series F Certificate of Designation").

Upon completion of the following as mutually agreed upon by us and the Purchaser: (i) the successful registration and listing under 21 CFR part 807 with the FDA of the Purchaser and one of its designated affiliates to manufacture our products, and (ii) us achieving an aggregate of \$10 million in gross revenue within any four consecutive fiscal quarters after the Initial Closing, excluding any gross revenue achieved by us under the License Agreement discussed above (together, the "Milestones"), the Purchaser will invest an additional \$7.5 million (the "Milestone Closing") to purchase shares of our new Series G convertible preferred stock, par value \$0.001 per share (the "Series G Preferred Stock"). Each share of Series G Preferred Stock will have a stated value of \$1,000 and will be convertible into shares of Common Stock at a conversion price of equal to the lowest of (x) the Purchase Price, (y) the closing price of the Common Stock on the date immediately preceding the Milestone Closing, and (z) the average closing price for the last five trading days preceding the Milestone Closing, provided that the conversion price will be no less than \$0.20.

#### *Series A Preferred Stock Exchange*

On March 5, 2024, we entered into a Securities Purchase Agreement (the "A-1 Securities Purchase Agreement") to exchange all outstanding shares of Series A convertible preferred stock, par value \$0.001 (the "Series A Preferred Stock"), for 10,000 shares of Series A-1 convertible preferred stock, par value \$0.001 (the "Series A-1 Preferred Stock"). Among other things, the shares of Series A-1 Preferred Stock: (i) are convertible into an aggregate of approximately 2,729,257 shares of Common Stock at a conversion price equal to the Purchase Price, (ii) do not accrue or pay dividends payable solely on the Series A-1 Preferred Stock, (iii) will have no liquidation preference and (iv) will be junior in rank to shares of our Series E convertible preferred stock, par value \$0.001 (the "Series E Preferred Stock"), Series F Preferred Stock and Series G Preferred Stock.

#### *CRG Loan Amendment*

On March 5, 2024, we also entered into Amendment No. 9 to the Loan Agreement effective as of the Initial Closing with CRG, which amends the Loan Agreement to, among other things: (i) extend the interest-only period through December 31, 2026; (ii) provide that interest payable through December 31, 2026 may be payable in kind rather than in cash; and (iii) permit the payment of dividends on the preferred stock issued or issuable to the Purchaser.

#### *Lease Extension*

On March 6, 2024, we entered into an amendment to the lease which extended the lease term for a period of one year, subsequent to the original expiration of November 30, 2024. As amended, the lease will expire on November 30, 2025. Under the terms of the amendment, we will be obligated to pay approximately \$1.3 million in base rent payments through November 2025, beginning on December 1, 2024. This amendment also provides an optional one year extension of the lease following the end of the current term, as amended.

#### **2023 Reverse Stock Split**

On September 11, 2023, our board of directors approved an amendment to our amended and restated certificate of incorporation to effect a 1-for-15 reverse stock split of our issued and outstanding Common Stock (the “reverse stock split”). The reverse stock split became effective on September 12, 2023. The par value of the Common Stock was not adjusted as a result of the reverse stock splits. All Common Stock, stock options, restricted stock units, and per share amounts in this prospectus and have been retroactively adjusted for all periods presented to give effect to the reverse stock split, however, certain of the documents filed with the SEC prior to September 12, 2023, do not give effect to the reverse stock split.

#### **Implication of Being a Smaller Reporting Company**

We are a “smaller reporting company” as defined in Item 10(f)(1) of Regulation S-K. Smaller reporting companies may take advantage of certain reduced disclosure obligations, including, among other things, providing only two years of audited financial statements. We will remain a smaller reporting company until the last day of any fiscal year for so long as either (1) the market value of our shares of Common Stock held by non-affiliates does not equal or exceed \$250.0 million as of the prior June 30th, or (2) our annual revenues did not equal or exceed \$100.0 million during such completed fiscal year and the market value of our shares of Common Stock held by non-affiliates did not equal or exceed \$700.0 million as of the prior June 30th. To the extent we take advantage of any reduced disclosure obligations, it may make comparison of our financial statements with other public companies difficult or impossible.

#### **Company Information**

We were incorporated in Delaware on March 8, 2007. Our principal executive offices are located at 400 Chesapeake Drive, Redwood City, CA 94063, and our telephone number is (650) 241-7900. Our website address is [www.avinger.com](http://www.avinger.com). The information on, or that may be accessed through, our website is not incorporated by reference into this prospectus and should not be considered a part of this prospectus. We make available, free of charge on our corporate website at [www.avinger.com](http://www.avinger.com), copies of our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, Proxy Statements, and all amendments to these reports, as soon as reasonably practicable after such material is electronically filed with or furnished to the SEC, pursuant to Section 13(a) or 15(d) of the Securities Exchange Act. We also show detail about stock trading by corporate insiders by providing access to SEC Forms 3, 4 and 5. The SEC maintains a website that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. The address of that website is [www.sec.gov](http://www.sec.gov). The information in or accessible through the websites referred to above are not incorporated into, and are not considered part of, this filing. Further, our references to the URLs for these websites are intended to be inactive textual references only.

## THE OFFERING

**Issuer**

Avinger, Inc., a Delaware corporation

**Common Stock Offered by us**

Up to           shares of Common Stock based on an assumed combined public offering price of \$ per share of Common Stock and accompanying Common Warrant, which is based on the last sale price of our Common Stock as reported by Nasdaq on 2024.

**Pre-Funded Warrants Offered by us**

We are also offering to those purchasers, if any, whose purchase of Common Stock in this offering would result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or at the election of the purchaser, 9.99%) of our outstanding Common Stock immediately following consummation of this offering, the opportunity to purchase, if they so choose, Pre-Funded Warrants in lieu of Common Stock that would otherwise result in ownership in excess of 4.99% (or 9.99%, as applicable) of our outstanding Common Stock.

The purchase price of each Pre-Funded Warrant and accompanying Common Warrant will equal the price per share of Common Stock and accompanying Common Warrant being sold to the public in this offering, minus \$0.001, and the exercise price of each Pre-Funded Warrant will be \$0.001 per share.

Each Pre-Funded Warrant will be immediately exercisable and may be exercised at any time until exercised in full. There is no expiration date for the Pre-Funded Warrants. To better understand the terms of the Pre-Funded Warrants, you should carefully read the "Description of Securities We Are Offering" section of this prospectus. You should also read the form of Pre-Funded Warrant, which will be filed as an exhibit to the registration statement that includes this prospectus.

This prospectus also relates to the offering of the shares of Common Stock issuable upon exercise of the Pre-Funded Warrants.

**Common Warrants Offered by us**

We are also offering up to Common Warrants to purchase up to shares of Common Stock. Each Common Warrant will be exercisable for one share of Common Stock, will have an exercise price of \$ per share (representing % of the price at which a share of Common Stock and accompanying Common Warrant are sold to the public in this offering), will be exercisable immediately, and will expire from the date of issuance.

The shares of Common Stock and Pre-Funded Warrants, and the accompanying Common Warrants, as the case may be, can only be purchased together in this offering but will be issued separately and will be immediately separable upon issuance. Because we will issue a Common Warrant for each share of our Common Stock and for each Pre-Funded Warrant sold in this offering, the number of Common Warrants sold in this offering will not change as a result of a change in the mix of the shares of our Common Stock and Pre-Funded Warrants sold.

To better understand the terms of the Common Warrants, you should carefully read the "Description of Securities We Are Offering" section of this prospectus. You should also read the form of Common Warrant, which will be filed as an exhibit to the registration statement that includes this prospectus. This prospectus also relates to the offering of the shares of Common Stock issuable upon exercise of the Common Warrants.

**Placement Agent Warrants Offered by us**

We have also agreed to issue to the Placement Agent or its designees as compensation in connection with this offering, warrants to purchase up to shares of Common Stock (the "Placement Agent Warrants") as compensation in connection with this offering. The Placement Agent Warrants will be exercisable immediately and will have substantially the same terms as the Common Warrants, except that the Placement Agent Warrants will have an exercise price of \$ per share (representing % of the combined public offering price per share of Common Stock and accompanying Common Warrant) and a termination date that will be from the commencement of the sales pursuant to this offering. See "Plan of Distribution" below.

To better understand the terms of the Placement Agent Warrants, you should carefully read the descriptions of the Placement Agent Warrants in the "Description of Securities We Are Offering" and "Plan of Distribution" sections of this prospectus. You should also read the form of Placement Agent Warrant, which will be filed as an exhibit to the registration statement that includes this prospectus. This prospectus also relates to the offering of the shares of Common Stock issuable upon exercise of the Placement Agent Warrants.

**Common Stock Outstanding**

1,702,226 shares as of May 17, 2024 (including 115,792 of unvested restricted stock awards).

**Common Stock to be Outstanding After This Offering**

shares of Common Stock, assuming exercise in full of all Pre-Funded Warrants and no exercise of the Common Warrants and Placement Agent Warrants being offered in this offering. To the extent Pre-Funded Warrants are sold, the number of shares of Common Stock sold in this offering will be reduced on a one-for-one basis.

**Use of Proceeds**

We estimate that the net proceeds of this offering based upon an assumed combined public offering price of \$ per share of Common Stock and accompanying Common Warrant, which was the closing price of our Common Stock on Nasdaq on , 2024, after deducting Placement Agent fees and estimated offering expenses, will be approximately \$ , assuming the exercise in full of all Pre-Funded Warrants offered hereby and assuming no exercise of the Common Warrants and Placement Agent Warrants.

We currently intend to use the net proceeds from this offering for working capital and general corporate purposes.

**Risk Factors**

Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page 12 and other information included and incorporated by reference in this prospectus for a discussion of factors that you should carefully consider before deciding to invest in our Common Stock.

**Lock-Up Agreements**

The Company and our directors and officers have agreed with the Placement Agent, subject to certain exceptions, not to sell, transfer or dispose of, directly or indirectly, any of our Common Stock or securities convertible into or exercisable or exchangeable for our Common Stock for a period of ( ) days after the closing of this offering. See "Plan of Distribution" for more information.

**Nasdaq Listing**

Our Common Stock is listed on Nasdaq under the symbol "AVGR." We do not intend to apply for the listing of the Pre-Funded Warrants, Placement Agent Warrants or Common Warrants on any national securities exchange or other trading system. Without an active trading market, the liquidity of the Pre-Funded Warrants, Placement Agent Warrants and Common Warrants will be limited.

The number of shares of Common Stock to be outstanding immediately after this offering is based on 1,702,226 shares of our Common Stock outstanding as of May 17, 2024 and excludes (in each case as of May 17, 2024):

- 15 shares of Common Stock issuable upon the exercise of stock options outstanding with a weighted average exercise price of \$183,340 per share;
- 7,752,174 shares of Common Stock issuable upon conversion of outstanding preferred stock, comprised of 2,729,257 shares of Common Stock issuable upon conversion of outstanding Series A-1 Preferred Stock, 23,205 shares of Common Stock issuable upon conversion of outstanding Series B convertible preferred stock, par value \$0.001 (the "Series B Preferred Stock"), 178,560 shares of Common Stock issuable upon conversion of outstanding Series E Preferred Stock, 1,972,152 shares of Common Stock issuable upon conversion of outstanding Series F Preferred Stock and 2,849,000 shares of Common Stock issuable upon conversion of outstanding Series H Preferred Stock;

- 497,034 shares of Common Stock issuable upon exercise of outstanding warrants, comprised of 2,993 shares of Common Stock issuable upon exercise of outstanding Series 1 Warrants, 2,903 shares of Common Stock issuable upon exercise of outstanding Series 2 Warrants, 53,833 shares of Common Stock issuable upon exercise of outstanding January 2022 financing warrants, 4,433 shares of Common Stock issuable upon exercise of outstanding placement agent warrants issued in the January 2022 financing, 190,259 shares of Common Stock issuable upon exercise of outstanding Series A Preferred Investment Options issued in the August 2022 financing, 190,259 shares of Common Stock issuable upon exercise of outstanding Series B Preferred Investment Options issued in the August 2022 financing, 11,416 shares of Common Stock issuable upon exercise of outstanding placement agent warrants issued in the August 2022 financing, and 40,938 of Common Stock issuable upon the exercise of outstanding Advisor Warrants issued in the March 2024 financing; and
- 68,109 shares of Common Stock reserved for future issuance under our 2015 Equity Incentive Plan, or our 2015 Plan, and any additional shares that become available under our 2015 Plan pursuant to provisions thereof that automatically increase the share reserve under the plan each year.

Unless otherwise indicated, the information in this prospectus, including the number of shares outstanding after this offering, does not reflect:

- any issuance, exercise, vesting, expiration, or forfeiture of any additional equity awards under our equity incentive plans or stock purchase plans that occurred after May 17, 2024; and
- any exercise of the Common Warrants or the Placement Agent Warrants, and exercise in full of all Pre-Funded Warrants issued in this offering.

## RISK FACTORS

An investment in our securities involves a high degree of risk. Before deciding whether to invest in our securities, you should consider carefully the risks described below and discussed under this section, together with other information in this prospectus and the documents incorporated by reference in this prospectus, including the information set forth under the caption "Risk Factors" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2023 and our Quarterly Report on Form 10-Q for the quarter ended March 31, 2024. If any of these risks actually occurs, our business, financial condition or results of operations could be seriously harmed. This could cause the trading price of our Common Stock to decline, resulting in a loss of all or part of your investment.

### Risks Related to Our Business

You should read and consider risk factors specific to our business and indebtedness, our securities and this offering in their entirety before making an investment decision. Those risks are described below and in the sections entitled "Risk Factors" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2023, our Quarterly Report on Form 10-Q for the quarter ended March 31, 2024, and in other documents incorporated by reference into this prospectus. Please be aware that additional risks and uncertainties not currently known to us or that we currently deem to be immaterial could also materially and adversely affect our business, results of operations, financial condition, cash flows or prospects.

***There is substantial doubt about our ability to continue as a going concern, and we will need additional financing to execute our business plan, to fund our operations and to continue as a going concern, and, if we are unable to obtain additional financing, may be required to pursue a reorganization proceeding under applicable bankruptcy or insolvency laws, including under Chapter 11 of the U.S. Bankruptcy Code.***

Since inception, we have experienced recurring operating losses and negative cash flows and we expect to continue to generate operating losses and consume significant cash resources for the foreseeable future. There is substantial doubt regarding our ability to continue as a going concern. Our independent registered public accounting firm has expressed in its auditors' report on our 2023 financial statements, included our Annual Report on Form 10-K filed on March 20, 2024, an emphasis of matter paragraph relating to our ability to continue as a "going concern," meaning that our recurring losses from operations and negative cash flows from operations raise substantial doubt regarding our ability to continue as a going concern. We have prepared our financial statements on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. Our financial statements do not include any adjustment to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the outcome of this uncertainty, with the exception that all borrowings are classified as current on the balance sheets.

Under our Term Loan Agreement (the "Loan Agreement") with CRG, a "Material Adverse Change" or "Material Adverse Effect" (each as defined in the Loan Agreement) is an "Event of Default" thereunder, which gives Majority Lenders (as defined in the Loan Agreement) the right to declare amounts outstanding under the Loan Agreement immediately due and payable. Due to the substantial doubt about our ability to continue operating as a going concern and the Event of Default that could result due to a Material Adverse Change under the Loan Agreement, the entire amount of borrowings at March 31, 2024 and December 31, 2023 are classified as current. In addition, we may not be able to generate sufficient liquidity or revenue to satisfy minimum liquidity and minimum revenue covenants under the Loan Agreement. If we fail to satisfy such requirements, we will be in default under the Loan Agreement and all outstanding amounts under the Loan Agreement will become immediately due.

Majority Lenders have not purported that an Event of Default has occurred as a result of a Material Adverse Change or breach of other financial covenants. However, there can be no guarantee that Majority Lenders will not invoke such Event of Default in the future, or that we will not experience other Material Adverse Changes or other Material Adverse Effects, or otherwise breach our financial or other covenants under the Loan Agreement, that could give rise to an Event of Default under the Loan Agreement.

If we are unable to generate sufficient revenue and liquidity to service our debt, we may be required to pursue a reorganization proceeding under applicable bankruptcy or insolvency laws, including protection ("Bankruptcy Protection") under Chapters 7 or 11 of the U.S. Bankruptcy Code. Holders of our Common Stock will likely not receive any value or payments in a restructuring or similar scenario.

## Risks Related to this Offering

***Purchasers who purchase our securities in this offering pursuant to a securities purchase agreement may have rights not available to purchasers that purchase without the benefit of a securities purchase agreement.***

In addition to rights and remedies available to all purchasers in this offering under federal securities and state law, the purchasers that enter into a securities purchase agreement will also be able to bring claims of breach of contract against us. The ability to pursue a claim for breach of contract provides those investors with the means to enforce the covenants uniquely available to them under the securities purchase agreement including: (i) timely delivery of shares; (ii) agreement to not enter into variable rate financings for       ( ) year from closing, subject to certain exceptions; (iii) agreement to not enter into any financings for       ( ) days from closing; and (iv) indemnification for breach of contract.

***This is a reasonable best efforts offering, with no minimum amount of securities is required to be sold, and we may not raise the amount of capital we believe is required for our business plans, including our near-term business plans, nor will investors in this offering receive a refund in the event that we do not sell an amount of securities sufficient to pursue the business goals outlined in this prospectus.***

The Placement Agent has agreed to use its reasonable best efforts to solicit offers to purchase the securities in this offering. The Placement Agent has no obligation to buy any of the securities from us or to arrange for the purchase or sale of any specific number or dollar amount of the securities. We may sell fewer than all of the securities offered hereby, which may significantly reduce the amount of proceeds received by us, and investors in this offering will not receive a refund in the event that we do not sell an amount of securities sufficient to support our business goals and continued operations, including our near-term continued operations. Thus, we may not raise the amount of capital we believe is required for our operations in the short-term and may need to raise additional funds to complete such short-term operations. Such additional capital may not be available or available on terms acceptable to us, or at all.

There is no required minimum number of securities that must be sold as a condition to completion of this offering, and we have not, nor will we, establish an escrow account in connection with this offering. Because there is no minimum offering amount required as a condition to the closing of this offering, the actual offering amount, the Placement Agent fees and proceeds to us are not presently determinable and may be substantially less than the maximum amounts set forth herein. Because there is no escrow account and no minimum offering amount, investors could be in a position where they have invested in us, but we are unable to fulfill our objectives due to a lack of interest in this offering. Further, because there is no escrow account in operation and no minimum investment amount, any proceeds from the sale of securities offered by us will be available for our immediate use, despite uncertainty about whether we would be able to use such funds to effectively implement our business plan. Investor funds will not be returned under any circumstances whether during or after the offering.

***You will experience immediate and substantial dilution in the net tangible book value of the shares you purchase in this offering and may experience additional dilution in the future.***

The combined public offering price per share of Common Stock and related Common Warrant, and the combined public offering price of each Pre-Funded Warrant and related Common Warrant, will be substantially higher than the pro forma as adjusted net tangible book value per share of our Common Stock after giving effect to this offering.

Assuming the sale of       shares of our Common Stock and Common Warrants to purchase up to       shares of Common Stock at an assumed combined public offering price of \$       per share and accompanying Common Warrant, the closing sale price per share of our Common Stock on Nasdaq on       , 2024, assuming the exercise in full of any Pre-Funded Warrants in this offering, no exercise of the Common Warrants and Placement Agent Warrants being offered in this offering and after deducting the Placement Agent fees and estimated offering expenses payable by us, you will incur immediate dilution of approximately \$       per share. As a result of the dilution in net tangible book value to investors purchasing securities in this offering, investors may receive significantly less than the purchase price paid in this offering, if anything, in the event of the liquidation of our company. See the section entitled "Dilution" on page 44 for a more detailed discussion of the dilution you will incur if you participate in this offering. To the extent shares are issued under outstanding options and warrants at exercise prices lower than the combined public offering price of our Common Stock in this offering, including the shares underlying the Pre-Funded Warrants, Placement Agent Warrants and the Common Warrants, holders will incur further dilution.

***There is no public market for the Pre-Funded Warrants or the Common Warrants sold in this offering.***

There is no established public trading market for the Pre-Funded Warrants or Common Warrants being sold in this offering. We will not list the Pre-Funded Warrants or Common Warrants on any securities exchange or nationally recognized trading system, including Nasdaq. Therefore, we do not expect a market to ever develop for the Pre-Funded Warrants or Common Warrants. Without an active market, the liquidity of the Pre-Funded Warrants and the Common Warrants will be limited.

***The Pre-Funded Warrants and Common Warrants are speculative in nature. Holders of the Pre-Funded Warrants and the Common Warrants offered hereby will have no rights as common stockholders with respect to the shares of our Common Stock underlying such warrants until such holders exercise their warrants and acquire our Common Stock, except as otherwise provided in the Pre-Funded Warrants and the Common Warrants.***

The Pre-Funded Warrants and Common Warrants do not confer any rights of Common Stock ownership on their holders, such as voting rights or the right to receive dividends, but merely represent the right to acquire shares of Common Stock at a fixed price. Commencing on the date of issuance, holders of the Pre-Funded Warrants and the Common Warrants may exercise their right to acquire the underlying shares of Common Stock and pay the respective stated warrant exercise price per share. Following this offering, the market value of the Common Warrants is uncertain and there can be no assurance that the market value of the Common Warrants, if any, will equal or exceed their combined public offering prices. There can be no assurance that the market price of the shares of Common Stock will ever equal or exceed the exercise price of the Common Warrants, and consequently, whether it will ever be profitable for holders of Common Warrants to exercise the Common Warrants.

Until holders of the Pre-Funded Warrants and the Common Warrants acquire shares of our Common Stock upon exercise thereof, holders of such Pre-Funded Warrants and Common Warrants will have no rights with respect to shares of our Common Stock, except as provided in the Pre-Funded Warrants and the Common Warrants, respectively. Upon exercise of the Pre-Funded Warrants and Common Warrants, such holders will be entitled to the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

***We have broad discretion in how we use the net proceeds of this offering, and we may not use these proceeds effectively or in ways with which you agree.***

Our management will have broad discretion as to the application of the net proceeds of this offering and could use them for purposes other than those contemplated at the time of the offering. We currently intend to use the net proceeds, if any, from this offering for working capital and general corporate purposes. Our stockholders may not agree with the manner in which our management chooses to allocate and spend the net proceeds. Moreover, our management may use the net proceeds for corporate purposes that may not increase the market price of our Common Stock or other securities. See the section of this prospectus titled "Use of Proceeds" on page 24.

**Risks Related to our Securities**

***You may experience future dilution as a result of future equity offerings or other equity issuances.***

In order to raise additional capital, we believe that we will offer and issue additional shares of our Common Stock or other securities convertible into or exchangeable for our Common Stock in the future. We cannot assure you that we will be able to sell shares of our Common Stock or other securities in any other offering at a price per share that is equal to or greater than the price per share paid by purchasers in this offering, and investors purchasing other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our Common Stock or other securities convertible into or exchangeable for our Common Stock in future transactions may be higher or lower than the price per share in this offering.

Further, we have a significant number of warrants outstanding. To the extent that outstanding warrants have been or may be exercised, outstanding restricted stock units or restricted stock awards vest, instruments that are convertible or exercisable into Common Stock, if any, are converted or exercised, or other shares issued, you may experience further dilution. Further, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plan.

***Nasdaq may delist our securities from its exchange, which could harm our business and limit our stockholders' liquidity.***

Our Common Stock is currently listed on Nasdaq, which has qualitative and quantitative listing criteria. However, we cannot assure you that our Common Stock will continue to be listed on Nasdaq in the future. In order to continue listing our Common Stock on Nasdaq, we must maintain certain financial, distribution and stock price levels. Generally, we must maintain a minimum amount in stockholders' equity, a minimum number of holders of our Common Stock and a minimum bid price.

On May 18, 2023, we received notice (the "Stockholders' Equity Deficiency Letter") from the Staff that we no longer satisfy the \$2.5 million stockholders' equity requirement for continued listing on Nasdaq, or the alternatives to that requirements - a \$35 million market value of listed securities or \$500,000 in net income in the most recent fiscal year or two of the last three fiscal years - as required by Nasdaq Listing Rule 5550(b) (the "Equity Requirement").

The Stockholders' Equity Deficiency Letter has no immediate effect on our continued listing on Nasdaq. In accordance with the Nasdaq Listing Rules, we were provided 45 calendar days, or until July 3, 2023, to submit a plan to regain compliance with the Equity Requirement (the "Compliance Plan"). We submitted the Compliance Plan to Nasdaq on July 3, 2023. On July 31, 2023, the Staff granted our request for an extension of the deadline to regain compliance with the Equity Requirement to November 14, 2023 and on March 14, 2024, the Staff granted our request for an extension of the deadline to regain compliance to May 20, 2024.

If Nasdaq delists our Common Stock from trading on its exchange and we are not able to list our securities on another national securities exchange, we expect our securities could be quoted on an over-the-counter market. If this were to occur, we could face significant material adverse consequences, including:

- a limited availability of market quotations for our securities;
- reduced liquidity for our securities;
- a determination that our Common Stock is a "penny stock" which will require brokers trading in our Common Stock to adhere to more stringent rules and possibly result in a reduced level of trading activity in the secondary trading market for our securities;
- a limited amount of news and analyst coverage; and
- a decreased ability to issue additional securities or obtain additional financing in the future.

The National Securities Markets Improvement Act of 1996, which is a federal statute, prevents or preempts the states from regulating the sale of certain securities, which are referred to as "covered securities." If our Common Stock continues to be listed on Nasdaq, our Common Stock will be a covered security. Although the states are preempted from regulating the sale of our securities, the federal statute does allow the states to investigate companies if there is a suspicion of fraud, and, if there is a finding of fraudulent activity, then the states can regulate or bar the sale of covered securities in a particular case.

***Our stock price may be volatile, and purchasers of our Common Stock could incur substantial losses.***

Our stock price has fluctuated significantly since our IPO and is likely to continue to fluctuate substantially. As a result of this price fluctuation, investors may experience losses on their investments in our stock. In addition, the development stage of our operations may make it difficult for investors to evaluate the success of our business to date and to assess our future viability. The market price for our Common Stock may be influenced by many factors, including:

- sales of stock by our existing stockholders, including our affiliates;
- market acceptance of our Lumivascular platform and products;
- the results of our clinical trials;
- changes in analysts' estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' and our own estimates;
- the financial projections we may provide to the public, any changes in these projections or our failure to meet these projections;
- actual or anticipated fluctuations in our financial condition and operating results;
- quarterly variations in our or our competitors' results of operations;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors;
- changes in operating performance and stock market valuations of other technology companies generally, or those in the medical device industry in particular;
- the loss of key personnel, including changes in our board of directors and management;
- legislation or regulation of our business;
- lawsuits threatened or filed against us;
- the announcement or approvals of new products or product enhancements by us or our competitors;
- announcements related to patents issued to us or our competitors and to litigation; and
- developments in our industry.

From time to time, our affiliates may sell stock for reasons due to their personal financial circumstances. These sales may be interpreted by other stockholders as an indication of our performance and result in subsequent sales of our stock that have the effect of creating downward pressure on the market price of our Common Stock. In addition, the stock prices of many companies in the medical device industry have experienced wide fluctuations that have often been unrelated to the operating performance of those companies.

The market price and trading volume of our Common Stock has been volatile, and it may continue to be volatile. We cannot predict the price at which our Common Stock will trade in the future and it may decline. The price at which our Common Stock trades may fluctuate significantly and may be influenced by many factors, including our financial results; developments generally affecting our industry; general economic, industry and market conditions; the depth and liquidity of the market for our Common Stock; investor perceptions of our business; reports by industry analysts; announcements by other market participants, including, among others, investors, our competitors, and our customers; regulatory action affecting our business; and the impact of other "Risk Factors" discussed in this Annual Report. In addition, changes in the trading price of our Common Stock may be inconsistent with our operating results and outlook. The volatility of the market price of our Common Stock may adversely affect investors' ability to purchase or sell shares of our Common Stock.

***We may not be able to secure additional financing on favorable terms, or at all, to meet our future capital needs and our failure to obtain additional financing when needed could force us to delay, reduce or eliminate our product development programs and commercialization efforts or cause us to become insolvent.***

On March 5, 2024, we entered into a financing as part of a broader strategic collaboration with Zylox-Tonbridge Medical Technology Co., Ltd. ("Zylox-Tonbridge") in which we received an aggregate of \$7.5 million before any commissions, legal and accounting fees, and other ancillary expenses. We believe that our cash and cash equivalents of \$7.2 million at March 31, 2024 and expected revenues, debt and financing activities and funds from operations will be sufficient to allow us to fund our current operations through the end of the second quarter of 2024. Even though we received proceeds of \$7.5 million from the sale of our Common Stock and Series F Preferred Stock in March 2024, we will need to raise additional funds through future equity or debt financings in the near future to meet our operational needs and capital requirements for product development, clinical trials and commercialization. We can provide no assurance that we will be successful in raising funds pursuant to additional equity or debt financings or that such funds will be raised at prices that do not create substantial dilution for our existing stockholders. Given the volatility of our stock price, any financing that we undertake could cause substantial dilution to our existing stockholders.

To date, we have financed our operations primarily through sales of our products and net proceeds from the issuance of our preferred stock and debt financings, our initial public offering ("IPO"), and our follow-on public offerings. We do not know when or if our operations will generate sufficient cash to fund our ongoing operations. We cannot be certain that additional capital will be available as needed on acceptable terms, or at all. In the future, we may require additional capital in order to (i) continue to conduct research and development activities, (ii) conduct post-market clinical studies, as well as clinical trials to obtain regulatory clearances and approvals necessary to commercialize our Lumivascular platform products, (iii) expand our sales and marketing infrastructure, (iv) acquire complementary businesses technologies or products; or (v) respond to business opportunities, challenges, a decline in sales, increased regulatory obligations or unforeseen circumstances. Our future capital requirements will depend on many factors, including:

- the degree of success we experience in commercializing our Lumivascular platform products, particularly Pantheris, and any future versions of such products;
- the costs, timing and outcomes of clinical trials and regulatory reviews associated with our future products;
- the costs and expenses of maintaining or expanding our sales and marketing infrastructure and our manufacturing operations;
- the costs and timing of developing variations of our Lumivascular platform products, especially Pantheris and, if necessary, obtaining FDA clearance of such variations;
- the extent to which our Lumivascular platform is adopted by hospitals for use by interventional cardiologists, vascular surgeons and interventional radiologists in the treatment of PAD;
- the number and types of future products we develop and commercialize;

- the costs of defending ourselves against future litigation;
- the costs of preparing, filing and prosecuting patent applications and maintaining, enforcing and defending intellectual property-related claims; and
- the extent and scope of our general and administrative expenses.

We may raise additional funds in equity or debt financings or enter into credit facilities in order to access funds for our capital needs. Any debt financing obtained by us in the future would cause us to incur additional debt service expenses and could include restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and pursue business opportunities. In addition, due to our current level of debt, future equity investors may require that we convert all or a portion of our debt to equity, and our debtholders may not agree to such terms. If we raise additional funds through further issuances of equity or convertible debt securities, and/or if we convert all or a portion of our existing debt to equity, our existing stockholders could suffer significant dilution in their percentage ownership of our company, and any new equity securities we issue could have rights, preferences and privileges senior to those of holders of our Common Stock. If we are unable to obtain adequate financing or financing on terms satisfactory to us when we require it, we may terminate or delay the development of one or more of our products, delay clinical trials necessary to market our products, delay establishment of sales and marketing capabilities or other activities necessary to commercialize our products, and significantly scale back our operations, or we may become insolvent. If this were to occur, our ability to continue to grow and support our business and to respond to business challenges could be significantly limited.

***We have outstanding shares of convertible preferred stock, some of which contain “full-ratchet” anti-dilution protection, which may cause significant dilution to our stockholders.***

As of May 17, 2024, we had outstanding 1,702,226 shares of Common Stock (including 115,792 shares subject to unvested restricted stock awards). As of that date we had outstanding 85 shares of Series B Preferred Stock convertible into an aggregate of 23,205 shares of Common Stock, 10,000 shares of Series A-1 Preferred Stock convertible, subject to certain conditions, into an aggregate of 2,729,257 shares of Common Stock, 1,920 shares of Series E Preferred Stock convertible into an aggregate of 178,560 shares of Common Stock, 7,224 shares of Series F Preferred Stock convertible into an aggregate of 1,972,152 shares of Common Stock and 11,000 shares of Series H Preferred Stock convertible into an aggregate of 2,849,741 shares of Common Stock. The issuance of shares of Common Stock upon the conversion of such shares of preferred stock would dilute the percentage ownership interest of all stockholders, might dilute the book value per share of our Common Stock and would increase the number of our publicly traded shares, which could depress the market price of our Common Stock.

As of May 17, 2024, the shares of Series B Preferred Stock contain a “full-ratchet” anti-dilution provision which, subject to limited exceptions, would reduce the conversion price of the Series B Preferred Stock (and increase the number of shares issuable) in the event that we in the future issue Common Stock, or securities convertible into or exercisable to purchase Common Stock, at price per share lower than the conversion price then in effect. Our outstanding 85 shares of Series B Preferred Stock are convertible into 23,205 shares of Common Stock at a conversion price of \$3.664 per share. The shares of Common Stock sold in this offering, if any, will be sold from time to time at various prices, and this “full-ratchet” anti-dilution provision will be triggered if the Common Stock is sold in this offering at a price below the then conversion price of the Series B Preferred Stock.

***The Series H Preferred Stock, Series F Preferred Stock and Series E Preferred Stock have liquidation preferences senior to our Common Stock, Series A-1 Preferred Stock and Series B Preferred Stock.***

The Series H, Series F and Series E Preferred Stock each have a liquidation preference payable prior to any payment on our Common Stock (including shares issuable upon the exercise of our outstanding warrants), Series A-1 Preferred Stock and Series B Preferred Stock. Payment of the liquidation preferences could result in Common Stock holders, Series A-1 Preferred Stock holders, Series B Preferred Stock holders and warrant holders not receiving any consideration if we were to liquidate, dissolve or wind up, either voluntarily or involuntarily.

***CRG has the ability to exert significant control over our business due to their substantial interest in us, pursuant to the protective provisions in the Series E and Series H Preferred Stock it holds and the covenants and other restrictions in the Loan Agreement.***

CRG's ownership of Common Stock, Series E Preferred Stock and Series F Preferred Stock represent up to 9.9% of our outstanding voting power. In addition, the Series E Preferred Stock and Series H Preferred Stock held by CRG have protective provisions that will require CRG to consent to certain significant Company events. For example, CRG's consent would be necessary to create additional shares of Series E Preferred Stock or Series H Preferred Stock, amend our organizational documents, or approve any merger, sale of assets, or other major corporate transaction. This consent requirement could delay or prevent any acquisition of our company on terms that other stockholders may desire, and may adversely affect the market price of our Common Stock.

CRG's interests may conflict with your interests as a stockholder. CRG's ability to influence our business could make some transactions, including mergers or other changes in control, more difficult or impossible without the support of CRG and could discourage others from making tender offers, which could prevent stockholders from receiving a premium for their shares. As a result, the market price of our Common Stock may be affected.

***Zylox-Tonbridge has the ability to exert significant control over our business due to their substantial interest in us, as well as their relationship with us through the license agreement and collaboration agreement previously entered into.***

Zylox-Tonbridge's ownership of Common Stock and Series F Preferred Stock represent up to 49.9% of our outstanding voting power. In addition, we are subject to a number of covenants and agreements under the license agreement and collaboration agreement, which could allow Zylox-Tonbridge to exercise influence over our business.

In addition, our Series F Preferred Stock has protective provisions that will require Zylox-Tonbridge to consent to certain significant Company events. For example, Zylox-Tonbridge's consent would be necessary to create additional shares of Series F Preferred Stock, amend our organizational documents, or approve any merger, sale of assets, or other major corporate transaction. This consent requirement could delay or prevent any acquisition of our company on terms that other stockholders may desire, and may adversely affect the market price of our Common Stock.

Zylox-Tonbridge's interests may conflict with your interests as a stockholder. Zylox-Tonbridge's ability to influence our business could make some transactions, including mergers or other changes in control, more difficult or impossible without the support of Zylox-Tonbridge and could discourage others from making tender offers, which could prevent stockholders from receiving a premium for their shares. As a result, the market price of our Common Stock may be affected.

***Future sales of our Common Stock in the public market could cause our stock price to fall.***

Sales of a substantial number of shares of our Common Stock in the public market, or the perception that these sales might occur, could depress the market price of our Common Stock, and could impair our ability to raise capital through the sale of additional equity securities. As of May 17, 2024, we had 1,702,226 shares of Common Stock (including 115,792 shares subject to unvested restricted stock awards) outstanding, all of which, other than shares held by our directors and certain officers and affiliates, were eligible for sale in the public market, subject in some cases to compliance with the requirements of Rule 144, including the volume limitations and manner of sale requirements.

***We have not paid cash dividends in the past and do not expect to pay cash dividends in the future, and any return on investment may be limited to the value of our stock.***

We have never paid cash dividends and do not anticipate paying cash dividends in the foreseeable future. The payment of dividends will depend on our earnings, capital requirements, financial condition, prospects and other factors our board of directors may deem relevant. In addition, our Loan Agreement with CRG prohibits us from, among other things, paying any dividends or making any other distribution or payment on account of our Common Stock. The terms of our Series A Preferred Stock, Series B Preferred Stock and Series E Preferred Stock provide that we may not pay dividends on our Common Stock without concurrently declaring dividends on each. If we do not pay dividends, our stock may be less valuable because a return on your investment will only occur if you sell our Common Stock after our stock price appreciates. For more information on restrictions governing our ability to pay dividends, see the section titled "Dividend Policy" in our Annual Report on Form 10-K, incorporated by reference to this prospectus.

***We currently take advantage of reduced disclosure and governance requirements applicable to smaller reporting companies, which could result in our Common Stock being less attractive to investors.***

We have a public float of less than \$250.0 million and therefore qualify as a smaller reporting company under the rules of the SEC. As a smaller reporting company, we are able to take advantage of reduced disclosure requirements, such as simplified executive compensation disclosures and reduced financial statement disclosure requirements in our SEC filings. Decreased disclosures in our SEC filings due to our status as a smaller reporting company may make it harder for investors to analyze our results of operations and financial prospects. We cannot predict if investors will find our Common Stock less attractive if we rely on these exemptions. If some investors find our Common Stock less attractive as a result, there may be a less active trading market for our Common Stock and our stock price may be more volatile. We may take advantage of the reporting exemptions applicable to a smaller reporting company until we are no longer a smaller reporting company, which status would end once we have a public float greater than \$250.0 million. In that event, we could still be a smaller reporting company if our annual revenues were below \$100.0 million and we have a public float of less than \$700.0 million.

***Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.***

Our amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware is 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 to our stockholders, (iii) any action asserting a claim arising pursuant to the Delaware General Corporation Law or our certificate of incorporation or bylaws (iv) any action to interpret, apply, enforce or determine the validity of our certificate of incorporation or bylaws, or (v) any action asserting a claim governed by the internal affairs doctrine. This exclusive forum provision would not apply to suits brought to enforce any liability or duty created by the Securities Act or the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. To the extent that any such claims may be based upon federal law claims, Section 27 of the Exchange Act creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all suits brought to enforce any duty or liability created by the Securities Act or the rules and regulations thereunder.

This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or employees, which may discourage such lawsuits against us and our directors, officers or employees. If a court were to find the choice of forum provision contained in our certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could have a material adverse effect on our business, financial condition, results of operations and prospects.

#### SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and any documents we incorporate by reference contain "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. All statements, other than statements of historical fact, included or incorporated in this prospectus and any documents we incorporate by reference regarding our strategy, future operations, collaborations, intellectual property, cash resources, financial position, future revenues, projected costs, prospects, plans, and objectives of management are forward-looking statements. The words "believes," "anticipates," "estimates," "plans," "expects," "intends," "may," "could," "should," "potential," "likely," "projects," "continue," "will," and "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We have based these forward-looking statements on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, strategy, short- and long-term business operations and objectives, and financial needs. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described under the heading "Risk Factors." In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances included herein may not occur, and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Forward-looking statements include, but are not limited to, statements about:

- our ability to continue as a going concern;
- our ability to regain and remain in compliance with the listing requirements of Nasdaq;
- the outcome of and expectations regarding our current clinical studies, and any additional clinical studies we initiate;
- our plans to modify our current products, or develop new products, to address additional indications;
- our ability to obtain additional financing through future equity or debt financings;
- the expected timing of 510(k) clearances by the FDA which may include but are not limited to additional versions of Pantheris, Ocelot, Tigereye and Lightbox;
- the expected timing of 510(k) submission to the FDA, and associated marketing clearances by the FDA, which may include but are not limited to additional versions of Pantheris, Ocelot, Tigereye and Lightbox;
- our ability to realize benefits from our license and collaboration agreements with Zylox-Tonbridge;
- the expected growth in our business and our organization;
- our expectations regarding government and third-party payor coverage and reimbursement, including the ability of Pantheris to qualify for reimbursement codes used by other atherectomy products;
- our ability to retain and recruit key personnel, including the continued development of our sales and marketing infrastructure;
- our ability to obtain and maintain intellectual property protection for our products;
- our estimates of our expenses, ongoing losses, future revenue, capital requirements and our needs for, or ability to obtain, additional financing;
- expectations regarding revenue, cost of revenue, gross margins, and expenses, including research and development and selling, general and administrative expenses;

- our ability to identify and develop new and planned products and acquire new products, including those for the coronary market;
- our financial performance;
- our ability to remain in compliance with laws and regulations that currently apply or become applicable to our business, both in the United States and internationally; and
- developments and projections relating to our competitors or our industry.

Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. In addition, neither we nor any other person assumes responsibility for the accuracy and completeness of any of these forward-looking statements. These risks should not be construed as exhaustive and should be read in conjunction with our other disclosures, including but not limited to the risks described under the heading "Risk Factors." Other risks may be described from time to time in our filings made under the securities laws. New risks emerge from time to time. It is not possible for our management to predict all risks. All forward-looking statements in this prospectus and any documents we incorporate by reference speak only as of the date made and are based on our current beliefs and expectations. We undertake no obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

## INDUSTRY AND MARKET DATA

This prospectus and the documents incorporated by reference herein and therein contain estimates, projections and other information concerning our industry, our business, and the markets for certain products, including data regarding the estimated size of those markets, their projected growth rates and the incidence and prevalence of certain medical conditions. Information that is based on estimates, forecasts, projections, market research, or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information. Unless otherwise expressly stated, we obtained these industry, business, market, and other data from our own research as well as from reports, research surveys, studies, and similar data prepared by market research firms and other third parties, industry, medical and general publications, government data and similar sources. These data involve a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. Projections, assumptions and estimates of our future performance and the future performance of the industry in which we operate is necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in "Risk Factors" and elsewhere in this prospectus. These and other factors could cause results to differ materially from those expressed in the estimates made by independent third parties and by us.

## USE OF PROCEEDS

We estimate that we will receive net proceeds from this offering of approximately \$      million (assuming the sale of the maximum number of securities offered hereby), based upon an assumed combined public offering price of \$      per share of Common Stock and accompanying Common Warrants (which is the last reported sale price of our Common Stock on Nasdaq on      , 2024), after deducting Placement Agent fees and estimated offering expenses payable by us and assuming no exercise of the Common Warrants and Placement Agent Warrants and exercise in full of the Pre-Funded Warrants.

However, because this is a reasonable best efforts offering with no minimum number of securities or amount of proceeds as a condition to closing, the actual offering amount, Placement Agent fees, and net proceeds to us are not presently determinable and may be substantially less than the maximum amounts set forth on the cover page of this prospectus, and we may not sell all or any of the securities we are offering. As a result, we may receive significantly less in net proceeds. Based on the assumed offering price set forth above, we estimate that our net proceeds from the sale of 75%, 50%, and 25% of the securities offered in this offering would be approximately \$      million, \$      million, and \$      million, respectively, after deducting the Placement Agent fees and estimated offering expenses payable by us, and assuming no exercise of the Common Warrants and Placement Agent Warrants and exercise in full of the Pre-Funded Warrants. We will only receive additional proceeds from the exercise of the Pre-Funded Warrants, if any, and the Placement Agent Warrants and Common Warrants we are issuing in this offering if the Pre-Funded Warrants, Placement Agent Warrants and the Common Warrants are exercised for cash. We cannot predict when or if the Pre-Funded Warrants, Placement Agent Warrants or the Common Warrants will be exercised. It is possible that these warrants may expire and may never be exercised.

These estimates exclude the proceeds, if any, from the exercise of Common Warrants offered hereby. If all of the Common Warrants offered hereby were to be exercised in cash at the exercise price of \$      per share, we would receive additional proceeds of approximately \$      million. We cannot predict when or if these Common Warrants will be exercised. It is possible that these Common Warrants may expire and may never be exercised. Additionally, these Common Warrants contain a cashless exercise provision that permit exercise of such Common Warrants on a cashless basis at any time when there is no effective registration statement under the Securities Act covering the issuance of the underlying shares.

These estimates also exclude the proceeds, if any, from the exercise of Placement Agent Warrants to be issued to the Placement Agent or its designees as compensation in connection with this offering. If all of the Placement Agent Warrants were to be exercised in cash at the exercise price of \$      per share, we would receive additional proceeds of approximately \$      million. We cannot predict when or if these Placement Agent Warrants will be exercised. It is possible that these Placement Agent Warrants may expire and may never be exercised. Additionally, these Placement Agent Warrants contain a cashless exercise provision that permit exercise of such Placement Agent Warrants on a cashless basis at any time when there is no effective registration statement under the Securities Act covering the issuance of the underlying shares.

We currently intend to use the net proceeds from this offering for working capital and other general corporate purposes. This expected use of net proceeds from this offering represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. The foregoing represents our intentions as of the date of this prospectus based upon our current plans and business conditions to use and allocate the net proceeds of the offering. However, our management will have significant flexibility and discretion in the timing and application of the net proceeds of the offering. Unforeseen events or changed business conditions may result in application of the proceeds of the offering in a manner other than as described in this prospectus. Our stockholders may not agree with the manner in which our management chooses to allocate and spend the net proceeds. Moreover, our management may use the net proceeds for corporate purposes that may not result in our being profitable or increase our market value.

Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities.

## DESCRIPTION OF CAPITAL STOCK

We are offering up to shares of our Common Stock, or Pre-Funded Warrants in lieu thereof, together with Common Warrants to purchase up to shares of Common Stock. The following description summarizes the material terms and provisions of our capital stock. The following description of our capital stock does not purport to be complete and is subject to, and qualified in its entirety by, our certificate of incorporation and bylaws, which are exhibits to the registration statement of which this prospectus forms a part, and by applicable law. The terms of our capital stock may also be affected by Delaware law.

### General

As of May 17, 2024, our authorized capital stock consists of one hundred million (100,000,000) shares of Common Stock, \$0.001 par value per share, and five million (5,000,000) shares of undesignated preferred stock, \$0.001 par value per share.

### Common Stock

#### **Outstanding Shares**

As of May 17, 2024, there 1,702,226 shares of Common Stock (including 115,792 shares subject to unvested restricted stock awards), held of record by 129 stockholders. Our board of directors is authorized, without stockholder approval, to issue additional shares of our Common Stock. As of May 17, 2024, there were 497,034 shares of Common Stock subject to the exercise of outstanding warrants, 7,752,174 shares of Common Stock subject to the conversion of outstanding preferred stock, and 115,807 shares of Common Stock subject to outstanding equity awards.

#### **Dividend Rights**

Subject to preferences that may be applicable to any then outstanding preferred stock, holders of our Common Stock are entitled to receive dividends, if any, as may be declared from time to time by our board of directors out of legally available funds. We have never declared or paid cash dividends on any of our capital stock and currently do not anticipate paying any cash dividends after this offering or in the foreseeable future.

#### **Voting Rights**

As of May 17, 2024, there are 100,000,000 shares of Common Stock authorized for issuance. Pursuant to our amended and restated certificate of incorporation, each holder of our Common Stock is entitled to one vote for each share on all matters submitted to a vote of stockholders; provided, however, that, except as otherwise required by law, holders of our Common Stock, as such, shall not be entitled to vote on any amendment to our amended and restated certificate of incorporation that relates solely to the terms of one or more outstanding series of preferred stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to our amended and restated certificate of incorporation. Pursuant to our amended and restated certificate of incorporation and amended and restated bylaws, corporate actions can generally be taken by a majority of our board and/or stockholders holding a majority of our outstanding shares, except as otherwise indicated in the section entitled "Anti-takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws," where certain amendments to our amended and restated certificate of incorporation and amended and restated bylaws require the vote of at least 66 2/3% of our then outstanding voting securities. Additionally, our stockholders do not have cumulative voting rights in the election of directors. Accordingly, holders of a plurality of the votes cast at a meeting of stockholders will be able to elect all of the directors then standing for election.

#### **Right to Receive Liquidation Distributions**

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

## **Rights and Preferences**

Holders of our Common Stock have no preemptive, conversion, subscription or other rights, and there are no redemption or sinking fund provisions applicable to our Common Stock. The rights, preferences and privileges of the holders of our Common Stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of our preferred stock that we may designate in the future.

### **Fully Paid and Nonassessable**

All of our outstanding shares of Common Stock are, and the shares of Common Stock to be issued pursuant to this offering, when paid for, will be, fully paid and nonassessable.

### **Preferred Stock**

Under our Charter and as of May 17, 2024, we have authority, subject to any limitations prescribed by law and without further stockholder approval, to issue from time to time up to 5,000,000 shares of preferred stock, par value \$0.001 per share, in one or more series. As of May 17, 2024, 10,000 shares of preferred stock were designated Series A-1 Preferred Stock, 18,000 shares of preferred stock were designated Series B Preferred Stock, 8,656 shares of preferred stock were designated Series C convertible preferred stock, par value \$0.001 (the "Series C Preferred Stock"), 5,000 shares of preferred stock were designated Series E Preferred Stock, 7,244 shares of preferred stock were designated Series F Preferred Stock and 15,000 shares of preferred stock were designated Series H Preferred Stock. As of May 17, 2024, 10,000 shares of Series A-1 Preferred Stock were issued and outstanding, 85 shares of Series B Preferred Stock were issued and outstanding, 0 shares of Series C Preferred Stock were issued and outstanding, 0 shares of Series D Preferred Stock were issued and outstanding, 1,920 shares of Series E Preferred Stock were issued and outstanding, 7,224 shares of Series F Preferred Stock were issued and outstanding, and 11,000 shares of Series H Preferred Stock were issued and outstanding. Pursuant to our Charter, we are authorized to issue "blank check" preferred stock, which may be issued from time to time in one or more series upon authorization by our board of directors. Our board of directors, without further approval of the stockholders, is authorized to fix the designation, powers, preferences, relative, participating optional or other special rights, and any qualifications, limitations and restrictions applicable to each series of the preferred stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes could, among other things, adversely affect the voting power or rights of the holders of our Common Stock and, under certain circumstances, make it more difficult for a third party to gain control of us, discourage bids for our Common Stock at a premium or otherwise adversely affect the market price of the Common Stock.

### **Series A-1 Convertible Preferred Stock**

The preferences and rights of the Series A-1 Preferred Stock are as set forth in a Certificate of Designation of Preferences, Rights and Limitations of Series A-1 Convertible Preferred Stock, or the Series A-1 Certificate of Designation, which is included as Exhibit 3.16 to the registration statement of which this prospectus forms a part. The following is a summary of the material terms of our Series A-1 Preferred Stock and is qualified in its entirety by the Series A-1 Certificate of Designation. Please refer to the Series A-1 Certificate of Designation for more information on the preferences, rights and limitations of Series A-1 Preferred Stock.

*Liquidation.* Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series A-1 Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, an amount equal to the par value of the Series A-1 Preferred Stock plus any accrued and unpaid dividends thereon. Amounts payable to the Series A-1 Preferred Stock upon any dissolution, liquidation or winding up are payable prior and in preference to the payment of any amounts to the holders of our Common Stock.

*Conversion.* As of May 17, 2024, each share of Series A-1 Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into that number of shares of Common Stock determined by dividing \$1,000 by the conversion price of \$3.664 (subject to adjustment as described below). This right to convert is limited by the beneficial ownership limitation described below.

*Forced Conversion.* If the Company's average market capitalization is at least \$100,000,000 both (i) on a given date, based on the closing price and number of shares outstanding and (ii) for the prior quarter, based on the volume-weighted average closing price during such quarter and number of shares outstanding on the last day of such quarter, the Series A-1 Preferred Stock is subject to mandatory conversion (subject to the beneficial ownership limitation below).

*Beneficial Ownership Limitation.* A holder shall have no right to convert any portion of Series A-1 Preferred Stock, to the extent that, after giving effect to such conversion, such holder, together with such holder's affiliates, and any persons acting as a group together with such holder or any such affiliate, would beneficially own in excess of 4.99% (or, upon election by a holder any higher or lower percentage) of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon such conversion. A holder of Series A-1 Preferred Stock may adjust the percentage of the beneficial ownership upon not less than 61 days prior notice. Beneficial ownership of the holder and its affiliates will be determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder. Holders of Series A-1 Preferred Stock who are subject to such beneficial ownership limitation are and will remain responsible for ensuring their own compliance with Regulation 13D-G promulgated under the Securities Exchange Act of 1934, as amended, consistent with their individual facts and circumstances. In addition, pursuant to Rule 13d-3(d)(1)(i) promulgated under the Securities Exchange Act of 1934, as amended, any person who acquires Series A-1 Preferred Stock with the purpose or effect of changing or influencing the control of our company, or in connection with or as a participant in any transaction having such purpose or effect, immediately upon such acquisition will be deemed to be the beneficial owner of the underlying Common Stock.

*Optional Redemption.* Subject to the terms of the certificate of designation, the Company holds an option to redeem some or all the Series A-1 Preferred Stock for \$1,000 per share, upon 30 days prior written notice to the holder of the Series A-1 Preferred Stock.

*Stock Dividends and Stock Splits.* If we pay a stock dividend or otherwise make a distribution payable in shares of Common Stock on shares of Common Stock or any other Common Stock equivalents, subdivide or combine outstanding Common Stock, or reclassify Common Stock, the conversion price will be adjusted by multiplying the then effective conversion price by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

*Fundamental Transaction.* In the event we consummate a merger or consolidation with or into another person or other reorganization event in which our Common Stock is converted or exchanged for securities, cash or other property, or we sell, lease, license, assign, transfer, convey or otherwise dispose of all or substantially all of our assets or we or another person acquire 50% or more of our outstanding shares of Common Stock, then following such event, the holders of the Series A-1 Preferred Stock will be entitled to receive upon conversion of the Series A-1 Preferred Stock the same kind and amount of securities, cash or property which the holders would have received had they converted the Series A-1 Preferred Stock immediately prior to such fundamental transaction.

*Voting Rights, etc.* Except as otherwise provided in the Series A-1 Certificate of Designation or required by law, the Series A-1 Preferred Stock has no voting rights. However, as long as any shares of Series A-1 Preferred Stock are outstanding, we may not, without the affirmative vote of the holders of a majority of the then outstanding shares of the Series A-1 Preferred Stock, (i) materially alter or amend the powers, preferences, or rights of the Series A-1 Preferred Stock or the Series A-1 Certificate of Designation in any manner adverse to the holders of Series A-1 Preferred Stock, (ii) materially amend the certificate of incorporation or other charter documents of the Company in a manner adverse to the Series A-1 Preferred Stock; (iii) increase the number of authorized shares of Series A-1 Preferred Stock; or (iv) enter into any agreement with respect to any of the foregoing.

*Fractional Shares.* No fractional shares of Common Stock will be issued upon conversion of Series A-1 Preferred Stock. Rather, we shall pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the fair market value of a share of Common Stock. The Series A-1 Preferred Stock was issued in book-entry form under a preferred stock agent agreement between Equiniti Trust Company as preferred stock agent, and us, and was initially represented by one or more book-entry certificates deposited with The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC. There is no established public trading market for the Series A-1 Preferred Stock and we do not expect a market to develop. We do not plan on applying to list the Series A-1 Preferred Stock on Nasdaq, any other national securities exchange or any other nationally recognized trading system. The transfer agent for our Series A-1 Preferred Stock is Equiniti Trust Company, LLC.

## **Series B Convertible Preferred Stock**

The preferences and rights of the Series B Preferred Stock are as set forth in a Certificate of Designation of Preferences, Rights and Limitations of Series B Convertible Preferred Stock, or the Series B Certificate of Designation, which is included as Exhibit 3.5 to the registration statement of which this prospectus forms a part. The following is a summary of the material terms of our Series B Preferred Stock and is qualified in its entirety by the Series B Certificate of Designation. Please refer to the Series B Certificate of Designation for more information on the preferences, rights and limitations of Series B Preferred Stock.

***Liquidation.*** Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series B Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, of an amount equal to \$0.001 per share of Series B Preferred Stock before any distributions shall be made on the Common Stock or any series of preferred stock ranked junior to the Series B Preferred Stock, but after distributions shall be made on any outstanding Series E Preferred Stock or Series F Preferred Stock and any of our existing or future indebtedness.

***Dividends.*** Holders of the Series B Preferred Stock will be entitled to receive dividends equal (on an "as converted to Common Stock" basis) to and in the same form as dividends actually paid on shares of our Common Stock when, as and if such dividends are paid on shares of our Common Stock. No other dividends will be paid on shares of Series B Preferred Stock.

***Conversion.*** As of May 17, 2024, each share of Series B Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into that number of shares of Common Stock determined by dividing \$1,000 by the conversion price of \$3.664 (subject to adjustment as described below). This right to convert is limited by the beneficial ownership limitation described below.

***Forced Conversion.*** Subject to certain ownership limitations as described below and certain equity conditions being met, until such time that during any 30 consecutive trading days, the volume weighted average price of our Common Stock exceeds 300% of the conversion price and the daily dollar trading volume during such period exceeds \$500,000 per trading day, we shall have the right to force the conversion of the Series B Preferred Stock into Common Stock.

***Beneficial Ownership Limitation.*** A holder shall have no right to convert any portion of Series B Preferred Stock, to the extent that, after giving effect to such conversion, such holder, together with such holder's affiliates, and any persons acting as a group together with such holder or any such affiliate, would beneficially own in excess of 4.99% (or, upon election by a holder prior to the issuance of any shares of Series B Preferred Stock, 9.99%) of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon such conversion (subject to the right of the holder to increase such beneficial ownership limitation upon not less than 61 days prior notice provided that such limitation can never exceed 9.99% and such 61 day period cannot be waived). Beneficial ownership of the holder and its affiliates will be determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder. Holders of Series B Preferred Stock who are subject to such beneficial ownership limitation are and will remain responsible for ensuring their own compliance with Regulation 13D-G promulgated under the Securities Exchange Act of 1934, as amended, consistent with their individual facts and circumstances. In addition, pursuant to Rule 13d-3(d)(1)(i) promulgated under the Securities Exchange Act of 1934, as amended, any person who acquires Series B Preferred Stock with the purpose or effect of changing or influencing the control of our company, or in connection with or as a participant in any transaction having such purpose or effect, immediately upon such acquisition will be deemed to be the beneficial owner of the underlying Common Stock.

***Optional Redemption.*** Subject to the terms of the certificate of designation, the Company holds an option to redeem some or all the Series B Preferred Stock six months after its issuance date at a 200% premium to the stated value of the Series B Preferred Stock subject to the redemption, upon 30 days prior written notice to the holder of the Series B Preferred Stock. The Series B Preferred Stock would be redeemed by the Company for cash.

*Subsequent Equity Sales.* The Series B Preferred Stock has full-ratchet price based anti-dilution protection, subject to customary carve-outs, in the event of a down-round financing at a price per share below the conversion price of the Series B Preferred Stock. If during any 20 of 30 consecutive trading days the volume weighted average price of our Common Stock exceeds 300% of the then-effective conversion price of the Series B Preferred Stock and the daily dollar trading volume for each trading day during such 30 day period exceeds \$500,000, the anti-dilution protection in the Series B Preferred Stock will expire and cease to apply.

*Stock Dividends and Stock Splits.* If we pay a stock dividend or otherwise make a distribution payable in shares of Common Stock on shares of Common Stock or any other Common Stock equivalents, subdivide or combine outstanding Common Stock, or reclassify Common Stock, the conversion price will be adjusted by multiplying the then conversion price by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

*Fundamental Transaction.* In the event we consummate a merger or consolidation with or into another person or other reorganization event in which our Common Stock is converted or exchanged for securities, cash or other property, or we sell, lease, license, assign, transfer, convey or otherwise dispose of all or substantially all of our assets or we or another person acquire 50% or more of our outstanding shares of Common Stock, then following such event, the holders of the Series B Preferred Stock will be entitled to receive upon conversion of the Series B Preferred Stock the same kind and amount of securities, cash or property which the holders would have received had they converted the Series B Preferred Stock immediately prior to such fundamental transaction. Any successor to us or surviving entity shall assume the obligations under the Series B Preferred Stock.

*Voting Rights, etc.* Except as otherwise provided in the Series B Certificate of Designation or required by law, the Series B Preferred Stock has no voting rights. However, as long as any shares of Series B Preferred Stock are outstanding, we may not, without the affirmative vote of the holders of a majority of the then outstanding shares of the Series B Preferred Stock, materially alter or change adversely the powers, preferences or rights given to the Series B Preferred Stock, materially amend the Series B Certificate of Designation, amend our certificate of incorporation or other charter documents in any manner that adversely affects any rights of the holders, increase the number of authorized shares of Series B Preferred Stock, or enter into any agreement with respect to any of the foregoing. The Series B Certificate of Designation provides that if any party commences an action or proceeding to enforce any provisions thereunder, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding. This provision may, under certain circumstances, be inconsistent with federal securities laws and Delaware general corporation law.

*Fractional Shares.* No fractional shares of Common Stock will be issued upon conversion of Series B Preferred Stock. Rather, we shall pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the conversion price. The Series B Preferred Stock was issued in book-entry form under a preferred stock agent agreement between Equiniti Trust Company as preferred stock agent, and us, and was initially represented by one or more book-entry certificates deposited with The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC. There is no established public trading market for the Series B Preferred Stock and we do not expect a market to develop. We do not plan on applying to list the Series B Preferred Stock on Nasdaq, any other national securities exchange or any other nationally recognized trading system.

The transfer agent for our Series B Preferred Stock is Equiniti Trust Company, LLC.

#### **Series E Convertible Preferred Stock**

The preferences and rights of the Series E Preferred Stock are as set forth in a Certificate of Designation of Preferences, Rights and Limitations of Series E Convertible Preferred Stock, as amended, or the Series E Certificate of Designation, which is included as Exhibit 3.13 to the registration statement of which this prospectus forms a part. The following is a summary of the material terms of our Series E Preferred Stock and is qualified in its entirety by the Series E Certificate of Designation. Please refer to the Series E Certificate of Designation for more information on the preferences, rights and limitations of Series E Preferred Stock.

*Liquidation.* Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series E Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, of the greater of (i) an amount equal to \$1,000 per share plus accrued and unpaid dividends thereon or (ii) such amount as would be payable if the Series E Preferred Stock had been converted to Common Stock. Amounts payable to the Series E Preferred Stock upon any dissolution, liquidation or winding up are payable prior and in preference to the payment of any amounts to the holders of Series A-1 Preferred Stock, Series B Preferred Stock or Common Stock.

*Dividends.* Holders of the Series E Preferred Stock are entitled to receive accruing dividends of 8% per annum, which dividends are cumulative and annually compounded. The holders of Series E Preferred Stock will be entitled to receive an amount equal (on an "as converted to Common Stock" basis) to and in the same form as dividends actually paid on shares of our Common Stock when, as and if such dividends are paid on shares of our Common Stock. We have an option to pay the Series E Preferred Stock's accruing dividend in additional shares of Series E Preferred Stock.

*Conversion.* Each share of Series E Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into that number of shares of Common Stock determined by dividing \$1,000 by the conversion price of \$10.725 (subject to adjustment as described below). This right to convert is limited by the beneficial ownership limitation described below.

*Beneficial Ownership Limitation.* A holder shall have no right to convert any portion of Series E Preferred Stock, to the extent that, after giving effect to such conversion, such holder, together with such holder's affiliates, and any persons acting as a group together with such holder or any such affiliate, would beneficially own in excess of 9.99% of the number of shares of the Common Stock outstanding immediately. Notwithstanding the foregoing, by written notice to the Corporation, any holder may, from time to time, reset the beneficial ownership limitation percentage applicable to such Holder to a higher or lower percentage; provided, however, that in no case will the beneficial ownership limitation exceed 19.99% unless the required Nasdaq Stockholder Approval has been obtained. Any increase in the Beneficial Ownership Limitation will not be effective until the sixty-first (61st) day after such notice is delivered to the Company. Any decrease in the beneficial ownership limitation will be effective upon delivery to the Company.

*Forced Conversion.* If the Company's average market capitalization is at least \$100,000,000 both (i) on a given date, based on the closing price and number of shares outstanding and (ii) for the prior quarter, based on the volume-weighted average closing price during such quarter and number of shares outstanding on the last day of such quarter, the Series E Preferred Stock is subject to mandatory conversion (subject to the beneficial ownership limitation below).

*Optional Redemption.* Subject to the terms of the certificate of designation, the Company holds an option to redeem some or all the Series E Preferred Stock at the stated value of the Series E Preferred Stock subject to the redemption, upon 30 days prior written notice to the holder of the Series E Preferred Stock. The Series E Preferred Stock would be redeemed by the Company for cash.

*Stock Dividends and Stock Splits.* If we pay a stock dividend or otherwise make a distribution payable in shares of Common Stock on shares of Common Stock or any other Common Stock equivalents, subdivide or combine outstanding Common Stock, or reclassify Common Stock, the conversion price will be adjusted by multiplying the then conversion price by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

*Voting Rights, etc.* The Series E Preferred Stock is entitled to vote on any matter presented to the Company's stockholders, on an as-converted basis, provided that in no event shall the shares of Series E Preferred Stock be entitled to vote, on an as-converted basis and in the aggregate, more than 19.99% of the voting power of the Company's outstanding shares of capital stock entitled to vote generally in the election of directors, unless approved by the Company's stockholders in accordance with Nasdaq Listing Rule 5635(b). In addition, the Series E Preferred Stock is entitled to a separate class vote on (1) the liquidation, dissolution, winding up or other changes in control of the Company, (2) amendments of the Company's certificate of incorporation or bylaws in a manner adverse to the Series E Preferred Stock, (3) amendments to the Series E Certificate of Designation, (4) the issuance of additional Series E Preferred Stock to any person other than the original holders, (5) the issuance of any shares in a new class or series of capital stock unless such new class or series of capital ranks junior to the Series E Preferred Stock, (6) the reclassification, alteration or amendment of any existing security with respect to dividend rights and rights in a liquidation of the Company that would render such security senior to the Series E Preferred Stock and (7) the repurchase or redemption of, or the payment of any dividend or distribution to, other classes or series of the Company's capital stock, subject to certain exceptions.

*Fractional Shares.* No fractional shares of Common Stock will be issued upon conversion of Series E Preferred Stock. Rather, we shall pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the conversion price.

The transfer agent for our Series E Preferred Stock is Equiniti Trust Company, LLC.

#### **Series F Convertible Preferred Stock**

The preferences and rights of the Series F Preferred Stock are as set forth in a Certificate of Designation of Preferences, Rights and Limitations of Series F Convertible Preferred Stock, as amended, or the Series F Certificate of Designation, which is included as Exhibit 3.15 to the registration statement of which this prospectus forms a part. The following is a summary of the material terms of our Series F Preferred Stock and is qualified in its entirety by the Series F Certificate of Designation. Please refer to the Series F Certificate of Designation for more information on the preferences, rights and limitations of Series F Preferred Stock.

*Liquidation.* Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series F Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, of the greater of (i) an amount equal to \$1,000 per share plus accrued and unpaid dividends thereon or (ii) such amount as would be payable if the Series F Preferred Stock had been converted to Common Stock. Amounts payable to the Series F Preferred Stock upon any dissolution, liquidation or winding up are payable prior and in preference to the payment of any amounts to the holders of Series A-1 Preferred Stock, Series B Preferred Stock or Common Stock.

*Dividends.* Holders of the Series F Preferred Stock are entitled to receive accruing dividends of 5% per annum, which is compounded annually and is payable in cash or additional shares of Series F Preferred Stock at the election of the Company, until the third anniversary of the issuance date. Following the third anniversary of the issuance date, the Series F Preferred Stock will carry an 8% per year cumulative dividend, which is compounded annually and is payable in cash or additional shares of Series F Preferred Stock at the election of the holders. The holders of Series F Preferred Stock will be entitled to receive an amount equal (on an "as converted to Common Stock" basis) to and in the same form as dividends actually paid on shares of our Common Stock when, as and if such dividends are paid on shares of our Common Stock. Dividends will accrue through the date immediately prior to such date that the Milestones (as defined below) have been achieved.

*Conversion.* Each share of Series F Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into that number of shares of Common Stock determined by dividing \$1,000 by the conversion price of \$3.664 (subject to adjustment as described below). This right to convert is limited by the beneficial ownership limitation described below.

*Beneficial Ownership Limitation.* The beneficial ownership limitation is 49.9% of the number of shares of the Common Stock and voting power outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to such conversion notice if and after the Nasdaq Stockholder Approval has been obtained.

*Stock Dividends and Stock Splits.* If we pay a stock dividend or otherwise make a distribution payable in shares of Common Stock on shares of Common Stock or any other Common Stock equivalents, subdivide or combine outstanding Common Stock, or reclassify Common Stock, the conversion price will be adjusted by multiplying the then conversion price by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

*Voting Rights, etc.* The holders of the Series F Preferred Stock are entitled to vote on any matter presented to the Company's stockholders, on an as-converted basis, provided that in no event shall any holder of the shares of the Series F Preferred Stock be entitled to vote, on an as-converted basis and in the aggregate, more than 49.9% of the voting power of the Company's outstanding shares of capital stock. In addition, the Company will not take any of the following actions without the affirmative vote of the holders of a majority of the outstanding shares of the Series F Preferred Stock: (1) the liquidation, dissolution, winding up or other changes in control of the Company, (2) amendments of the Company's certificate of incorporation or bylaws in a manner adverse to the Series F Preferred Stock, (3) amendments of the powers, preferences or rights given to the Series F Preferred Stock or amendments to the Series F Certificate of Designation, (4) the increase of the number of authorized shares of the Series F Preferred Stock or any additional class or series of capital stock of the Company unless the same ranks junior to the Series F Preferred Stock with respect to its rights, preferences and privileges, (5) the issuance of any shares of a new class or series of capital stock unless such new class or series of capital ranks junior to the Series F Preferred Stock, (6) the reclassification, alteration or amendment of any existing security with respect to dividend rights and rights in a liquidation of the Company that would render such security senior to the Series F Preferred Stock and (7) the repurchase or redemption of, or the payment of any dividend or distribution to, other classes or series of the Company's capital stock, subject to certain exceptions.

*Fractional Shares.* No fractional shares of Common Stock will be issued upon conversion of Series F Preferred Stock. Rather, we shall pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the conversion price.

The transfer agent for our Series F Preferred Stock is Equiniti Trust Company, LLC.

#### **Series H Convertible Preferred Stock**

The preferences and rights of the Series H Preferred Stock are as set forth in a Certificate of Designation of Preferences, Rights and Limitations of Series H Convertible Preferred Stock, as amended, or the Series H Certificate of Designation, t. The following is a summary of the material terms of our Series H Preferred Stock and is qualified in its entirety by the Series H Certificate of Designation. Please refer to the Series H Certificate of Designation filed as Exhibit 3.1 on our Current Report on Form 8-K filed on May 16, 2024 for more information on the preferences, rights and limitations of Series H Preferred Stock.

*Liquidation.* Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series H Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, of the greater of (i) an amount equal to \$1,000 per share plus accrued and unpaid dividends thereon or (ii) such amount as would be payable if the Series H Preferred Stock had been converted to Common Stock. Amounts payable to the Series H Preferred Stock upon any dissolution, liquidation or winding up are payable prior and in preference to the payment of any amounts to the holders of Series A-1 Preferred Stock, Series B Preferred Stock, Series E Preferred Stock, Series F Preferred Stock or Common Stock.

*Dividends.* Holders of the Series H Preferred Stock are entitled to receive accruing dividends of 8% per annum, which dividends are cumulative and annually compounded. The holders of Series H Preferred Stock will be entitled to receive an amount equal (on an "as converted to Common Stock" basis) to and in the same form as dividends actually paid on shares of our Common Stock when, as and if such dividends are paid on shares of our Common Stock. We have an option to pay the Series H Preferred Stock's accruing dividend in additional shares of Series H Preferred Stock.

*Conversion.* Each share of Series H Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into that number of shares of Common Stock determined by dividing \$1,000 by the conversion price of \$10.725 (subject to adjustment as described below). This right to convert is limited by the beneficial ownership limitation described below.

***Beneficial Ownership Limitation.*** A holder shall have no right to convert any portion of Series H Preferred Stock, to the extent that, after giving effect to such conversion, such holder, together with such holder's affiliates, and any persons acting as a group together with such holder or any such affiliate, would beneficially own in excess of 9.99% of the number of shares of the Common Stock outstanding immediately. Notwithstanding the foregoing, by written notice to the Corporation, any holder may, from time to time, reset the beneficial ownership limitation percentage applicable to such Holder to a higher or lower percentage; provided, however, that in no case will the beneficial ownership limitation exceed 19.99% unless the required Nasdaq Stockholder Approval has been obtained. Any increase in the Beneficial Ownership Limitation will not be effective until the sixty-first (61st) day after such notice is delivered to the Company. Any decrease in the beneficial ownership limitation will be effective upon delivery to the Company.

***Forced Conversion.*** If the Company's average market capitalization is at least \$100,000,000 both (i) on a given date, based on the closing price and number of shares outstanding and (ii) for the prior quarter, based on the volume-weighted average closing price during such quarter and number of shares outstanding on the last day of such quarter, the Series H Preferred Stock is subject to mandatory conversion (subject to the beneficial ownership limitation below).

***Optional Redemption.*** Subject to the terms of the certificate of designation, the Company holds an option to redeem some or all the Series H Preferred Stock at the stated value of the Series H Preferred Stock subject to the redemption, upon 30 days prior written notice to the holder of the Series H Preferred Stock. The Series H Preferred Stock would be redeemed by the Company for cash.

***Stock Dividends and Stock Splits.*** If we pay a stock dividend or otherwise make a distribution payable in shares of Common Stock on shares of Common Stock or any other Common Stock equivalents, subdivide or combine outstanding Common Stock, or reclassify Common Stock, the conversion price will be adjusted by multiplying the then conversion price by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

***Voting Rights, etc.*** The Series H Preferred Stock is entitled to vote on any matter presented to the Company's stockholders, on an as-converted basis, provided that in no event shall the shares of Series H Preferred Stock be entitled to vote, on an as-converted basis and in the aggregate, more than 19.99% of the voting power of the Company's outstanding shares of capital stock entitled to vote generally in the election of directors, unless approved by the Company's stockholders in accordance with Nasdaq Listing Rule 5635(b). In addition, the Series H Preferred Stock is entitled to a separate class vote on (1) the liquidation, dissolution, winding up or other changes in control of the Company, (2) amendments of the Company's certificate of incorporation or bylaws in a manner adverse to the Series H Preferred Stock, (3) amendments to the Series H Certificate of Designation, (4) the issuance of additional Series H Preferred Stock to any person other than the original holders, (5) the issuance of any shares in a new class or series of capital stock unless such new class or series of capital ranks junior to the Series H Preferred Stock, (6) the reclassification, alteration or amendment of any existing security with respect to dividend rights and rights in a liquidation of the Company that would render such security senior to the Series H Preferred Stock and (7) the repurchase or redemption of, or the payment of any dividend or distribution to, other classes or series of the Company's capital stock, subject to certain exceptions.

***Fractional Shares.*** No fractional shares of Common Stock will be issued upon conversion of Series H Preferred Stock. Rather, we shall pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the conversion price.

The transfer agent for our Series H Preferred Stock is Equiniti Trust Company, LLC.

## Warrants and Preferred Investment Options

As of May 17, 2024, we had outstanding warrants and preferred investment options to purchase Common Stock as follows:

	Total Outstanding and Exercisable	Underlying Shares of Common Stock	Exercise Price per Share	Expiration Date
Series 1 Warrants issued in the February 2018 Series B financing	8,979,000	2,993	\$ 6,000.00	February 2025
Series 2 Warrants issued in the February 2018 Series B financing	8,709,500	2,903	\$ 6,000.00	February 2025
Placement agent warrants issued in the January 2022 financing	1,330,000	4,433	\$ 150.00	January 2027
Warrants issued in the January 2022 financing	16,150,000	53,833	\$ 144.00	July 2027
Series A Preferred Investment Options issued in August 2022 financing	2,853,883	190,259	\$ 22.53	February 2028
Series B Preferred Investment Options issued in August 2022 financing	2,853,883	190,259	\$ 22.53	August 2024
Placement agent Preferred Investment Options issued in the August 2022 financing	171,233	11,416	\$ 32.85	August 2027
Advisor Warrants issued in the March 2024 financing	40,938	40,938	\$ 3.664	March 2029

### Series 1 and Series 2 Warrants

The material terms and provisions of the Series 1 and Series 2 Warrants are summarized below. This summary of some provisions of the Series 1 and Series 2 Warrants is not complete and is qualified in its entirety by the form of warrant filed as Exhibit 4.2 to the registration statement of which this prospectus is a part. Pursuant to a warrant agency agreement between us and Equiniti Trust Company, LLC, as warrant agent, the warrants were issued in book-entry form and were initially represented only by one or more global warrants deposited with the warrant agent, as custodian on behalf of The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC.

**Exercise.** The Series 1 Warrants are immediately exercisable and expire on the seventh anniversary of the date of issuance. The Series 2 Warrants are immediately exercisable and expire on the earlier of (i) the seventh anniversary of the date of issuance or (ii) the 60th calendar day following the receipt and announcement of FDA clearance of our Pantheris below-the-knee device (or the same or similar product with a different name); provided, however, if at any time during such 60-day period the volume weighted average price for any trading day is less than the then effective exercise price, the termination date shall be extended to the seven-year anniversary of the initial exercise date. Each whole Series 1 or Series 2 Warrant is exercisable to purchase one share of our Common Stock at an exercise price of \$6,000.00 per share at any time prior to expiration. The Series 1 and Series 2 Warrants are each governed by the terms of a global warrant certificate deposited with DTC. The holder of a Series 1 or Series 2 Warrant will not be deemed a holder of our underlying Common Stock until such warrant is exercised, except as set forth in such warrant. The holders Series 1 and Series 2 Warrants must pay the exercise price in cash upon exercise of the Series 1 and Series 2 Warrants, unless such holders are utilizing the cashless exercise provision of the Series 1 and Series 2 Warrants, which is only available in certain circumstances such as if the underlying shares are not registered with the SEC pursuant to an effective registration statement.

**Beneficial Ownership Limitation.** Subject to limited exceptions, a holder of Series 1 or Series 2 Warrants will not have the right to exercise any portion of its Series 1 or Series 2 Warrants if the holder (together with such holder's affiliates, and any persons acting as a group together with such holder or any of such holder's affiliates) would beneficially own a number of shares of Common Stock in excess of 4.99% (or, at the election of the holder, 9.99%) of the shares of our Common Stock then outstanding after giving effect to such exercise; provided, however, that upon notice to the Company, the holder may increase or decrease the beneficial ownership limitation, provided that in no event shall the beneficial ownership limitation exceed 9.99% and any increase in the beneficial ownership limitation will not be effective until 61 days following notice of such increase from the holder to us.

*Stock Dividends and Stock Splits.* The exercise price and the number of shares issuable upon exercise of the Series 1 and Series 2 Warrants is subject to appropriate adjustment in the event of recapitalization events, stock dividends, stock splits, stock combinations, reclassifications, reorganizations or similar events affecting our Common Stock.

*Fundamental Transaction.* In the event we consummate a merger or consolidation with or into another person or other reorganization event in which our Common Stock is converted or exchanged for securities, cash or other property, or we sell, lease, license, assign, transfer, convey or otherwise dispose of all or substantially all of our assets or we or another person acquire 50% or more of our outstanding shares of Common Stock, then following such event, the holders of the Series 1 and Series 2 Warrants will be entitled to receive upon exercise of the Series 1 and Series 2 Warrants the same kind and amount of securities, cash or property which the holders would have received had they exercised the Series 1 and Series 2 Warrants immediately prior to such fundamental transaction. Any successor to us or surviving entity shall assume the obligations under the Series 1 and Series 2 Warrants. Further, as more fully described in the Series 1 and Series 2 Warrants, in the event of certain fundamental transactions, the holders of the Series 1 and Series 2 Warrants will be entitled to receive consideration in an amount equal to the Black Scholes value of the Series 1 or Series 2 Warrants on the date of consummation of such transaction. Upon the holder's exercise of a Series 1 or Series 2 Warrant, we will issue the shares of Common Stock issuable upon exercise of the Series 1 or Series 2 Warrant within the earlier of two trading days following our receipt of a notice of exercise or the standard settlement period for the market on which the Common Stock is then listed, provided that payment of the exercise price has been made (unless exercised via the "cashless" exercise provision). Prior to the exercise of any Series 1 or Series 2 Warrants, holders of the Series 1 or Series 2 Warrants will not have any of the rights of holders of the Common Stock purchasable upon exercise, including the right to vote, except as set forth therein. The Series 1 and Series 2 Warrants are not listed on any securities exchange, and we do not intend to apply for listing of the Series 1 and Series 2 Warrants on any securities exchange or other trading system.

#### **Warrants issued in January 2022**

The material terms and provisions of the Common Stock purchase warrants (the "January 2022 Warrants") and the placement agent warrants (the "January 2022 Placement Agent Warrants") issued in January 2022 are summarized below. This summary of the provisions of the January 2022 Warrants and January 2022 Placement Agent Warrants is not complete and is qualified in its entirety by the form of January 2022 Warrant and January 2022 Placement Agent Warrant filed as Exhibit 4.5 and 4.6, respectively, to the registration statement of which this prospectus is a part. The January 2022 Placement Agent Warrants have the same terms as the January 2022 Warrants, except that the January 2022 Placement Agent Warrants have an exercise price of \$150.00 and will expire on January 12, 2027.

*Exercise.* Each January 2022 Warrant became exercisable on July 14, 2022 and has an exercise price of \$144.00 per share. Each January 2022 Warrant may be exercised, in cash or, if no effective registration statement is available registering the issuance of the shares of Common Stock underlying the January 2022 Warrants, by a cashless exercise, at any time beginning on July 14, 2022 (the "Initial Exercise Date"), and from time to time thereafter through and including the fifth anniversary of the Initial Exercise Date. The January 2022 Warrants will be exercisable in whole or in part by delivering to the company a completed instruction form for exercise and complying with the requirements for exercise set forth in the January 2022 Warrant. Payment of the exercise price may be made in cash or, if no effective registration statement is available registering the issuance of the shares of Common Stock underlying the January 2022 Warrants, pursuant to a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of Common Stock determined according to the formula set forth in the January 2022 Warrant.

*No Fractional Shares.* No fractional shares or scrip representing fractional shares shall be issued upon the exercise of the January 2022 Warrant. As to any fraction of a share which the holder would otherwise be entitled to purchase upon such exercise, we may, at our election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the exercise price or round up to the next whole share.

*Failure to Timely Deliver Shares.* If we fail to deliver to the holder a certificate representing shares issuable upon exercise of a January 2022 Warrant or to credit the holder's balance account with The Depository Trust Company for such number of shares of Common Stock to which the holder is entitled upon the holder's exercise of the January 2022 Warrant, in each case, by the delivery date set forth in the January 2022 Warrant, and if after such date the holder is required by its broker to purchase (in an open market transaction or otherwise) or the holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the holder of the warrant shares which the holder anticipated receiving upon such exercise, or a Buy-In, then we shall (A) pay in cash to the holder the amount, if any, by which (x) the holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased exceeds (y) the amount obtained by multiplying (1) the number of warrant shares that we were required to deliver to the holder in connection with the exercise at issue, times (2) the price at which the sell order giving rise to such purchase obligation was executed, and (B) at the option of the holder, either reinstate the portion of the applicable warrant and equivalent number of warrant shares for which such exercise was not honored (in which case such exercise shall be deemed rescinded) or deliver to the holder the number of shares of Common Stock that would have been issued had we timely complied with our exercise and delivery obligations. In addition, if we fail to deliver to the holder any Common Stock pursuant to a validly-exercised January 2022 Warrant, we will be required to pay liquidated damages in the amount of \$10 per trading day (increasing to \$20 per trading day on the third trading day after the warrant share delivery date) for each \$1,000 of the shares of Common Stock exercised but not delivered until such time the shares of Common Stock are delivered or the holder rescinds such exercise.

*Exercise Limitation.* In general, a holder will not have the right to exercise any portion of a January 2022 Warrant if the holder (together with its Attribution Parties (as defined in the January 2022 Warrant)) would beneficially own in excess of 4.99% or 9.99%, at the election of the holder, of the number of shares of our Common Stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the warrant. However, any holder may increase or decrease such percentage to any other percentage not in excess of 9.99% upon notice to us, provided that any increase in this limitation will not be effective until 61 days after such notice from the holder to us and such increase or decrease will apply only to the holder providing such notice.

*Adjustment for Stock Splits.* The exercise price and the number of shares of Common Stock purchasable upon the exercise of the January 2022 Warrants are subject to adjustment upon the occurrence of specific events, including stock dividends, stock splits, and combinations of our Common Stock.

*Dividends or Distributions.* If we declare or make any dividend or other distribution of our assets (or rights to acquire our assets) to holders of shares of our Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property, options, evidence of indebtedness or any other assets by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) at any time after the issuance of the January 2022 Warrants, then, in each such case, the holders of the January 2022 Warrants shall be entitled to participate in such distribution to the same extent that the holders would have participated therein if the holders had held the number of shares of Common Stock acquirable upon complete exercise of the January 2022 Warrants.

*Purchase Rights.* If we grant, issue or sell any shares of our Common Stock or securities exercisable for, exchangeable for or convertible into our Common Stock, or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of our Common Stock, referred to as Purchase Rights, then each holder of the January 2022 Warrants will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the holder could have acquired if the holder had held the number of shares of Common Stock acquirable upon complete exercise of the January 2022 Warrant immediately before the record date, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined, for the grant, issue or sale of such Purchase Rights.

*Fundamental Transaction.* If a Fundamental Transaction (as defined in the January 2022 Warrants and described below) occurs, the holder will thereafter have the right to receive upon an exercise of the January 2022 Warrants at any time after the consummation of the Fundamental Transaction but prior to the applicable expiration date of the January 2022 Warrants, the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it is the surviving corporation, and any additional consideration (the "Alternate Consideration") receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which the January 2022 Warrants are exercisable immediately prior to such Fundamental Transaction on the exercise of the January 2022 Warrants. For purposes of any such exercise, the determination of the Exercise Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Company shall apportion the Exercise Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. Additionally, the Company will cause any successor entity to assume all of our obligations under the January 2022 Warrants with the same effect as if such successor entity had been named in the warrant itself. If holders of our Common Stock are given a choice as to the securities, cash or property to be received in a Fundamental Transaction, then the holder shall be given the same choice as to the consideration it receives upon any exercise of the January 2022 Warrants, following such Fundamental Transaction. These provisions apply similarly and equally to successive Fundamental Transactions and other corporate events described in the January 2022 Warrants and will be applied without regard to any limitations on the exercise of the warrant. In the event of a Fundamental Transaction other than one in which a successor entity that is a publicly traded corporation whose stock is quoted or listed on a trading market assumes the January 2022 Warrant such that the January 2022 Warrant shall be exercisable for the publicly traded Common Stock of such successor entity and only if such Fundamental Transaction is within the Company's control and the consideration is in all stock in the successor entity, then, at the request of the holder, we or the successor entity shall purchase the unexercised portion of the January 2022 Warrants from the holder by paying to the holder, on or prior to the second trading day after such request (or, if later, on the effective date of the Fundamental Transaction), an amount, in the same type or form of consideration that is being paid to holders of Common Stock in such Fundamental Transaction, equal to the Black-Scholes Value (as defined below) of the remaining unexercised portion of the January 2022 Warrants on the date of such Fundamental Transaction, subject to certain limitations in the event of a Fundamental Transaction not within our control.

*Transferability.* Subject to applicable laws, the January 2022 Warrants may be offered for sale, sold, transferred or assigned. There is currently no trading market for the January 2022 Warrants and a trading market is not expected to develop.

*Rights as a Shareholder.* Except as otherwise provided in the January 2022 Warrants or by virtue of a holder's ownership of shares of our Common Stock, the holders of the January 2022 Warrants do not have the rights or privileges of holders of our Common Stock, including any voting rights, unless and until they exercise their warrants.

*Amendments.* Each January 2022 Warrant may be amended with the written consent of the holder of such January 2022 Warrant and us.

*Listing.* There is no established public trading market for the January 2022 Warrants, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the January 2022 Warrants on any national securities exchange.

*Definitions Relating to the January 2022 Warrants*

"Black Scholes Value" means the value of the January 2022 Warrants based on the Black-Scholes Option Pricing Model obtained from the "OV" function on Bloomberg determined as of the day of consummation of the applicable Fundamental Transaction for pricing purposes and reflecting (A) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the time between the date of the public announcement of the applicable Fundamental Transaction and the termination date of the January 2022 Warrants, (B) an expected volatility equal to the greater of 100% and the 100 day volatility obtained from the HVT function on Bloomberg (determined utilizing a 365 day annualization factor) as of the trading day immediately following the public announcement of the applicable Fundamental Transaction, (C) the underlying price per share used in such calculation shall be the sum of the price per share being offered in cash, if any, plus the value of any noncash consideration, if any, being offered in such Fundamental Transaction, (D) a remaining option time equal to the time between the date of the public announcement of the applicable Fundamental Transaction and the termination date of the January 2022 Warrants, and a zero cost of borrow.

"Fundamental Transaction" means (i) we, directly or indirectly, in one or more related transactions effect any merger or consolidation with or into another person, (ii) we or any of our subsidiaries, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of our assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by us or another person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) we, directly or indirectly, in one or more related transactions effect any reclassification, reorganization or recapitalization of our Common Stock or any compulsory share exchange pursuant to which our Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) we, directly or indirectly, in one or more related transactions consummate a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off, merger or scheme of arrangement) with another person or group of persons whereby such other person or group acquires more than 50% of the outstanding shares of our Common Stock (not including any shares of Common Stock held by the other person or other persons making or party to, or associated or affiliated with the other persons making or party to, such stock or share purchase agreement or other business combination).

#### **Warrants issued in March 2024**

On March 7, 2024, the Company issued warrants to financial advisors to purchase up to an aggregate of 40,938 shares of the Company's Common Stock (the "Advisor Warrants") at an exercise price of \$3.664 per share which were immediately exercisable. The Advisor Warrants will expire five years following the time they become exercisable, or March 5, 2029.

The exercise price and the number of shares of Common Stock issuable upon exercise of each Advisor Warrants are subject to appropriate adjustments in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting the Common Stock. In addition, in certain circumstances, upon a fundamental transaction, a holder of Advisor Warrants will be entitled to receive, upon exercise, the kind and amount of securities, cash or other property that such holder would have received had they exercised the Advisor Warrants prior to the fundamental transaction.

The Advisor Warrants can be exercised at the option of the holders at any time after they become exercisable provided that shares cannot be exercised into Common Stock if the applicable holder would beneficially own in excess of 4.99% of the Company's outstanding Common Stock immediately after giving effect to the exercise. A holder of the Advisor Warrants may, upon notice to the Company, increase or decrease such beneficial ownership limitation, but not in excess of 9.99%.

#### **Equity Awards**

As of May 17, 2024, there were 115,792 shares of our Common Stock issuable upon exercise or vesting of outstanding awards under our 2015 Equity Incentive Plan.

#### **Exclusive Jurisdiction**

Unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware is the sole and exclusive forum for:

- any derivative action or proceeding brought on behalf of us;
- any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders;
- any action asserting a claim against us arising pursuant to any provision of the DGCL or our amended and restated certificate of incorporation or amended and restated bylaws; or
- any action asserting a claim against us governed by the internal affairs doctrine.

The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with any action, a court could find the choice of forum provisions contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in such action.

## Anti-Takeover Effects of Delaware Law and Our Charter and Bylaws

Certain provisions of Delaware law, our Charter, and our Bylaws may have the effect of delaying, deferring or discouraging another person from acquiring control of our company. These provisions, which are summarized below, may have the effect of discouraging takeover bids. They are also designed, in part, to encourage persons seeking to acquire control of us to negotiate first with our board of directors. We believe that the benefits of increased protection of our potential ability to negotiate with an unfriendly or unsolicited acquirer outweigh the disadvantages of discouraging a proposal to acquire us because negotiation of these proposals could result in an improvement of their terms.

*Delaware Law.* We are governed by the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a public Delaware corporation from engaging in a “business combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. A “business combination” includes mergers, asset sales or other transactions resulting in a financial benefit to the stockholder. An “interested stockholder” is a person who, together with affiliates and associates, owns, or within three years of the date on which it is sought to be determined whether such person is an “interested stockholder,” did own, 15% or more of the corporation’s outstanding voting stock. These provisions may have the effect of delaying, deferring or preventing a change in our control.

*Charter and Bylaw Provisions.* Our Charter and our Bylaws include a number of provisions that could deter hostile takeovers or delay or prevent changes in control of our management team, including the following:

- *Board of directors vacancies.* Our Charter and Bylaws authorize only our board of directors to fill vacant directorships, including newly created seats. In addition, the number of directors constituting our board of directors is permitted to be set only by a resolution adopted by our board of directors. These provisions prevent a stockholder from increasing the size of our board of directors and then gaining control of our board of directors by filling the resulting vacancies with its own nominees. This makes it more difficult to change the composition of our board of directors but promotes continuity of management.
- *Classified board.* Our Charter and Bylaws provide that our board is classified into three classes of directors. A third party may be discouraged from making a tender offer or otherwise attempting to obtain control of us as it is more difficult and time consuming for stockholders to replace a majority of the directors on a classified board of directors.
- *Stockholder action; special meeting of stockholders.* Our Charter provides that our stockholders may not take action by written consent, but may only take action at annual or special meetings of our stockholders. As a result, a holder controlling a majority of our capital stock may not be able to amend our Bylaws or remove directors without holding a meeting of our stockholders called in accordance with our Bylaws. Our Bylaws further provide that special meetings of our stockholders may be called only by our board of directors, the Chairman of our Board of Directors, our Chief Executive Officer or our President, thus prohibiting a stockholder from calling a special meeting. These provisions might delay the ability of our stockholders to force consideration of a proposal or for stockholders controlling a majority of our capital stock to take any action, including the removal of directors.
- *Advance notice requirements for stockholder proposals and director nominations.* Our Bylaws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. Our amended and restated bylaws also specify certain requirements regarding the form and content of a stockholder’s notice. These provisions might preclude our stockholders from bringing matters before our annual meeting of stockholders or from making nominations for directors at our annual meeting of stockholders if the proper procedures are not followed. We expect that these provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer’s own slate of directors or otherwise attempting to obtain control of our company.
- *No cumulative voting.* The Delaware General Corporation Law provides that stockholders are not entitled to the right to cumulate votes in the election of directors unless a corporation’s certificate of incorporation provides otherwise. Our Charter does not provide for cumulative voting.

- *Directors removed only for cause*. Our Charter provides that stockholders may remove directors only for cause.
- *Amendment of charter provisions*. Any amendment of the above provisions in our Charter would require approval by holders of at least 66 and 2/3% of the voting power of our then outstanding voting securities.
- *Issuance of undesignated preferred stock*. Our board of directors will have the authority, without further action by the stockholders, to issue up to 5,000,000 shares of undesignated preferred stock with rights and preferences, including voting rights, designated from time to time by our board of directors. The existence of authorized but unissued shares of preferred stock would enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or other means.

#### **Transfer Agent and Registrar**

The transfer agent and registrar for our Common Stock is Equiniti Trust Company, LLC. The transfer agent and registrar's address is 6201 15th Avenue, Brooklyn, NY 11219. Our shares of Common Stock are issued in uncertificated form only, subject to limited circumstances.

#### **Market Listing**

Our Common Stock is listed on Nasdaq under the symbol "AVGR."

## DESCRIPTION OF SECURITIES WE ARE OFFERING

We are offering up to      shares of our Common Stock, or Pre-Funded Warrants in lieu thereof, together with Common Warrants to purchase up to      shares of Common Stock.

### Common Stock

See the description above under "Description of our Capital Stock - Common Stock."

### Common Warrants to be Issued in this Offering

The material terms and provisions of the Common Warrants are summarized below. This summary of some provisions of the Common Warrants is not complete and is qualified in its entirety by the form of Common Warrants, to be filed as an exhibit to the registration statement of which this prospectus is a part. Prospective investors should carefully review the terms and provisions of the form of Common Warrant for a complete description of the terms and conditions of the Common Warrant.

*Duration, Exercise Price and Form.* Each Common Warrant offered hereby will have an exercise price equal to \$ per share. The Common Warrants will be immediately exercisable and may be exercised until the anniversary of the original issuance date. The exercise price and number of shares of Common Stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting our Common Stock and the exercise price. The Common Warrants will be issued separately from the Common Stock or the Pre-Funded Warrants, as the case may be, and may be transferred separately immediately thereafter. The Common Warrants will be issued in certificated form only.

*No Fractional Shares.* No fractional shares of Common Stock will be issued upon the exercise of Common Warrants. Rather, the number of shares of Common Stock to be issued will, at our election, either be rounded up to the nearest whole number or we will pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the exercise price.

*Exercise Limitation.* The Common Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of our Common Stock purchased upon such exercise (except in the case of a cashless exercise as discussed below). A holder (together with its affiliates) may not exercise any portion of such holder's Common Warrants to the extent that the holder would own more than 4.99% of the outstanding Common Stock (or at the election of a holder prior to the date of issuance, 9.99%) immediately after exercise, except that upon at least 61 days' prior notice from the holder to us, the holder may increase the amount of ownership of outstanding stock after exercising the holder's warrants up to 9.99% of the number of shares of our Common Stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the Common Warrants.

*Cashless Exercise.* If at the time of exercise there is no effective registration statement registering, or the prospectus contained therein is not available for the issuance of the underlying shares to the holder, in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of Common Stock determined according to a formula set forth in the Common Warrants.

*Fundamental Transactions.* In the event of a fundamental transaction, as described in the Common Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise and generally including any reorganization, recapitalization or reclassification of our Common Stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of more than 50% of our outstanding Common Stock, or any person or group becoming the beneficial owner of 50% of the voting power represented by our outstanding Common Stock, the holders of the Common Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise will be entitled to receive upon exercise of the Common Warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the Common Warrants immediately prior to such fundamental transaction. In addition, in certain circumstances, upon a fundamental transaction, the holder of a Common Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise will have the right to require us to repurchase its Common Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise at the Black-Scholes value; provided, however, that, if the fundamental transaction is not within our control, including not approved by our Board, then the holder will only be entitled to receive the same type or form of consideration (and in the same proportion), at the Black-Scholes value of the unexercised portion of the Common Warrant that is being offered and paid to the holders of our Common Stock in connection with the fundamental transaction.

*Transferability.* Subject to applicable laws, a Common Warrant may be transferred at the option of the holder upon surrender of the Common Warrants to us together with the appropriate instruments of transfer.

*Rights as a Stockholder.* Except as otherwise provided in the Common Warrants or by virtue of the holders' ownership of shares of Common Stock, the holders of the Common Warrants do not have the rights or privileges of holders of our shares of Common Stock, including any voting rights, until such Common Warrant holders exercise their Common Warrants.

*Waivers and Amendments.* Except as otherwise provided in the Common Warrants or by virtue of the holders' ownership of shares of Common Stock, the holders of the Common Warrants do not have the rights or privileges of holders of our shares of Common Stock, including any voting rights, until such Common Warrant holders exercise their Common Warrants.

*Trading Market and Listing.* There is no established trading market for the Common Warrants, and we do not expect a market to develop. We do not intend to apply for a listing of the Common Warrants on any securities exchange or other nationally recognized trading system. Without an active trading market, the liquidity of the Common Warrants will be limited. The Common Stock issuable upon exercise of the Common Warrants is currently listed on Nasdaq.

#### **Pre-Funded Warrants to be Issued in this Offering**

The following summary of certain terms and provisions of the Pre-Funded Warrants that are being offered hereby is not complete and is subject to, and qualified in its entirety by, the provisions of the Pre-Funded Warrants, the form of which will be filed as an exhibit to the registration statement of which this prospectus forms a part. Prospective investors should carefully review the terms and provisions of the form of Pre-Funded Warrants for a complete description of the terms and conditions of the Pre-Funded Warrants.

*Duration, Exercise Price and Form.* The Pre-Funded Warrants offered hereby will have an exercise price of \$0.001 per share. The Pre-Funded Warrants will be immediately exercisable and may be exercised at any time after their original issuance until such Pre-Funded Warrants are exercised in full. The exercise price and number of shares of Common Stock issuable upon exercise are subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting our shares of Common Stock. The Pre-Funded Warrants and the Common Warrants are immediately separable and will be issued separately in this offering, but must be purchased together in this offering. The Pre-Funded Warrants will be issued in certificated form only.

*Exercisability.* The Pre-Funded Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of our Common Stock purchased upon such exercise (except in the case of a cashless exercise as discussed below). A holder (together with its affiliates) may not exercise any portion of the Pre-Funded Warrants to the extent that the holder would own more than 4.99% (or at the election of a holder prior to the date of issuance, 9.99%) of the outstanding Common Stock immediately after exercise; provided, however, that upon 61 days' notice to us, the holder may increase or decrease such beneficial ownership limitation, provided that in no event shall the beneficial ownership limitation exceed 9.99% and any increase in the beneficial ownership limitation will not be effective until 61 days following notice of such increase from the holder to us.

***Cashless Exercise.*** At the time a holder exercises its Pre-Funded Warrants, in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of Common Stock determined according to a formula set forth in the Pre-Funded Warrants.

***Fundamental Transactions.*** In the event of a fundamental transaction, as described in the Pre-Funded Warrants and generally including any reorganization, recapitalization or reclassification of our Common Stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of more than 50% of our outstanding Common Stock, or any person or group becoming the beneficial owner of 50% of the voting power represented by our outstanding Common Stock, the holders of the Pre-Funded Warrants will be entitled to receive upon exercise of the Pre-Funded Warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the Pre-Funded Warrants immediately prior to such fundamental transaction.

***Transferability.*** Subject to applicable laws, a Pre-Funded Warrant may be transferred at the option of the holder upon surrender of the Pre-Funded Warrants to us together with the appropriate instruments of transfer.

***Fractional Shares.*** No fractional shares of Common Stock will be issued upon the exercise of the Pre-Funded Warrants. Rather, the number of shares of Common Stock to be issued will, at our election, either be rounded up to the nearest whole number or we will pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the exercise price.

***Trading Market.*** There is no established trading market for the Pre-Funded Warrants, and we do not expect a market to develop. We do not intend to apply for a listing of the Pre-Funded Warrants on any securities exchange or other nationally recognized trading system. Without an active trading market, the liquidity of the Pre-Funded Warrants will be limited. The Common Stock issuable upon exercise of the Pre-Funded Warrants is currently listed on Nasdaq.

***Rights as a Stockholder.*** Except as otherwise provided in the Pre-Funded Warrants or by virtue of the holders' ownership of shares of Common Stock, the holders of Pre-Funded Warrants do not have the rights or privileges of holders of our shares of Common Stock, including any voting rights, until such Pre-Funded Warrant holders exercise their Pre-Funded Warrants.

***Waivers and Amendments.*** The Pre-Funded Warrants may be modified or amended, or the provisions thereof waived with the written consent of the Company and the respective holder.

#### **Placement Agent Warrants**

We have also agreed to issue to the Placement Agent or its designees as compensation in connection with this offering, the Placement Agent Warrants to purchase up to        shares of Common Stock as compensation in connection with this offering. The Placement Agent Warrants will be exercisable immediately and will have substantially the same terms as the Common Warrants described above, except that the Placement Agent Warrants will have an exercise price of \$ per share (representing % of the combined public offering price per share and accompanying Common Warrant) and a termination date that will be from the commencement of the sales pursuant to this offering. See "Plan of Distribution" below.

## DILUTION

If you invest in our Securities in this offering, your ownership interest will be diluted immediately to the extent of the difference between the effective combined public offering price per share of Common Stock and the as adjusted net tangible book value per share of our Common Stock after this offering.

Our historical net tangible book value as of March 31, 2024 was \$(4,054,000), or \$(2.38) per share of Common Stock, based on 1,702,226 shares of Common Stock outstanding (including 115,792 shares subject to unvested restricted stock awards). Historical net tangible book value per share represents the amount of our total tangible assets less total liabilities, divided by the number of shares of our Common Stock outstanding as of March 31, 2024.

After giving effect to our issuance of 11,000 shares of Series H Preferred Stock in exchange for CRG surrendering for cancellation \$11 million of outstanding principal and accrued interest of its senior secured term loan under the Loan Agreement (collectively, the "Pro Forma Adjustments"), our pro forma net tangible book value as of March 31, 2024 was \$6,946,000, or \$4.08 per share of our Common Stock. Pro forma net tangible book value per share represents total tangible assets less total liabilities, divided by the number of shares of our Common Stock outstanding as of March 31, 2024, after giving effect to the Pro Forma Adjustments.

After giving further effect to the Pro Forma Adjustments and the issuance and sale of the maximum number of securities offered in this offering at an assumed combined public offering price of \$ per share of Common Stock and accompanying Common Warrant, based on the last reported sale price of our Common Stock on Nasdaq on , 2024, and after deducting the Placement Agent fees and estimated offering expenses payable by us, and assuming no exercise of Common Warrants and Placement Agent Warrants and exercise in full of the Pre-Funded Warrants, our pro forma as adjusted net tangible book value as of March 31, 2024 would have been \$ , or \$ per share. This represents an immediate increase in net tangible book value per share of \$ to existing stockholders, compared to the pro forma net tangible book value per share, and immediate dilution of \$ per share to investors purchasing securities in this offering. Dilution per share to investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering from the combined public offering price per share paid by investors in this offering. The following table illustrates this dilution on a per share basis:

Assumed combined public offering price per share of Common Stock and accompanying Common Warrant	\$	
Historical net tangible book value per share as of March 31, 2024	\$	(2.38)
Increase in net tangible book value per share attributable to the Pro Forma Adjustments	\$	6.46
Pro forma net tangible book value per share as of March 31, 2024	\$	4.08
Increase in pro forma as adjusted net tangible book value per share attributable to the offering	\$	
Pro forma as adjusted net tangible book value per share as of March 31, after this offering	\$	
Dilution per share to new investors purchasing securities in this offering	\$	

A \$0.10 increase in the assumed combined public offering price to \$ per share of Common Stock and accompanying Common Warrant would increase our pro forma as adjusted net tangible book value as of , 2024 after this offering to \$ , or approximately \$ per share, and would change the dilution to investors in this offering to approximately \$ per share, and after deducting the Placement Agent fees and estimated offering expenses payable by us. A \$0.10 decrease in the assumed combined public offering price to \$ per share of Common Stock and accompanying Common Warrant would decrease our pro forma as adjusted net tangible book value as of March 31, 2024 after this offering to \$ , or approximately \$ per share, and would change the dilution to investors in this offering to approximately \$ per share, assuming exercise in full of the Pre-Funded Warrants, no exercise of Common Warrants and Placement Agent Warrants, and after deducting the Placement Agent fees and estimated offering expenses payable by us.

We may also increase or decrease the number of securities to be issued in this offering. An increase of 250,000 in the number of shares of Common Stock and Common Warrants offered by us would increase our pro forma as adjusted net tangible book value per share and decrease the dilution per share to investors purchasing securities in this offering by \$ and \$ , respectively, and each decrease of 250,000 in the number of shares of Common Stock and Common Warrants offered by us would decrease our pro forma as adjusted net tangible book value per share and increase the dilution per share to investors purchasing securities in this offering by \$ and \$ , respectively, assuming that the combined public offering price remains the same, exercise in full of the Pre-Funded Warrants, no exercise of Common Warrants and Placement Agent Warrants, and after deducting Placement Agent fees and estimated offering expenses payable by us. The information discussed above is illustrative only and will be adjusted based on the actual combined public offering price and other terms of this offering as determined between us, the Placement Agent, and the investors at pricing.

The number of shares of our Common Stock to be outstanding after this offering is based on 1,586,434 shares of our Common Stock outstanding as of March 31, 2024, gives effect to the pro forma adjustments described above, and excludes as of March 31, 2024:

- 15 shares of Common Stock issuable upon the exercise of stock options outstanding with a weighted average exercise price of \$183,340 per share;
- 2,931,022 shares of Common Stock issuable upon conversion of outstanding Preferred Stock, comprised of 2,729,257 shares of Common Stock issuable upon conversion of outstanding Series A-1 Preferred Stock, 23,205 shares of Common Stock issuable upon conversion of outstanding Series B Preferred Stock and 178,560 shares of Common Stock issuable upon conversion of outstanding Series E Preferred Stock ;
- 456,096 shares of Common Stock issuable upon exercise of outstanding warrants, comprised of 2,993 shares of Common Stock issuable upon exercise of outstanding Series 1 Warrants, 2,903 shares of Common Stock issuable upon exercise of outstanding Series 2 Warrants, 53,833 shares of Common Stock issuable upon exercise of outstanding January 2022 financing warrants; 4,433 shares of Common Stock issuable upon exercise of outstanding Placement Agent warrants issued in the January 2022 financing; 190,259 shares of Common Stock issuable upon exercise of outstanding Series A Preferred Investment Options issued in the August 2022 financing; 190,259 shares of Common Stock issuable upon exercise of outstanding Series B Preferred Investment Options issued in the August 2022 financing; and 11,416 shares of Common Stock issuable upon exercise of outstanding Placement Agent warrants issued in the August 2022 financing;
- 115,792 unvested restricted stock awards; and
- 68,109 shares of Common Stock reserved for future issuance under our 2015 Equity Incentive Plan, or our 2015 Plan, and any additional shares that become available under our 2015 Plan pursuant to provisions thereof that automatically increase the share reserve under the plan each year.

The discussion and table above assumes exercise in full of the Pre-Funded Warrants and no exercise of the Common Warrants and Placement Agent Warrants. To the extent that the Common Warrants and Placement Agent Warrants are exercised, any outstanding warrants or options are exercised, any outstanding convertible notes are converted any outstanding restricted stock units vest, or new options or restricted stock units are issued our equity incentive plan, you may experience further dilution. In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

## MATERIAL UNITED STATES FEDERAL INCOME TAX CONSIDERATIONS

The following discussion describes the material U.S. federal income tax consequences of the acquisition, ownership and disposition of shares of the Common Stock, Pre-Funded Warrants and Common Warrants acquired in this offering. This discussion is based on the current provisions of the Internal Revenue Code of 1986, as amended, referred to as the Code, existing and proposed U.S. Treasury regulations promulgated thereunder, and administrative rulings and court decisions in effect as of the date hereof, all of which are subject to change at any time, possibly with retroactive effect. No ruling has been or will be sought from the Internal Revenue Service, or IRS, with respect to the matters discussed below, and there can be no assurance the IRS will not take a contrary position regarding the tax consequences of the acquisition, ownership or disposition of the Common Stock, Pre-Funded Warrants or Common Warrants, or that any such contrary position would not be sustained by a court. Except as provided herein, this summary does not discuss the potential effects, whether adverse or beneficial, of any proposed legislation that, if enacted, could be applied on a retroactive or prospective basis.

We assume in this discussion that the shares of Common Stock, Pre-Funded Warrants and Common Warrants will be held as capital assets (generally, property held for investment). This discussion does not address all aspects of U.S. federal income taxes, does not discuss the potential application of the Medicare contribution tax or the alternative minimum tax and does not address state or local taxes or U.S. federal gift and estate tax laws, except as specifically provided below with respect to Non-U.S. Holders, or any non-U.S. tax consequences that may be relevant to holders in light of their particular circumstances. In addition, except as specifically set forth below, this summary does not discuss applicable tax reporting requirements. This discussion also does not address the special tax rules applicable to particular holders, such as:

- persons who acquired our Common Stock, Pre-Funded Warrants or Common Warrants as compensation for services;
- traders in securities that elect to use a mark-to-market method of accounting for their securities holdings;
- persons that own, or are deemed to own, more than 5% of our Common Stock (except to the extent specifically set forth below);
- persons required for U.S. federal income tax purposes to conform the timing of income accruals to their financial statements under Section 451(b) of the Code (except to the extent specifically set forth below);
- persons for whom our Common Stock constitutes "qualified small business stock" within the meaning of Section 1202 of the Code or "Section 1244 stock" for purposes of Section 1244 of the Code;
- persons deemed to sell our Common Stock, Pre-Funded Warrants or Common Warrants under the constructive sale provisions of the Code;
- banks or other financial institutions;
- brokers or dealers in securities or currencies;
- tax-exempt organizations or tax-qualified retirement plans;
- S corporations (and shareholders thereof);
- partnerships or other entities treated as partnerships for U.S. federal income tax purposes (and partners or other owners thereof);
- corporations organized outside the United States, any state thereof, or the District of Columbia that are nonetheless treated as U.S. persons for U.S. federal income tax purposes;
- pension plans;
- regulated investment companies or real estate investment trusts;
- persons that hold the Common Stock, Pre-Funded Warrants or Common Warrants as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment;
- insurance companies;
- controlled foreign corporations, passive foreign investment companies, or corporations that accumulate earnings to avoid U.S. federal income tax;
- U.S. Holders that are subject to taxing jurisdictions other than, or in addition to, the United States with respect to the Common Stock, Pre-Funded Warrants or Common Warrants; and
- certain U.S. expatriates, former citizens, or long-term residents of the United States.

In addition, this discussion does not address the tax treatment of partnerships (including any entity or arrangement classified as a partnership for U.S. federal income tax purposes) or other pass-through entities or persons who hold shares of Common Stock, Pre-Funded Warrants or Common Warrants through such partnerships or other entities which are pass-through entities for U.S. federal income tax purposes. If such a partnership or other pass-through entity holds shares of Common Stock, Pre-Funded Warrants or Common Warrants, the treatment of a partner in such partnership or investor in such other pass-through entity generally will depend on the status of the partner or investor and upon the activities of the partnership or other pass-through entity. A partner in such a partnership and an investor in such other pass-through entity that will hold shares of Common Stock, Pre-Funded Warrants or Common Warrants should consult his, her or its own tax advisor regarding the tax consequences of the ownership and disposition of shares of Common Stock, Pre-Funded Warrants or Common Warrants through such partnership or other pass-through entity, as applicable.

**This discussion of U.S. federal income tax considerations is for general information purposes only and is not tax advice. Prospective investors should consult their own tax advisors regarding the U.S. federal, state, local and non-U.S. income and other tax considerations of acquiring, holding and disposing of our Common Stock, Pre-Funded Warrants and Common Warrants.**

For the purposes of this discussion, a "U.S. Holder" means a beneficial owner of shares of Common Stock, Pre-Funded Warrants or Common Warrants acquired in this offering that is for U.S. federal income tax purposes (a) an individual citizen or resident of the United States, (b) a corporation (or other entity taxable as a corporation for U.S. federal income tax purposes), created or organized in or under the laws of the United States, any state thereof or the District of Columbia, (c) an estate the income of which is subject to U.S. federal income taxation regardless of its source, or (d) a trust if it (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons (within the meaning of Section 7701(a)(30) of the Code) has the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a domestic trust. A "Non-U.S. Holder" is, for U.S. federal income tax purposes, a beneficial owner of shares of Common Stock, Pre-Funded Warrants or Common Warrants that is not a U.S. Holder or a partnership for U.S. federal income tax purposes.

#### **Treatment of Pre-Funded Warrants**

Although it is not entirely free from doubt, a Pre-Funded Warrant should be treated as a share of Common Stock for U.S. federal income tax purposes and a holder of Pre-Funded Warrants should generally be taxed in the same manner as a holder of Common Stock, as described below. Accordingly, no gain or loss should be recognized upon the exercise of a Pre-Funded Warrant and, upon exercise, the holding period of a Pre-Funded Warrant should carry over to the share of Common Stock received. Similarly, the tax basis of the Pre-Funded Warrant should carry over to the share of Common Stock received upon exercise, increased by the exercise price of \$0.001 per share. Each holder should consult his, her or its own tax advisor regarding the risks associated with the acquisition of Pre-Funded Warrants pursuant to this offering (including potential alternative characterizations). The balance of this discussion generally assumes that the characterization described above is respected for U.S. federal income tax purposes.

#### **Allocation of Purchase Price**

For U.S. federal income tax purposes, each share of Common Stock (or, in lieu of Common Stock, each Pre-Funded Warrant) and the accompanying Common Warrants issued pursuant to this offering will be treated as an "investment unit" each of which consisting of one share of Common Stock or one Pre-Funded Warrant (which, as described above, should generally be treated as a share of Common Stock for U.S. federal income tax purposes), as applicable, and the accompanying Common Warrants to acquire one share of Common Stock. The purchase price for each investment unit will be allocated between these components in proportion to their relative fair market values at the time the unit is purchased by the holder. This allocation of the purchase price for each unit will establish the holder's initial tax basis for U.S. federal income tax purposes in the share of Common Stock (or, in lieu of Common Stock, Pre-Funded Warrant) and the Common Warrant included in each unit. The separation of the share of Common Stock and the (or, in lieu of Common Stock, Pre-Funded Warrant) and the Common Warrants included in a unit should not be a taxable event for U.S. federal income tax purposes. Each holder should consult his, her or its own tax advisor regarding the allocation of the purchase price between the Common Stock (or, in lieu of Common Stock, Pre-Funded Warrants) and the Common Warrants.

## **Tax Considerations Applicable to U.S. Holders**

### ***Exercise and Expiration of Common Warrants***

Except as discussed below with respect to the cashless exercise of a Common Warrant, a U.S. Holder generally will not recognize gain or loss for U.S. federal income tax purposes upon exercise of a Common Warrant. The U.S. Holder will take a tax basis in the shares acquired on the exercise of a Common Warrant equal to the exercise price of the Common Warrant, increased by the U.S. Holder's adjusted tax basis in the Common Warrant exercised (as determined pursuant to the rules discussed above). The U.S. Holder's holding period in the shares of Common Stock acquired on the exercise of a Common Warrant will begin on the date of exercise or possibly the day after such exercise, and will not include any period for which the U.S. Holder held the Common Warrant.

The lapse or expiration of a Common Warrant will be treated as if the U.S. Holder sold or exchanged the Common Warrant and recognized a capital loss equal to the U.S. Holder's tax basis in the Common Warrant. The deductibility of capital losses is subject to limitations.

The tax consequences of a cashless exercise of a Common Warrant are not clear under current tax law. A cashless exercise may be tax-free, either because the exercise is not a realization event or because the exercise is treated as a recapitalization for U.S. federal income tax purposes. In either tax-free situation, a U.S. Holder's tax basis in the Common Stock received generally would equal the U.S. Holder's tax basis in the Common Warrants. If the cashless exercise was not a realization event, it is unclear whether a U.S. Holder's holding period for the Common Stock would be treated as commencing on the date of exercise of the Common Warrant or the day following the date of exercise of the Common Warrant. If the cashless exercise were treated as a recapitalization, the holding period of the Common Stock would include the holding period of the Common Warrants.

It is also possible that a cashless exercise could be treated as a taxable exchange in which gain or loss would be recognized. In such event, a U.S. Holder could be deemed to have surrendered Common Warrants having an aggregate fair market value equal to the exercise price for the total number of Common Warrants to be exercised. The U.S. Holder would recognize capital gain or loss in an amount equal to the difference between the fair market value of the Common Stock received in respect of the Common Warrants deemed surrendered and the U.S. Holder's tax basis in such Common Warrants. Such gain or loss would be long-term or short-term, depending on the U.S. Holder's holding period in the Common Warrants deemed surrendered. In this case, a U.S. Holder's tax basis in the Common Stock received would equal the sum of the U.S. Holder's initial investment in the exercised Common Warrants (i.e., the portion of the U.S. Holder's purchase price for the investment unit that is allocated to the Common Warrants, as described above under the section titled "Allocation of Purchase Price") and the exercise price of such Common Warrants. It is unclear whether a U.S. Holder's holding period for the Common Stock would commence on the date of exercise of the Common Warrant or the day following the date of exercise of the Common Warrant. There may also be alternative characterizations of any such taxable exchange that would result in similar tax consequences, except that a U.S. Holder's gain or loss would be short-term.

Due to the absence of authority on the U.S. federal income tax treatment of a cashless exercise, there can be no assurance which, if any, of the alternative tax consequences and holding periods described above would be adopted by the IRS or a court of law. Accordingly, U.S. Holders should consult their own tax advisors regarding the tax consequences of a cashless exercise of the Common Warrants.

### ***Distributions***

In the event that we make distributions on our Common Stock to a U.S. Holder, those distributions generally will constitute dividends for U.S. tax purposes to the extent paid out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles). Distributions in excess of our current and accumulated earnings and profits will constitute a return of capital that is applied against and reduces, but not below zero, a U.S. Holder's adjusted tax basis in our Common Stock. Any remaining excess will be treated as gain realized on the sale or exchange of shares of Common Stock as described below under the section titled "Disposition of Common Stock, Pre-Funded Warrants or Common Warrants."

### ***Certain Adjustments to Pre-Funded Warrants or Common Warrants***

The number of shares of Common Stock issued upon the exercise of the Pre-Funded Warrants or Common Warrants and the exercise price of Pre-Funded Warrants or Common Warrants are subject to adjustment in certain circumstances. Adjustments (or failure to make adjustments) that have the effect of increasing a U.S. Holder's proportionate interest in our assets or earnings and profits may, in some circumstances, result in a constructive distribution to the U.S. Holder. Adjustments to the conversion rate made pursuant to a bona fide reasonable adjustment formula which has the effect of preventing the dilution of the interest of the holders of Pre-Funded Warrants or Common Warrants generally should not be deemed to result in a constructive distribution. If an adjustment is made that does not qualify as being made pursuant to a bona fide reasonable adjustment formula, a U.S. Holder of Pre-Funded Warrants or Common Warrants may be deemed to have received a constructive distribution from us, even though such U.S. Holder has not received any cash or property as a result of such adjustment. The tax consequences of the receipt of a distribution from us are described above under the section titled "Distributions."

### ***Disposition of Common Stock, Pre-Funded Warrants or Common Warrants***

Upon a sale or other taxable disposition (other than a redemption treated as a distribution, which will be taxed as described above under the section titled "Distributions") of shares of Common Stock, Pre-Funded Warrants or Common Warrants, a U.S. Holder generally will recognize capital gain or loss in an amount equal to the difference between the amount realized and the U.S. Holder's adjusted tax basis in the Common Stock, Pre-Funded Warrants or Common Warrants sold. Capital gain or loss will constitute long-term capital gain or loss if the U.S. Holder's holding period for the Common Stock, Pre-Funded Warrants or Common Warrants exceeds one year. The deductibility of capital losses is subject to certain limitations. U.S. Holders who recognize losses with respect to a disposition of shares of Common Stock, Pre-Funded Warrants or Common Warrants should consult their own tax advisors regarding the tax treatment of such losses.

### ***Information Reporting and Backup Reporting***

Information reporting requirements generally will apply to payments of distributions (including constructive distributions) on the Common Stock, Pre-Funded Warrants and Common Warrants and to the proceeds of a sale or other disposition of Common Stock, Pre-Funded Warrants and Common Warrants paid by us to a U.S. Holder unless such U.S. Holder is an exempt recipient, such as a corporation. Backup withholding will apply to those payments if the U.S. Holder fails to provide the holder's taxpayer identification number, or certification of exempt status, or if the holder otherwise fails to comply with applicable requirements to establish an exemption.

Backup withholding is not an additional tax. Rather, any amounts withheld under the backup withholding rules will be allowed as a refund or a credit against the U.S. Holder's U.S. federal income tax liability provided the required information is timely furnished to the IRS. U.S. Holders should consult their own tax advisors regarding their qualification for exemption from information reporting and backup withholding and the procedure for obtaining such exemption.

### ***Tax Considerations Applicable to Non-U.S. Holders***

#### ***Exercise and Expiration of Common Warrants***

In general, a Non-U.S. Holder will not recognize gain or loss for U.S. federal income tax purposes upon the exercise of Common Warrants into shares of Common Stock, however, to the extent a cashless exercise results in a taxable exchange, the consequences would be similar to those described in the discussion below under the section titled "Disposition of Common Stock, Pre-Funded Warrants or Common Warrants."

The expiration of a Common Warrant will be treated as if the Non-U.S. Holder sold or exchanged the Common Warrant and recognized a capital loss equal to the Non-U.S. Holder's tax basis in the Common Warrants. However, a Non-U.S. Holder will not be able to utilize a loss recognized upon expiration of a Common Warrant against the Non-U.S. Holder's U.S. federal income tax liability unless the loss is effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States (and, if an income tax treaty applies, is attributable to a permanent establishment or fixed base in the United States) or is treated as a U.S.-source loss and the Non-U.S. Holder is present 183 days or more in the taxable year of disposition and certain other conditions are met.

### **Certain Adjustments to Common Warrants**

As described above under the section titled "Tax Considerations Applicable to U.S. Holders – Certain Adjustments to Pre-Funded Warrants and Common Warrants," an adjustment to the Pre-Funded Warrants or Common Warrants could result in a constructive distribution to a Non-U.S. Holder, which would be treated as described below under the section titled "Distributions." Any resulting withholding tax attributable to deemed dividends would be collected from other amounts payable or distributable to the Non-U.S. Holder. Non-U.S. Holders should consult their own tax advisors regarding the proper treatment of any adjustments to the Pre-Funded Warrants or Common Warrants.

In addition, regulations governing "dividend equivalents" under Section 871(m) of the Code may apply to the Pre-Funded Warrants. Under those regulations, an implicit or explicit payment under the Pre-Funded Warrants that references a dividend distribution on our Common Stock would possibly be taxable to a Non-U.S. Holder as described below under the section titled "Distributions." Such dividend equivalent amount would be taxable and subject to withholding whether or not there is actual payment of cash or other property, and the Company may satisfy any withholding obligations it has in respect of the Pre-Funded Warrants by withholding from other amounts due to the Non-U.S. Holder. Non-U.S. Holders are encouraged to consult their own tax advisors regarding the application of Section 871(m) of the Code to the Pre-Funded Warrants.

### **Distributions**

In the event that we make distributions on our Common Stock to a Non-U.S. Holder, those distributions generally will constitute dividends for U.S. federal income tax purposes as described above under the section titled "U.S. Holders-Distributions." To the extent those distributions do not constitute dividends for U.S. federal income tax purposes (i.e., the amount of such distributions exceeds both our current and our accumulated earnings and profits), they will constitute a return of capital and will first reduce a Non-U.S. Holder's basis in our Common Stock (determined separately with respect to each share of Common Stock), but not below zero, and then will be treated as gain from the sale of that share Common Stock as described below under the section titled "Disposition of Common Stock, Pre-Funded Warrants or Common Warrants."

Any distribution (including constructive distributions) on shares of Common Stock that is treated as a dividend paid to a Non-U.S. Holder that is not effectively connected with the holder's conduct of a trade or business in the United States will generally be subject to withholding tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and the Non-U.S. Holder's country of residence. To obtain a reduced rate of withholding under a treaty, a Non-U.S. Holder generally will be required to provide the applicable withholding agent with a properly executed IRS Form W-8BEN, IRS Form W-8BEN-E or other appropriate form, certifying the Non-U.S. Holder's entitlement to benefits under that treaty. Such form must be provided prior to the payment of dividends and must be updated periodically. If a Non-U.S. Holder holds stock through a financial institution or other agent acting on the holder's behalf, the holder will be required to provide appropriate documentation to such agent. The holder's agent may then be required to provide certification to the applicable withholding agent, either directly or through other intermediaries. If you are eligible for a reduced rate of U.S. withholding tax under an income tax treaty, you should consult with your own tax advisor to determine if you are able to obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim for a refund with the IRS.

We generally are not required to withhold tax on dividends paid (or constructive dividends deemed paid) to a Non-U.S. Holder that are effectively connected with the holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, are attributable to a permanent establishment or fixed base that the holder maintains in the United States) if a properly executed IRS Form W-8ECI, stating that the dividends are so connected, is furnished to us (or, if stock is held through a financial institution or other agent, to the applicable withholding agent). In general, such effectively connected dividends will be subject to U.S. federal income tax on a net income basis at the regular tax rates applicable to U.S. persons. A corporate Non-U.S. Holder receiving effectively connected dividends may also be subject to an additional "branch profits tax," which is imposed, under certain circumstances, at a rate of 30% (or such lower rate as may be specified by an applicable treaty) on the corporate Non-U.S. Holder's effectively connected earnings and profits, subject to certain adjustments.

See also the sections below titled "Backup Withholding and Information Reporting" and "Foreign Accounts" for additional withholding rules that may apply to dividends paid to certain foreign financial institutions or non-financial foreign entities.

#### ***Disposition of Common Stock, Pre-Funded Warrants or Common Warrants***

Subject to the discussions below under the sections titled "Backup Withholding and Information Reporting" and "Foreign Accounts," a Non-U.S. Holder generally will not be subject to U.S. federal income or withholding tax with respect to gain recognized on a sale or other disposition (other than a redemption treated as a distribution, which will be taxable as described above under the section titled "Distributions") of shares of Common Stock, Pre-Funded Warrants or Common Warrants unless:

- the gain is effectively connected with the Non-U.S. Holder's conduct of a trade or business in the United States, and if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment or fixed base maintained by the Non-U.S. Holder in the United States; in these cases, the Non-U.S. Holder will be taxed on a net income basis at the regular tax rates and in the manner applicable to U.S. persons, and if the Non-U.S. Holder is a corporation, an additional branch profits tax at a rate of 30%, or a lower rate as may be specified by an applicable income tax treaty, may also apply;
- the Non-U.S. Holder is a nonresident alien present in the United States for 183 days or more in the taxable year of the disposition and certain other requirements are met, in which case the Non-U.S. Holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence) on the net gain derived from the disposition, which may be offset by certain U.S.-source capital losses of the Non-U.S. Holder, if any; or
- we are, or have been, at any time during the five-year period preceding such sale or other taxable disposition (or the Non-U.S. Holder's holding period, if shorter) a "U.S. real property holding corporation," unless our Common Stock is regularly traded on an established securities market and the Non-U.S. Holder holds no more than 5% of our outstanding Common Stock, directly or indirectly, actually or constructively, during the shorter of the five-year period ending on the date of the disposition or the period that the Non-U.S. Holder held our Common Stock. Generally, a corporation is a U.S. real property holding corporation only if the fair market value of its U.S. real property interests equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we do not believe that we are, or have been, a U.S. real property holding corporation, or that we are likely to become one in the future. No assurance can be provided that the Common Stock will be regularly traded on an established securities market for purposes of the rules described above."

See the sections below titled "Backup Withholding and Information Reporting" and "Foreign Accounts" for additional information regarding withholding rules that may apply to proceeds of a disposition of the Common Stock, Pre-Funded Warrants or Common Warrants paid to foreign financial institutions or non-financial foreign entities.

#### ***Backup Withholding and Information Reporting***

We must report annually to the IRS and to each Non-U.S. Holder the gross amount of the distributions (including constructive distributions) on the Common Stock, Pre-Funded Warrants or Common Warrants paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. Holders may have to comply with specific certification procedures to establish that the holder is not a U.S. person (as defined in the Code) in order to avoid backup withholding at the applicable rate, currently 24%, with respect to dividends (or constructive dividends) on the Common Stock, Pre-Funded Warrants or Common Warrants. Generally, a holder will comply with such procedures if it provides a properly executed IRS Form W-8BEN (or other applicable IRS Form W-8) or otherwise meets documentary evidence requirements for establishing that it is a Non-U.S. Holder, or otherwise establishes an exemption. Dividends paid to Non-U.S. Holders subject to withholding of U.S. federal income tax, as described above under the section titled "Distributions," will generally be exempt from U.S. backup withholding.

Information reporting and backup withholding generally will apply to the proceeds of a disposition of the Common Stock, Pre-Funded Warrants or Common Warrants by a Non-U.S. Holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a Non-U.S. Holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a Non-U.S. Holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. Holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the Non-U.S. Holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a Non-U.S. Holder can be refunded or credited against the Non-U.S. Holder's U.S. federal income tax liability, if any, provided that an appropriate claim is timely filed with the IRS.

#### **Foreign Accounts**

The Foreign Account Tax Compliance Act, or FATCA, generally imposes a 30% withholding tax on dividends (including constructive dividends) on the Common Stock, Pre-Funded Warrants and Common Warrants if paid to a non-U.S. entity unless (i) if the non-U.S. entity is a "foreign financial institution," the non-U.S. entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the non-U.S. entity is not a "foreign financial institution," the non-U.S. entity identifies certain of its U.S. investors, if any, or (iii) the non-U.S. entity is otherwise exempt under FATCA.

Withholding under FATCA generally will apply to payments of dividends (including constructive dividends) on our Common Stock, Pre-Funded Warrants and Common Warrants. While withholding under FATCA would have also applied to payments of gross proceeds from a sale or other disposition of the Common Stock, Pre-Funded Warrants or Common Warrants, under proposed U.S. Treasury Regulations withholding on payments of gross proceeds is not required. Although such regulations are not final, applicable withholding agents may rely on the proposed regulations until final regulations are issued.

An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this section. Under certain circumstances, a holder may be eligible for refunds or credits of the tax. Holders should consult their own tax advisors regarding the possible implications of FATCA on their investment in the Common Stock, Pre-Funded Warrants or Common Warrants.

#### **Federal Estate Tax**

Common Stock owned or treated as owned by an individual who is not a citizen or resident of the United States (as specially defined for U.S. federal estate tax purposes) at the time of death will be included in the individual's gross estate for U.S. federal estate tax purposes and, therefore, may be subject to U.S. federal estate tax, unless an applicable estate tax or other treaty provides otherwise. The foregoing may also apply to Pre-Funded Warrants and Common Warrants. A Non-U.S. Holder should consult his, her, or its own tax advisor regarding the U.S. federal estate tax consequences of the ownership or disposition of shares of the Common Stock, Pre-Funded Warrants and Common Warrants.

**The preceding discussion of material U.S. federal tax considerations is for information only. It is not tax advice. Prospective investors should consult their own tax advisors regarding the particular U.S. federal, state, local and non-U.S. tax consequences of purchasing, holding and disposing of the Common Stock, Pre-Funded Warrants or Common Warrants, including the consequences of any proposed changes in applicable laws.**

## PLAN OF DISTRIBUTION

Pursuant to an engagement agreement dated , 2024 (the "Engagement Agreement"), we have engaged to act as our exclusive placement agent to solicit offers to purchase the shares of Common Stock, Common Warrants and Pre-Funded Warrants. The Placement Agent is not purchasing or selling any such securities, nor is it required to arrange for the purchase and sale of any specific number or dollar amount of such securities, other than to use its "reasonable best efforts" to arrange for the sale of such securities by us. Therefore, we may not sell all of the shares of Common Stock, the Common Warrants and the Pre-Funded Warrants being offered. The terms of this offering were subject to market conditions and negotiations between us, the Placement Agent and prospective investors. The Placement Agent will have no authority to bind us by virtue of the Engagement Agreement. This is a reasonable best efforts offering and there is no minimum offering amount required as a condition to the closing of this offering. The Placement Agent may retain sub-agents and selected dealers in connection with this offering.

Investors purchasing the Securities offered hereby will have the option to execute a securities purchase agreement with us. In addition to rights and remedies available to all purchasers in this offering under federal securities and state law, the purchasers which enter into a securities purchase agreement will also be able to bring claims of breach of contract against us. The ability to pursue a claim for breach of contract is material to larger purchasers in this offering as a means to enforce the following covenants uniquely available to them under the securities purchase agreement: (i) a covenant to not enter into variable rate financings for a period of following the closing of the offering, subject to an exception; and (ii) a covenant to not enter into any equity financings for from closing of the offering, subject to certain exceptions.

The nature of the representations, warranties and covenants in the securities purchase agreements shall include:

- standard issuer representations and warranties on matters such as organization, qualification, authorization, no conflict, no governmental filings required, current in SEC filings, no litigation, labor or other compliance issues, environmental, intellectual property and title matters and compliance with various laws such as the Foreign Corrupt Practices Act; and
- covenants regarding matters such as registration of warrant shares, no integration with other offerings, filing of an 8-K to disclose entering into these securities purchase agreements, no shareholder rights plans, no material nonpublic information, use of proceeds, indemnification of purchasers, reservation and listing of Common Stock, and no subsequent equity sales for .

Delivery of the shares of Common Stock, the Common Warrants and the Pre-Funded Warrants offered hereby is expected to occur on or about , 2024, subject to satisfaction of certain customary closing conditions.

We have agreed to pay the Placement Agent a total cash fee equal to % of the gross proceeds received in the offering and a management fee equal to % of the gross proceeds raised in the offering. We will also pay the Placement Agent for non-accountable fees and expenses of up to \$ , and its legal fees and expenses and other out-of-pocket expenses in an amount up to \$ .

In addition, we have agreed to issue to the Placement Agent or its designees as compensation in connection with this offering the Placement Agent Warrants to purchase that number of shares of our Common Stock equal to % of the aggregate number of shares of Common Stock (or Common Stock equivalents) issued in this offering at an exercise price of \$ (equal to % of the assumed combined public offering price per share of Common Stock and accompanying Common Warrant) and will terminate on the anniversary of commencement of sales in this offering. The Placement Agent Warrants are registered by the registration statement of which this prospectus is a part. The form of the Placement Agent Warrants is included as an exhibit to this registration statement of which this prospectus forms a part.

The Placement Agent Warrants provide for customary anti-dilution provisions (for share dividends, splits and recapitalizations and the like) consistent with FINRA Rule 5110. Pursuant to FINRA Rule 5110(e), the Placement Agent Warrants and any shares issuable thereunder shall not be sold, transferred, assigned, pledged, or hypothecated, or be the subject of any hedging, short sale, derivative, put or call transaction that would result in the effective economic disposition of the securities by any person for a period of 180 days immediately following the date of commencement of sales of this offering, except the transfer of any security: (i) by operation of law or by reason of reorganization of the issuer; (ii) to any FINRA member firm participating in the offering and the officers, partners, registered persons or affiliates thereof, if all securities so transferred remain subject to the lock-up restriction set forth above for the remainder of the time period; (iii) if the aggregate amount of our securities held by the Placement Agent persons does not exceed 1% of the securities being offered; (iv) that is beneficially owned on a pro-rata basis by all equity owners of an investment fund, provided that no participating member manages or otherwise directs investments by the fund and the participating members in the aggregate do not own more than 10% of the equity in the fund; (v) the exercise or conversion of any security, if all securities remain subject to the lock-up restriction set forth above for the remainder of the time period; (vi) if we meet the registration requirements of Forms S-3, F-3 or F-10; or (vii) back to us in a transaction exempt from registration under the Securities Act.

We estimate the total expenses of this offering paid or payable by us, exclusive of the Placement Agent's cash fee of % of the gross proceeds and expenses, will be approximately \$ million. After deducting the fees due to the Placement Agent and our estimated expenses in connection with this offering, we expect the net proceeds from this offering will be approximately \$ million (based on an assumed combined public offering price per share of Common Stock and accompanying Common Warrant of \$ which was the last reported sales price of our Common Stock on Nasdaq on , 2024.

The following table shows the per share and total cash fees we will pay to the Placement Agent in connection with the sale of the Common Stock, the Common Warrants and the Pre-Funded Warrants pursuant to this prospectus.

	Per Share and Common Warrant	Per Pre-Funded Warrant and Common Warrant	Total
Combined public offering price			
Placement Agent's fees			
Proceeds to us, before expenses			

#### Indemnification

We have agreed to indemnify the Placement Agent against certain liabilities, including liabilities under the Securities Act and liabilities arising from breaches of representations and warranties contained in our engagement letter with the Placement Agent. We have also agreed to contribute to payments the Placement Agent may be required to make in respect of such liabilities.

#### Lock-up Agreements

We and each of our officers and directors have agreed with the Placement Agent to be subject to a lock-up period of days following the date of closing of the offering pursuant to this prospectus. This means that, during the applicable lock-up period, we and such persons may not offer for sale, contract to sell, sell, distribute, grant any option, right or warrant to purchase, pledge, hypothecate or otherwise dispose of, directly or indirectly, any of our shares of Common Stock or any securities convertible into, or exercisable or exchangeable for, shares of Common Stock, subject to customary exceptions. The Placement Agent may waive the terms of these lock-up agreements in its sole discretion and without notice. In addition, we have agreed to not issue any securities that are subject to a price reset based on the trading prices of our Common Stock or upon a specified or contingent event in the future or enter into any agreement to issue securities at a future determined price for a period of following the closing date of this offering, subject to an exception. The Placement Agent may waive this prohibition in its sole discretion and without notice.

### **Right of First Refusal**

We have granted the Placement Agent a right of first refusal, subject to an exception, for a period of twelve (12) months following the closing of this offering, to act as exclusive financial advisor, sole book-running manager, sole underwriter, sole placement agent or sole agent for each and every future debt financing or refinancing and public or private equity offering or acquisition or disposition by us or any of our successors or subsidiaries when we seek a financial advisor, book-running manager, underwriter or placement agent. Notwithstanding anything to the contrary contained in this paragraph, in accordance with FINRA Rule 5110(g)(6)(A)(i), any such right of first refusal described in this paragraph shall not have a duration of more than three years from the commencement of sales of the first Offering or the termination date of the term of the Engagement Agreement.

### **Tail**

We have also agreed to pay the Placement Agent a tail fee equal to the cash and warrant compensation in this offering, if any investor, subject to certain exceptions, who with our written approval was contacted or introduced to us by the Placement Agent during the term of its engagement, provides us with capital in any public or private offering or other financing or capital raising transaction during the twelve (12)-month period following expiration or termination of the Engagement Agreement, subject to certain exceptions.

### **Other Relationships**

From time to time, the Placement Agent may provide in the future various advisory, investment and commercial banking and other services to us in the ordinary course of business, for which they have received and may continue to receive customary fees and commissions. However, except as disclosed in this prospectus, we have no present arrangements with the Placement Agent for any further services.

In addition, in the ordinary course of their business activities, the Placement Agent and its affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) for their own account and for the accounts of their customers. Such investments and securities activities may involve securities and/or instruments of ours or our affiliates. The Placement Agent and its affiliates may also make investment recommendations and/or publish or express independent research views in respect of such securities or financial instruments and may hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

Except as disclosed in this prospectus, we have no present arrangements with the Placement Agent for any further services.

### **Regulation M Compliance**

The Placement Agent may be deemed to be an underwriter within the meaning of Section 2(a)(11) of the Securities Act, and any commissions received by it and any profit realized on the sale of our securities offered hereby by it while acting as principal might be deemed to be underwriting discounts or commissions under the Securities Act. The Placement Agent will be required to comply with the requirements of the Securities Act and the Exchange Act, including, without limitation, Rule 10b-5 and Regulation M under the Exchange Act. These rules and regulations may limit the timing of purchases and sales of our securities by the Placement Agent. Under these rules and regulations, the Placement Agent may not (i) engage in any stabilization activity in connection with our securities; and (ii) bid for or purchase any of our securities or attempt to induce any person to purchase any of our securities, other than as permitted under the Exchange Act, until they have completed their participation in the distribution.

### **Listing and Transfer Agent**

Our Common Stock is listed on Nasdaq and trades under the symbol "AVGR." The transfer agent Common Stock is Equiniti Trust Company, LLC. There is no established public trading market for Common Stock, the Common Warrants and the Pre-Funded Warrants, and we do not plan on making an application to list the Common Warrants or the Pre-Funded Warrants on Nasdaq, any national securities exchange or other nationally recognized trading system. We will act as the registrar and transfer agent for the Common Warrants and the Pre-Funded Warrants.

### **Electronic Distribution**

This prospectus in electronic format may be made available on websites or through other online services maintained by the Placement Agent, or by its affiliates. Other than this prospectus in electronic format, the information on the Placement Agent's website and any information contained in any other website maintained by the Placement Agent is not part of this prospectus or the registration statement of which this prospectus forms a part, has not been approved and/or endorsed by us or the Placement Agent in its capacity as an underwriter, and should not be relied upon by investors.

## LEGAL MATTERS

The validity of the securities offered hereby will be passed upon for us by Dorsey & Whitney LLP, Salt Lake City, UT. Certain legal matters will be passed upon for the Placement Agent by .

## EXPERTS

The financial statements and financial statement schedules of Avinger, Inc. as of December 31, 2023 and 2022, and for the years then ended, have been audited by Moss Adams LLP, an independent registered public accounting firm, as stated in their report, which is incorporated by reference in this prospectus. Such financial statements have been incorporated by reference in this prospectus in reliance upon the report of such firm (which report expresses an unqualified opinion and includes an explanatory paragraph regarding a going concern uncertainty) given their authority as experts in accounting and auditing.

## WHERE YOU CAN FIND MORE INFORMATION

This prospectus constitutes a part of the registration statement on Form S-1 that we have filed with the SEC under the Securities Act. As permitted by the SEC's rules, this prospectus, which forms a part of the registration statement, does not contain all of the information that is included in the registration statement. You will find additional information about us in the registration statement. Any statement made in this prospectus concerning legal documents are not necessarily complete and you should read the documents that are filed as exhibits to the registration statement or otherwise filed with the SEC for a more complete understanding of the document or matter. For further information with respect to us and our Common Stock, we refer you to the registration statement and the exhibits and schedule that were filed with the registration statement. Statements contained in this prospectus about the contents of any contract or any other document that is filed as an exhibit to the registration statement are not necessarily complete, and we refer you to the full text of the contract or other document filed as an exhibit to the registration statement. The SEC maintains a website that contains reports, proxy and information statements, and other information regarding registrants that file electronically with the SEC. The address of the website is [www.sec.gov](http://www.sec.gov). We file periodic reports under the Securities Exchange Act of 1934, including annual, quarterly and special reports, and other information with the SEC. These periodic reports and other information are available on the website of the SEC referred to above. We make available free of charge on or through our internet website our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. The information found on our website, [www.avinger.com](http://www.avinger.com), other than as specifically incorporated by reference in this prospectus, is not part of this prospectus.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference into this prospectus certain information we file with it, which means that we can disclose important information by referring you to those documents. The information incorporated by reference is considered to be a part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement. We incorporate by reference the documents listed below that we have previously filed with the SEC (excluding any portions of any Form 8-K that are not deemed "filed" pursuant to the General Instructions of Form 8-K):

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2023, filed with the SEC on [March 20, 2024](#);
- our Quarterly Report on Form 10-Q for the quarter ended March 31, 2024, filed with the SEC on [May 15, 2024](#);
- our Current Reports on Form 8-K filed with the SEC on [January 26, 2024](#), [March 7, 2024](#), [March 8, 2024](#), [March 12, 2024](#), and [May 16, 2024](#) and

- the description of our Common Stock, which is contained in the Registration Statement on [Form 8-A](#), as filed with the SEC on January 27, 2015, as updated by the description of our Common Stock contained in [Exhibit 4.5](#) to our Annual Report on Form 10-K for the fiscal year ended December 31, 2019, filed with the SEC on March 6, 2020.

We also incorporate by reference any future filings (other than Current Reports furnished under Items 2.02 or 7.01 of Form 8-K and exhibits filed on such form that are related to such items unless such Form 8-K expressly provides to the contrary) made with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (i) after the date of the initial filing of the registration statement of which this prospectus is a part and prior to effectiveness of the registration statement, and (ii) after the effectiveness of the registration statement but prior to the termination of the offering of the securities covered by this prospectus, excluding, in each case, information deemed furnished and not filed. Any statement contained in this prospectus, or in a document incorporated or deemed to be incorporated by reference herein, shall be deemed to be modified or superseded to the extent that a statement contained herein, or in any subsequently filed document that also is incorporated or deemed to be incorporated by reference herein, modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus. We will provide to each person, including any beneficial owner, to whom this prospectus is delivered, upon written or oral request, at no cost to the requester, a copy of any and all of the information that is incorporated by reference in this prospectus.

Requests for such documents should be directed to:

Avinger, Inc.  
400 Chesapeake Drive  
Redwood City, CA 94063  
Attention: Secretary  
Telephone: (650) 363-2400

You may also access the documents incorporated by reference in this prospectus through our website at [www.avinger.com](http://www.avinger.com). Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus or the registration statement of which it forms a part.

Up to Shares of Common Stock

Up to Pre-Funded Warrants to purchase up to Shares of Common Stock

Up to Common Warrants to purchase up to Shares of Common Stock

Up to Placement Agent Warrants to purchase up to Shares of Common Stock

Up to Shares of Common Stock Underlying the Common Warrants, the Pre-Funded Warrants and the Placement Agent Warrants



Avenger, Inc.

**PROSPECTUS**

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, 2024

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## Part II-INFORMATION NOT REQUIRED IN PROSPECTUS

### Item 13. Other Expenses of Issuance and Distribution

The following table sets forth the estimated costs and expenses payable by the Registrant in connection with the sale of the securities being registered. All amounts are estimates except for the SEC registration fee and Financial Industry Regulatory Authority ("FINRA") filing fee. We will bear all expenses shown below.

Securities and Exchange Commission registration fee	\$ 1,837.62
FINRA filing fee	\$ 2,367.50
Accounting fees and expenses	*
Legal fees and expenses	*
Transfer agent fees and expenses	*
Printing and miscellaneous expenses	*
Total	\$ *

\* To be filed by amendment.

### Item 14. Indemnification of Directors and Officers

Section 145 of the Delaware General Corporation Law, or DGCL, provides, in effect, that any person made a party to any action by reason of the fact that he is or was a director, officer, employee or agent of ours may, and in certain cases must, be indemnified by us against, in the case of a non-derivative action, judgments, fines, amounts paid in settlement, and reasonable expenses (including attorneys' fees) incurred by him as a result of such action, and in the case of a derivative action, against expenses (including attorneys' fees), if in either type of action he acted in good faith and in a manner he reasonably believed to be in or not opposed to our best interests. This indemnification does not apply, (i) in a derivative action, to matters as to which it is adjudged that the director, officer, employee or agent is liable to us, unless upon court order it is determined that, despite such adjudication of liability, but in view of all the circumstances of the case, he is fairly and reasonably entitled to indemnity for expenses, and, (ii) in a non-derivative action, to any criminal proceeding in which such person had no reasonable cause to believe his conduct was unlawful.

Article VIII of our Charter provides for the indemnification of directors to the fullest extent permissible under Delaware law.

Article VIII of our Bylaws provides for the indemnification of officers, directors and third parties acting on our behalf if such person acted in good faith and in a manner reasonably believed to be in and not opposed to our best interest and, with respect to any criminal action or proceeding, the indemnified party had no reason to believe his or her conduct was unlawful.

We have entered into indemnification agreements with certain of our directors, executive officers and others, in addition to indemnification provided for in our Bylaws.

We have purchased and intend to maintain insurance on behalf of any person who is or was a director or officer against any loss arising from any claim asserted against him or her and incurred by him or her in any such capacity, subject to certain exclusions. Such insurance also provides coverage to our directors and officers against loss arising from claims relating to, among other things, public securities matters.

## Item 15. Recent Sales of Unregistered Securities

On May 16, 2024, the Company and CRG entered into a Securities Purchase Agreement pursuant to which the Company issued 11,000 shares of a newly Series H Preferred Stock, in exchange for CRG surrendering for cancellation \$11 million of outstanding principal and accrued interest of the senior secured term loan under the Loan Agreement (as defined below) (the "Exchange"). Each share of Series H Preferred Stock has a stated value of \$1,000 per share and is convertible into 259 shares of the Company's Common Stock at a conversion price of \$3.86 per share, provided that the shares of Series H Preferred Stock cannot be converted into Common Stock to the extent the applicable holder would beneficially own in excess of 9.99% of the Company's outstanding voting power, unless approved by the Company's stockholders in accordance with Nasdaq Listing Rule 5635(b).

On March 4, 2024, the Company and Zylox-Tonbridge Medical Limited, a wholly-owned subsidiary of Zylox-Tonbridge (the "Purchaser"), entered into a securities purchase agreement, pursuant to which the Purchaser agreed to purchase, in two tranches, up to an aggregate of \$15 million in shares of the Company's Common Stock and shares of two new series of the Company's preferred stock (the "Private Placement"). On March 5, 2024, , the Company issued to the Purchaser 75,327 shares of the Common Stock at a purchase price per share of \$3.664, and 7,224 shares of a newly authorized Series F convertible preferred stock, par value \$0.001 per share, at a purchase price per share of \$1,000, for an aggregate purchase price of \$7.5 million.

In connection with the Private Placement, the Company agreed to issue to one financial advisor warrants to purchase an aggregate number of shares of common Stock equal to 2% of the gross proceeds. In connection with the Private Placement, the Company issued the financial advisor warrants (the "Advisor Warrants") to purchase 40,938 shares of common stock.

On March 5, 2024, the Company entered into a Securities Purchase Agreement (the "A-1 Securities Purchase Agreement") with CRG to exchange all outstanding shares of Series A preferred stock for 10,000 shares of Series A-1 Preferred Stock (the "Exchange"). Among other things, the shares of Series A-1 preferred stock: (i) are convertible into an aggregate of approximately 2,729,257 shares of common stock at a conversion price equal to the Purchase Price, (ii) do not accrue or pay dividends payable solely on the Series A-1 preferred stock, (iii) will have no liquidation preference and (iv) will be junior in rank to shares of the Company's Series E Preferred Stock, Series F Preferred Stock and Series G Preferred Stock. The Company relied on exemption from registration available under Section 4(a)(2) of the Securities Act in connection with the Private Placement, the Advisor Warrants and the Exchange.

On August 2, 2023, the Company and CRG entered into a Securities Purchase Agreement (as amended, the "SPA") pursuant to which the Company issued 1,920 shares of a newly authorized Series E Preferred Stock in exchange for CRG surrendering for cancellation \$1.92 million of outstanding principal and accrued interest of the senior secured term loan under the Loan Agreement. Each share of Series E Preferred Stock has a stated value of \$1,000 per share and is convertible into 93 shares of the Company's common stock at a conversion price of \$10.725 per share, provided that the shares of Series E Preferred Stock cannot be converted into common stock to the extent the applicable holder would beneficially own in excess of 9.99% of the Company's outstanding voting power, unless approved by the Company's stockholders in accordance with Nasdaq Listing Rule 5635(b).

On August 3, 2022, we entered into a securities purchase agreement with a single institutional investor for the purchase and sale of 700,000 shares of our Common Stock at a purchase price of \$1.752 per share and pre-funded warrants to purchase 784,019 shares of Common Stock at a purchase price of \$1.7519 per share of Common Stock underlying each such warrant in a registered direct offering priced at-the-market under Nasdaq rules. In a concurrent private placement (together with the registered direct offering, the "Offerings"), we entered into a separate securities purchase agreement with the same investor for the unregistered purchase and sale of pre-funded warrants to purchase 1,369,864 shares of Common Stock at a purchase price of \$1.7519 per share of Common Stock underlying each such warrant. Each pre-funded warrant sold in the registered direct offering and private placement offering is exercisable for one share of Common Stock at an exercise price of \$0.0001 per share, was immediately exercisable, and will not expire until fully exercised.

In addition, we issued to the investor in the Offerings unregistered Series A preferred investment options to purchase up to an aggregate of 2,853,883 shares of Common Stock at an exercise price of \$1.502 per share, expiring on February 8, 2028. We also issued to the investor in the Offerings unregistered Series B preferred investment options to purchase up to an aggregate of 2,853,883 shares of Common Stock at an exercise price of \$1.502 per share, expiring on August 8, 2024.

In connection with the Offerings, we issued to designees of H.C. Wainwright & Co., LLC ("Wainwright & Co.") preferred investment options to purchase up to an aggregate of 171,233 shares of Common Stock at an exercise price of \$2.19 per share, expiring on August 3, 2027.

The shares of Common Stock, the pre-funded warrants issued in the registered direct offering, and shares of Common Stock underlying the pre-funded warrants issued in the registered direct offering were issued or are issuable pursuant to a "shelf" registration statement on Form S-3 (File No. 333-263922) previously filed with the SEC on March 29, 2022 and declared effective by the SEC on April 7, 2022.

The unregistered pre-funded warrants and preferred investment options described above were offered in reliance on an exemption from registration under Section 4(a)(2) of the Securities Act and Regulation D promulgated thereunder and cannot be sold in the United States absent registration with the SEC or an applicable exemption from such registration requirements. In connection with the Offerings, we entered into a registration rights agreement with the investor. Under the registration rights agreement, we agreed to file a registration statement within 20 calendar days following August 3, 2022. Failure by us to meet the filing deadlines and other requirements set forth in the registration rights agreement may subject us to monetary penalties.

The holder (together with their affiliates) may not exercise any portion of the pre-funded warrants and preferred investment options to the extent that such holder would own more than 4.99% (or 9.99% at the election of said holder) of the outstanding Common Stock immediately after exercise, which percentage may be changed at the holder's election to a lower percentage at any time or to a higher percentage not to exceed 9.99% upon 61 days' notice to Avinger, Inc.

The unregistered pre-funded warrants and preferred investment options described above were offered in a private placement under Section 4(a)(2) of the Securities Act of 1933, as amended (the "Act") and Regulation D promulgated thereunder.

We engaged Wainwright & Co. as placement agent in connection with the Offerings pursuant to a letter agreement, dated July 8, 2022 (the "Engagement Letter"). Wainwright & Co. agreed to use its reasonable best efforts to arrange for the sale of the securities issued in the Offerings. We agreed to pay Wainwright & Co. a cash fee of 7.0% of the aggregate gross proceeds raised in the Offerings. We also agreed to pay Wainwright & Co. \$85,000 for non-accountable expenses, a management fee equal to 1.0% of the gross proceeds raised in each of the Offerings, and \$15,950 for closing costs.

We also issued to Wainwright & Co. or its designees unregistered preferred investment options (the "Placement Agent Investment Options") to purchase 6.0% of the aggregate number of shares of Common Stock and pre-funded warrants sold to the investor (or preferred investment options to purchase up to 171,233 shares of Common Stock). The Placement Agent Investment Options have substantially the same terms as the Series A preferred investment options, except that the Placement Agent Warrants have an exercise price equal to 125% of the purchase price per share (or \$2.19 per share) and a term of five years from the commencement of the sales in connection with the Offerings. We also agreed to pay Wainwright & Co., subject to certain exceptions, a tail fee equal to the cash and warrant compensation for the transactions described herein, with respect to any public or private offering or other financing or capital-raising transaction during the 12-month period following the expiration or termination of the Engagement Letter, to the extent that such financing or capital is provided to us by investors whom Wainwright & Co. had contacted during the term of its engagement or introduced to the Company during the term of its engagement in connection with the Offerings.

**Item 16. Exhibits**

Exhibit Number	Exhibit Title
3.1	<a href="#">Amended and Restated Certificate of Incorporation of the registrant (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K filed on February 6, 2015).</a>
3.2	<a href="#">Bylaws of the registrant (incorporated by reference to Exhibit 3.2 to our Current Report on Form 8-K filed on February 6, 2015).</a>
3.3	<a href="#">Certificate of Amendment to the Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on February 2, 2018).</a>
3.4	<a href="#">Avinger, Inc. Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock incorporated by reference to Exhibit 3.4 to Amendment No. 2 to our Registration Statement on Form S-1 filed on February 12, 2018).</a>
3.5	<a href="#">Avinger, Inc. Certificate of Designation of Preferences, Rights and Limitations of Series B Convertible Preferred Stock (incorporated by reference to Exhibit 3.5 to Amendment No. 3 to our Registration Statement on Form S-1 filed on February 13, 2018).</a>
3.6	<a href="#">Avinger, Inc. Certificate of Designation of Preferences, Rights and Limitations of Series C Convertible Preferred Stock (incorporated by reference to Exhibit 3.2 to our Current Report on Form 8-K filed on November 6, 2018).</a>
3.7	<a href="#">Certificate of Amendment to the Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on November 6, 2018).</a>
3.8	<a href="#">Certificate of Amendment to the Restated Certificate of Incorporation of Avinger, Inc. (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on June 21, 2019).</a>
3.9	<a href="#">Amendment to the Amended and Restated Bylaws of Avinger, Inc., dated as of October 27, 2021 (incorporated by reference to Exhibit 3.2 to our Current Report on Form 8-K filed on October 29, 2021).</a>
3.10	<a href="#">Avinger, Inc. Certificate of Designation of Preferences, Rights and Limitations of Series D Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on January 18, 2022).</a>
3.11	<a href="#">Certificate of Amendment to the Restated Certificate of Incorporation Avinger, Inc. dated March 11, 2022 (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on March 14, 2022).</a>
3.12	<a href="#">Certificate of Amendment to the Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock, as filed on December 22, 2022 (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on December 23, 2022).</a>
3.13	<a href="#">Avinger, Inc. Certificate of Designation of Preferences, Rights, and Limitations of Series E Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on August 4, 2023).</a>
3.14	<a href="#">Certificate of Amendment to the Amended and Restated Certificate of Incorporation of Avinger, Inc., dated September 11, 2023 (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed on September 12, 2023).</a>
3.15	<a href="#">Certificate of Designation of Preferences, Rights, and Limitations of Series F Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed March 7, 2024).</a>
3.16	<a href="#">Certificate of Designation of Preferences, Rights, and Limitations of Series A-1 Convertible Preferred Stock (incorporated by reference to Exhibit 3.2 to our Current Report on Form 8-K filed March 7, 2024).</a>
3.17	<a href="#">Certificate of Amendment to the Certificate of Designation of Preferences, Rights, and Limitations of Series E Convertible Preferred Stock (incorporated by reference to Exhibit 3.3 to our Current Report on Form 8-K filed March 7, 2024).</a>

3.18	<a href="#">Certificate of Designation of Preferences, Rights, and Limitations of Series H Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K filed May 16, 2024)</a>
4.1	<a href="#">Specimen Common Stock certificate of the registrant (incorporated by reference to Exhibit 4.1 to Amendment No. 1 to our Registration Statement on Form S-1 filed on October 19, 2018).</a>
4.2	<a href="#">Specimen Series 1/2 warrant of the registrant (incorporated by reference to Exhibit 4.2 to Amendment No. 3 to our Registration Statement on Form S-1 filed on February 13, 2018).</a>
4.3	<a href="#">Form of Common Stock Purchase Warrant (incorporated by reference to Exhibit 4.4 to Amendment No. 1 to our Registration Statement on Form S-1 filed on October 19, 2018).</a>
4.4	<a href="#">Description of Registrant's Securities (incorporated by reference to Exhibit 4.5 to our Annual Report on Form 10-K filed on March 6, 2020).</a>
4.5	<a href="#">Form of Common Stock Purchase Warrant (incorporated by reference to Exhibit .1 to our Current Report on Form 8-K filed on January 12, 2022).</a>
4.6	<a href="#">Form of Placement Agent Warrant (incorporated by reference to Exhibit 4.2 to our Current Report on Form 8-K filed on January 12, 2022).</a>
4.7	<a href="#">Form of Pre-Funded Common Stock Purchase Warrant - Registered Direct Offering (August 2022) (incorporated by reference to Exhibit 4.1 to our Current Report on Form 8-K filed on August 8, 2022).</a>
4.8	<a href="#">Form of Pre-Funded Common Stock Purchase Warrant - Private Placement Offering (August 2022) (incorporated by reference to Exhibit 4.2 to our Current Report on Form 8-K filed on August 8, 2022).</a>
4.9	<a href="#">Form of Series A Preferred Investment Option (incorporated by reference to Exhibit 4.3 to our Current Report on Form 8-K filed on August 8, 2022).</a>
4.10	<a href="#">Form of Series B Preferred Investment Option (incorporated by reference to Exhibit 4.4 to our Current Report on Form 8-K filed on August 8, 2022).</a>
4.11	<a href="#">Form of Placement Agent Preferred Investment Option (incorporated by reference to Exhibit 4.5 to our Current Report on Form 8-K filed on August 8, 2022).</a>
4.12**	Form of Common Warrant
4.13**	Form of Pre-Funded Warrant
4.14**	Form of Placement Agent Warrant
10.1#	<a href="#">Form of Indemnification Agreement for directors and executive officers (incorporated by reference to Exhibit 10.1 to Amendment No. 1 to our Registration Statement on Form S-1 filed on January 20, 2015).</a>
10.2#	<a href="#">2009 Stock Plan and Form of Option Agreement thereunder (incorporated by reference to Exhibit 10.2 to our Registration Statement on Form S-1 filed on December 30, 2014).</a>
10.3#	<a href="#">2014 Preferred Stock Plan (incorporated by reference to Exhibit 10.3 to our Registration Statement on Form S-1 filed on December 30, 2014).</a>
10.4#	<a href="#">Form of Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.5 to Amendment No. 1 to our Registration Statement on Form S-1 filed on January 20, 2015).</a>
10.5#	<a href="#">Form of Stock Option Agreement (incorporated by reference to Exhibit 10.6 to Amendment No. 1 to our Registration Statement on Form S-1 filed on January 20, 2015).</a>
10.6#	<a href="#">2015 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.7 to Amendment No. 1 to our Registration Statement on Form S-1 filed on January 20, 2015).</a>
10.7#	<a href="#">Executive Incentive Compensation Plan (incorporated by reference to Exhibit 10.8 to Amendment No. 1 to our Registration Statement on Form S-1 filed on January 20, 2015).</a>
10.8	<a href="#">Amended and Restated Investors' Rights Agreement dated September 2, 2014 by and among the registrant and certain stockholders (incorporated by reference to Exhibit 10.6 to our Registration Statement on Form S-1 filed on December 30, 2014).</a>
10.9	<a href="#">Lease Agreement, dated July 30, 2010, by and between the registrant and HCP LS Redwood City, LLC for office space located at 400 and 600 Chesapeake Drive, Redwood City, California (incorporated by reference to Exhibit 10.7 to our Registration Statement on Form S-1 filed on December 30, 2014).</a>
10.10	<a href="#">First Amendment to Lease Agreement dated September 30, 2011 by and between registrant and HCP LS Redwood City, LLC (incorporated by reference to Exhibit 10.8 to our Registration Statement on Form S-1 filed on December 30, 2014).</a>

10.11 [Second Amendment to Lease Agreement dated March 4, 2016 by and between the registrant and HCP LS Redwood City, LLC \(incorporated by reference to Exhibit 10.12 to our Annual Report on Form 10-K filed on March 8, 2016\).](#)

10.12# [Employment Letter dated December 17, 2014 by and between the registrant and Jeffrey M. Soinski \(incorporated by reference to Exhibit 10.20 to our Registration Statement on Form S-1 filed on December 30, 2014\).](#)

10.13# [Change of Control and Severance Agreement dated March 29, 2018 by and between the registrant and Jeffrey M. Soinski \(incorporated by reference to Exhibit 10.21 to our Annual Report on Form 10-K filed on March 30, 2018\).](#)

10.14 [Registration Rights Agreement, dated as of February , 2018, by and among the registrant, CRG Partners III L.P. and certain of its affiliated funds, as purchasers \(incorporated by reference to Exhibit 10.32 to Amendment No. 3 to our Registration Statement on Form S-1 filed on February 13, 2018\).](#)

10.15 [Term Loan Agreement, dated as of September 22, 2015, by and among the registrant, certain of its subsidiaries from time to time party thereto as guarantors and CRG Partners III L.P. and certain of its affiliated funds, as lenders \(incorporated by reference to Exhibit 6.1 to our Quarterly Report on Form 10-Q filed on November 12, 2015\).](#)

10.16 [Securities Purchase Agreement, dated as of September 22, 2015, by and among the registrant, CRG Partners III L.P. and certain of its affiliated funds, as purchasers \(incorporated by reference to Exhibit 6.2 to our Quarterly Report on Form 10-Q filed on November 12, 2015\).](#)

10.17 [Purchase Agreement, dated November 3, 2017, by and between the registrant and Lincoln Park Capital Fund, LLC \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on November 6, 2017\).](#)

10.18 [Registration Rights Agreement, dated as of November 3, 2017, by and between the registrant and Lincoln Park Capital Fund, LLC \(incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K filed on November 6, 2017\).](#)

10.19 [Waiver and Consent, dated as of December 14, 2017, by and among the registrant and the lenders party thereto \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on December 14, 2017\).](#)

10.20 [Waiver and Consent, dated as of January 24, 2018, by and among the registrant and the lenders party thereto \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on January 30, 2018\).](#)

10.21 [Amendment No. 2 to Term Loan Agreement, dated as of February 14, 2018, by and among the registrant and the lenders party thereto \(incorporated by reference to Exhibit 10.34 to Amendment No. 2 to our Registration Statement on Form S-1 filed on February 12, 2018\).](#)

10.22 [Form of Series A Preferred Stock Purchase Agreement by and among the registrant, CRG Partners III L.P. and certain of its affiliated funds, as purchasers \(incorporated by reference to Exhibit 10.33 to Amendment No. 2 to our Registration Statement on Form S-1 filed on February 12, 2018\).](#)

10.23 [Securities Purchase Agreement, dated as of July 12, 2018, by and among the registrant and the purchasers identified on the signature pages thereto \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on July 13, 2018\).](#)

10.24# [Change of Control and Severance Agreement, dated as of October 10, 2013, between the registrant and Himanshu Patel \(incorporated by reference to Exhibit 10.36 to our Annual Report on Form 10-K filed on March 6, 2019\).](#)

10.25 [Third Amendment to Lease Agreement dated April 1, 2019 by and between the registrant and HCP LS Redwood City, LLC \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on April 5, 2019\).](#)

10.26 [Amendment No. 3 to Term Loan Agreement dated as of March 2, 2020, by and among the registrant and the lenders party thereto \(incorporated by reference to Exhibit 10.41 to our Annual Report on Form 10-K filed on March 6, 2020\).](#)

10.27# [Amendment No. 1 dated March 4, 2020 to the Change of Control and Severance Agreement, dated March 29, 2018, by and between the registrant and Jeff Soinski \(incorporated by reference to Exhibit 10.42 to our Annual Report on Form 10-K filed on March 6, 2020\).](#)

10.28# [Amendment No. 1 dated March 4, 2020 to the Change of Control and Severance Agreement, dated October 10, 2013, by and between the registrant and Himanshu Patel \(incorporated by reference to Exhibit 10.43 to our Annual Report on Form 10-K filed on March 6, 2020\).](#)

10.29 [Amendment No. 4 and Waiver to Term Loan Agreement \(incorporated by reference to Exhibit 10.7 to our Quarterly Report on Form 10-Q filed on May 13, 2020\).](#)

10.30 [Amendment No. 5 to Term Loan Agreement, dated January 22, 2021, made by and among Avinger, Inc. and GRG Partners III L.P. and certain of its affiliated funds, as lenders \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on February 1, 2021\).](#)

10.31 [Form of Securities Purchase Agreement, dated January 12, 2022 by and between Avinger, Inc. and the purchasers party thereto \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on January 12, 2022\).](#)

10.32 [At the Market Offering Agreement dated May 20, 2022, by and between Avinger Inc., and H.C. Wainwright & Co., LLC \(incorporated by reference to Exhibit 1.1 to our Current Report on Form 8-K filed on May 20, 2022\).](#)

10.33# [Change of Control and Severance Agreement dated May 16, 2022, by and between Avinger Inc., Nabeel Subainati \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on July 22, 2022\).](#)

10.34 [Form of Registration Rights Agreement between the Company and the purchasers identified therein dated August 3, 2022 \(incorporated by reference to Exhibit 10.3 to our Quarterly Report on Form 10-Q filed on August 11, 2022\).](#)

10.35 [Amendment No. 6 to Term Loan Agreement, dated August 10, 2022, made by and among Avinger, Inc. and GRG Partners III L.P. and certain of its affiliated funds, as lenders \(incorporated by reference to Exhibit 10.3 to our Quarterly Report on Form 10-Q filed on August 11, 2022\).](#)

10.36# [Form of 2015 Equity Incentive Plan Restricted Stock Award Agreement \(incorporated by reference to Exhibit 10.6 to the Quarterly Report on Form 10-Q filed on November 9, 2022\).](#)

10.37# [Form of 2015 Equity Incentive Plan Restricted Stock Unit Award Agreement \(incorporated by reference to Exhibit 10.7 to the Quarterly Report on Form 10-Q filed on November 9, 2022\).](#)

10.38 [Form of Registered Direct Securities Purchase Agreement \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on August 8, 2022\).](#)

10.39 [Form of Private Placement Securities Purchase Agreement \(incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K filed on August 8, 2022\).](#)

10.40# [Amended and Restated 2015 Equity Incentive Plan \(previously filed as Exhibit 10.1 to our Current Report on Form 8-K filed on December 22, 2023\).](#)

10.41# [Amendment No. 1 to Change in Control and Severance Agreement dated March 14, 2023 by and between the registrant and Nabeel Subainati \(incorporated by reference to Exhibit 10.58 to our Quarterly Report on Form 10-Q filed on May 10, 2023\).](#)

10.42# [Form of Retention Bonus Agreement \(incorporated by reference to Exhibit 10.59 to our Annual Report on Form 10-K filed on March 16, 2023\).](#)

10.43# [Form of Restricted Stock Unit Award Grant Agreement \(incorporated by reference to Exhibit 10.60 to our Annual Report on Form 10-K filed on March 16, 2023\).](#)

10.44 [Securities Purchase Agreement, dated August 2, 2023, by and among Avinger, Inc. and Lenders party thereto \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on August 4, 2023\).](#)

10.45 [Consent to Term Loan Agreement, dated August 2, 2023, by and between Avinger, Inc. and the Lenders \(incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K filed on August 4, 2023\).](#)

10.46 [Waiver Agreement, dated September 29, 2023, by and between Avinger, Inc. and the Purchasers \(incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on September 29, 2023\).](#)

10.47	<a href="#">Amendment No. 7 to Term Loan Agreement, dated December 27, 2023, made by and among Avinger Inc. and GRG Partners III L.P. and certain of its affiliated funds, as lenders (incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on December 29, 2023).</a>
10.48	<a href="#">Amendment No. 8 to Term Loan Agreement, dated January 26, 2024, by and among Avinger Inc. and the lenders party thereto (incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed January 26, 2024).</a>
10.49	<a href="#">Strategic Cooperation and Framework Agreement, dated March 4, 2024, made by and between Avinger, Inc. and Zylox-Tonbridge Medical Technology Co., Ltd (incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.50	<a href="#">Securities Purchase Agreement, dated March 4, 2024, made by and between Avinger, Inc. and Zylox-Tonbridge Medical Limited (incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.51	<a href="#">Registration Rights Agreement, dated March 5, 2024, made by and between Avinger, Inc. and Zylox-Tonbridge Medical Limited (incorporated by reference to Exhibit 10.3 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.52	<a href="#">Amendment No. 9 to Term Loan Agreement, dated March 5, 2024, made by and among Avinger, Inc. and GRG Partners III L.P. and certain of its affiliated funds, as lenders (incorporated by reference to Exhibit 10.4 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.53	<a href="#">Form of Common Stock Purchase Warrant of Avinger, Inc (incorporated by reference to Exhibit 10.5 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.54	<a href="#">Securities Purchase Agreement, dated March 5, 2024, by and between Avinger, Inc. and the purchasers party thereto (incorporated by reference to Exhibit 10.6 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.55	<a href="#">Registration Rights Agreement, dated March 5, 2024, by and between Avinger, Inc. and the holders party thereto (incorporated by reference to Exhibit 10.7 to our Current Report on Form 8-K filed March 7, 2024).</a>
10.56	<a href="#">Fourth Amendment to Lease Agreement dated March 6, 2024 by and between Avinger, Inc. and HCP LS Redwood City, LLC (Incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed March 12, 2024).</a>
10.57	<a href="#">License and Distribution Agreement, dated March 4, 2024, made by and between Avinger, Inc. and Zylox-Tonbridge Medical Technology Co., Ltd (Incorporated by reference to Exhibit 10.10 to our Quarterly Report on Form 10-Q filed May 15, 2024)</a>
10.58	<a href="#">Securities Purchase Agreement, dated May 16, 2024, by and between the Company and the Lenders party thereto (Incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed May 16, 2024)</a>
10.59	<a href="#">Consent to Term Loan Agreement, dated May 16, 2024, by and between the Company and the Lenders (Incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K filed May 16, 2024)</a>
10.60**	Form of Securities Purchase Agreement
5.1**	Opinion of Dorsey & Whitney LLP
23.1*	Consent of Independent Registered Public Accounting Firm
23.2**	Consent of Dorsey & Whitney LLP (included in Exhibit 5.1)
24.1*	<a href="#">Power of Attorney (included on the signature page to this registration statement on Form S-1).</a>
107*	Filing Fee Table

# Management contract or compensatory plan or arrangement

\* Filed herewith

\*\* To be filed by amendment

**Item 17. Undertakings**

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

- (i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933, as amended (the "Securities Act");
- (ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Securities and Exchange Commission (the "SEC") pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and
- (iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement; provided, however, that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) of this section do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the SEC by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement;

provided, however, that paragraphs (1)(i), (1)(ii) and (1)(iii) above do not apply if the registration statement is on Form S-1 and the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof;

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering;

(4) That, for the purpose of determining liability under the Securities Act to any purchaser, each prospectus filed by the registrant pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness; and provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use;

(5) That, for the purpose of determining liability of the registrant under the Securities Act to any purchaser in the initial distribution of the securities, the undersigned registrant hereby undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

- (i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424 (§ 230.424 of this chapter);
- (ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
- (iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
- (iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof; and

(c) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction, the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Redwood City, California, on May 24, 2024.

### Avinger, Inc.

By: /s/ Jeffrey M. Soinski  
Name: Jeffrey M. Soinski  
Title: Chief Executive Officer

### POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Jeffrey M. Soinski and Nabeel Subainati, and each of them singly, as such person's true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for such person and in such person's name, place and stead, in any and all capacities, to sign any or all amendments (including, without limitation, post-effective amendments) to this registration statement (or any registration statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act of 1933), and to file the same, with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting unto each said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as such person might or could do in person, hereby ratifying and confirming all that any said attorney-in-fact and agent, or any substitute or substitutes of any of them, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement on Form S-1 has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
<u>/s/ Jeffrey M. Soinski</u> Jeffrey M. Soinski	Chief Executive Officer and Director (Principal Executive Officer)	May 24, 2024
<u>/s/ Nabeel Subainati</u> Nabeel Subainati	Vice President, Finance (Principal Financial and Accounting Officer)	May 24, 2024
<u>/s/ James B. McElwee</u> James B. McElwee	Director	May 24, 2024
<u>/s/ James G. Cullen</u> James G. Cullen	Director	May 24, 2024
<u>/s/ Tamara N. Elias</u> Tamara N. Elias	Director	May 24, 2024
<u>/s/ Jonathan Zhong Zhao, Ph.D.</u> Jonathan Zhong Zhao, Ph.D.	Director	May 24, 2024

**Consent of Independent Registered Public Accounting Firm**

We consent to the incorporation by reference in this Registration Statement on Form S-1 of Avinger, Inc. of our report dated March 20, 2024, relating to the financial statements and schedules of Avinger, Inc. (the "Company") (which report expresses an unqualified opinion and includes an explanatory paragraph relating to a going concern uncertainty), appearing in the Annual Report on Form 10-K of the Company for the year ended December 31, 2023, filed with the Securities and Exchange Commission. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ Moss Adams LLP

San Francisco, California  
May 24, 2024

**Calculation of Filing Fee Tables**

S-1

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(Form Type)

Avinger, Inc.

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(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered Securities

Table 1: Newly Registered and Carry Forward Securities

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Security Type	Security Class Title	Fee Calculation Rule	Amount to be Registered	Proposed Maximum Offering Price Per Unit	Proposed Maximum Aggregate Offering Price <sup>(1)(2)</sup>	Fee Rate	Amount of Registration Fee
Equity	Common Stock, par value \$0.001 per share	Rule 457(o)	-	-	\$ 6,000,000.00 (3)	\$ 0.0001476	\$ 885.60
Equity	Common Warrants	Rule 457(g)	-	-	(4)	-	-
Equity	Pre-Funded Warrants	Rule 457(g)	-	-	(3)(4)	-	-
Equity	Placement Agent Warrants <sup>(5)</sup>	Rule 457(g)	-	-	(4)(5)	-	-
Equity	Common Stock underlying Common Warrants	Rule 457(o)	-	-	\$ 6,000,000.00	\$ 0.0001476	\$ 885.60
Equity	Common Stock underlying Pre-Funded Warrants	Rule 457(o)	-	-	-	-	-
Equity	Common Stock underlying Placement Agent Warrants	Rule 457(o)	-	-	\$ 450,000.00 (5)(6)	\$ 0.0001476	\$ 66.42
<b>Total Offering Amounts</b>					<b>\$ 12,450,000.00</b>		<b>\$ 1,837.62</b>
<b>Total Fees Previously Paid</b>							
<b>Total Fee Offsets</b>							
<b>Net Fee Due</b>							<b>\$ 1,837.62</b>

(1)Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended (the "Securities Act").

(2)Pursuant to Rule 416(a) under the Securities Act, there are also being registered an indeterminable number of additional securities as may be issued to prevent dilution resulting from stock splits, stock dividends or similar transactions.

(3)The proposed maximum aggregate offering price of the Common Stock proposed to be sold in the offering will be reduced on a dollar-for-dollar basis based on the offering price of any Pre-Funded Warrants sold in the offering, and, as such, the proposed maximum aggregate offering price of the Common Stock and Pre-Funded Warrants (including the Common Stock issuable upon exercise of the Pre-Funded Warrants), if any, is \$6,000,000.

(4)Pursuant to Rule 457(g) of the Securities Act, no separate registration fee is required for the warrants because the warrants are being registered in the same registration statement as the Common Stock issuable upon exercise of the warrants.

(5)We have agreed to issue to the representative of the placement agent warrants to purchase shares of Common Stock representing up to 6% of the Common Stock issued in the offering (including the Pre-Funded Warrants issued in the offering). The Placement Agent Warrants are exercisable at a per share exercise price equal to 125% of the public offering price per share of the Common Stock offered hereby.

(6)We have calculated the proposed maximum aggregate offering price of the Common Stock underlying the Placement Agent Warrants by assuming that such warrants are exercisable at a price per share equal to 125% of the combined public offering price per share of Common Stock and accompanying warrant.