

Lightwave Logic, Inc.
Form S-1
January 30, 2019

As Filed with the Securities and Exchange Commission on January 30, 2019

Registration No. 333-

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

FORM S-1 REGISTRATION STATEMENT

UNDER THE SECURITIES ACT OF 1933

LIGHTWAVE LOGIC, INC.

(Name of Registrant As Specified in its Charter)

Nevada

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

3080

*(Primary Standard Industrial
Classification Code Number)*

82-049-7368

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

**369 Inverness Parkway, Suite 350
Englewood, Colorado 80112
(720) 340-4949**

(Address and Telephone Number of Principal Executive Offices)

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Approximate Date of Proposed Sale to the Public:

As soon as practicable 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.

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, or a smaller reporting 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.

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Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

If an emerging growth company, indicate by checkmark if the registrant has not elected 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.

CALCULATION OF REGISTRATION FEE

TITLE OF EACH CLASS OF SECURITIES TO BE REGISTERED	AMOUNT TO BE REGISTERED(1)	PROPOSED MAXIMUM OFFERING PRICE PER SHARE(2)	PROPOSED MAXIMUM AGGREGATE OFFERING PRICE	AMOUNT OF REGISTRATION FEE
Common Stock, par value \$0.001 per share	9,500,000	\$ 0.71	\$ 6,745,000.00	\$ 817.49
TOTAL	9,500,000		\$	\$ 817.49

(1)

Pursuant to Rule 416 under the Securities Act of 1933, as amended (the Securities Act), the securities being registered hereunder also include such indeterminate number of additional shares of Common Stock as may from time to time be issued after the date hereof as a result of stock splits, stock dividends, recapitalizations or similar transactions.

(2)

The offering price has been estimated solely for the purpose of computing the amount of the registration fee in accordance with Rule 457(c) under the Securities Act of 1933. The price per share and aggregate offering price are based on the average of the high and low sales prices of the registrant's Common Stock on January 28, 2019, as reported on the OTC Markets (OTCQB).

The Registrant 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 hereafter 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 Commission, acting pursuant to Section 8(a), may determine.

The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission becomes effective. This prospectus is not an offer to sell these securities and we are not soliciting offers to buy these securities in any state where the offer or sale is not permitted.

PROSPECTUS

SUBJECT TO COMPLETION

January 30, 2019

9,500,000 Shares of Common Stock

This prospectus relates to the resale of up to 9,500,000 shares of the common stock, par value \$0.001 per share (Common Stock) of Lightwave Logic, Inc. (Company , us or we) which may be offered by the selling securityholder identified in this prospectus from time to time. 9,500,000 shares (including 1,162,500 commitment shares) have been or may be issued pursuant to a purchase agreement between Lincoln Park and the Company, dated as of January 21, 2019 (the Purchase Agreement . See The Lincoln Park Transaction for a description of the Purchase Agreement, and Selling Securityholder for additional information regarding Lincoln Park.

We previously filed a registration statement on Form S-3 (File No. 333-224614) (the Prior Registration Statement) filed with the Securities and Exchange Commission on January 30, 2018 and declared effective on May 11, 2018. The Prior Registration Statement registered 21,705,326 shares of Common Stock including 5,563,343 shares that have been or may be issued pursuant to a purchase agreement between Lincoln Park and the Company, dated as of January 29, 2016 (the 2016 Purchase Agreement). As of January 22, 2019, 1,396,995 shares (including 246,995 commitment shares) registered under the Prior Registration Statement remain available for sale (or issuance) to Lincoln Park under the 2016 Purchase Agreement, which will terminate pursuant to its terms on April 30, 2019, after which time no further shares can be sold to Lincoln Park thereunder.

The registration of the shares hereunder does not mean that Lincoln Park will actually offer or sell the full number of the shares being registered pursuant to this prospectus. We will not receive any proceeds from the sales of shares of our Common Stock by Lincoln Park; however we may receive proceeds upon the sale of up to 8,337,500 purchase shares to Lincoln Park under the Purchase Agreement, which have not yet been sold.

Lincoln Park is an underwriter within the meaning of Section 2(a)(11) of the Securities Act. Lincoln Park may offer the securities registered hereunder directly or through agents or to or through underwriters or dealers. The securities may be offered and sold through public or private transactions at market prices prevailing at the time of sale, at a fixed price or fixed prices, at negotiated prices, at various prices determined at the time of sale or at prices related to prevailing market prices. See "Plan of Distribution" for more information about how Lincoln Park may sell the shares of Common Stock being registered pursuant to this prospectus.

Our Common Stock is currently quoted on the OTC Markets (OTCQB) under the symbol "LWLG". On January 22, 2019, the Company had 79,934,809 shares issued and outstanding, and the last reported sale price of our Common Stock was \$0.74 per share.

We will pay the expenses incurred in registering the shares, including legal and accounting fees. See Plan of Distribution .

Investing in our securities involves a high degree of risk. See Risk Factors beginning on page 4 of this prospectus for a discussion of information that should be considered in connection with an investment in our securities.

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

The date of this prospectus is _____, 2019.

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You should rely only on the information contained in this prospectus. We have not, and the selling securityholder has not, authorized any person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. This prospectus is not an offer to sell, nor is the selling securityholder seeking an offer to buy, securities in any state where the offer or solicitation is not permitted. The information contained in this prospectus is complete and accurate as of the date on the front cover of this prospectus, but information may have changed since that date. We are responsible for updating this prospectus to ensure that all material information is included and will update this prospectus to the extent required by law.

This prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they

do not guarantee the accuracy or completeness of such information. While we believe that these industry publications and third-party research, surveys and studies are reliable, we have not independently verified such data and we do not make any representation as to the accuracy of the information.

PROSPECTUS SUMMARY

Our Company

We were incorporated under the laws of the State of Nevada on June 24, 1997 and in 2004 we acquired PSI-TEC Corp., and in 2006 we merged with PSI-TEC Corp. PSI-TEC Corp. was incorporated under the laws of the State of Delaware on September 12, 1995. In 2008 we changed our name to Lightwave Logic, Inc. Unless the context otherwise requires, all references to Lightwave the Company, we, our or us and other similar terms means Lightwave Logic, Inc., a Nevada corporation.

Our principal executive office is located at 369 Inverness Parkway, Suite 350, Englewood, CO 80112, and our telephone number is (720) 340-4949. Our website address is www.lightwavelogic.com. No information found on our website is part of this prospectus.

Overview

Lightwave Logic, Inc. is a development stage company whose P²ICTM technology addresses advanced telecommunication, data communications, and data center markets utilizing its advanced organic electro-optic polymer systems. The Company currently has development activities in both polymer materials as well as device design.

Materials Development

The Company designs and synthesizes organic chromophores for use in its own proprietary electro-optic *polymer systems* and photonic device designs. A polymer system is not solely a material, but also encompasses various technical enhancements necessary for its implementation. These include host polymers, poling methodologies, and molecular spacer systems that are customized to achieve specific optical properties. Our organic electro-optic polymer systems compounds are mixed into solution form that allows for thin film application. Our proprietary electro-optic polymers are designed at the molecular level for potentially superior performance, stability and cost-efficiency. We believe they have the potential to replace more expensive, higher power consuming, slower-performance materials and devices used in fiber-optic communication networks.

Our patented and patent pending molecular architectures are based on a well-understood chemical and quantum mechanical occurrence known as *aromaticity*. Aromaticity provides a high degree of molecular stability that enables our core molecular structures to maintain stability under a broad range of operating conditions.

We expect our patented and patent-pending optical materials along with trade secrets and licensed materials, to be the core of and the enabling technology for future generations of optical devices, modules, sub-systems and systems that we will develop or potentially out-license to electro-optic device manufacturers. The Company contemplates future applications that may address the needs of semiconductor companies, optical network companies, Web 2.0 media companies, high performance computing companies, telecommunications companies, aerospace companies, and government agencies.

Device Design and Development

Electro-optic Modulators

The Company designs its own proprietary electro-optical modulation devices. Electro-optical modulators convert data from electric signals into optical signals that can then be transmitted over high-speed fiber-optic cables. Our modulators are electro-optic, meaning they work because the optical properties of the polymers are affected by electric fields applied by means of electrodes. Modulators are key components that are used in fiber optic telecommunications, data communications, and data centers networks etc., to convey the high data flows that have been driven by applications such as pictures, video streaming, movies etc., that are being transmitted through the internet. Electro-optical modulators are expected to continue to be an essential element as the appetite and hunger for data increases every year.

Polymer Photonic Integrated Circuits (P²ICTM)

The Company also designs its own proprietary polymer photonic integrated circuits (otherwise termed a polymer PIC). A polymer PIC is a photonic device that integrates several photonic functions on a single chip. We believe that our technology can enable the ultra-miniaturization needed to increase the number of photonic functions residing on a semiconductor chip to create a progression like what was seen in the computer integrated circuits, commonly referred to as Moore's Law. One type of integration is to combine several instances of the same photonic functions such as a plurality of modulators to create a 4 channel polymer PIC. In this case, the number of photonic components would increase by a factor of 4. Another type is to combine different types of devices including from different technology bases such as the combination of a semiconductor laser with a polymer modulator. Our P²IC platform encompasses both these types of architecture.

Current photonic technology today is struggling to reach faster device speeds. Our modulator devices, enabled by our electro-optic polymer material systems, work at extremely high frequencies (wide bandwidths) and possess inherent advantages over current crystalline electro-optic material contained in most modulator devices such as lithium niobate (LiNbO₃), indium phosphide (InP), silicon (Si), and gallium arsenide (GaAs). Our advanced electro-optic polymer platform is creating a new class of modulators and associated PIC platforms that can address higher data rates in a lower cost, lower power consuming manner, with much simpler modulation techniques.

Our electro-optic polymers can be integrated with other materials platforms because they can be applied as a thin film coating in a fabrication clean room such as may be found in semiconductor foundries. Our polymers are unique in that they are stable enough to seamlessly integrate into existing CMOS, Indium Phosphide (InP), Gallium Arsenide (GaAs), and other semiconductor manufacturing lines.

The Offering

Common stock outstanding prior to this offering (1) 79,934,809, including 350,000 commitment shares issued to Lincoln Park under the Purchase Agreement prior to the effectiveness of the registration statement of which this prospectus is a part (the Registration Statement).

Common Stock offered by the selling securityholder Up to 9,500,000 shares of Common Stock, consisting of (i) 8,337,500 shares of Common Stock that may be issued to Lincoln Park as purchase shares under the Purchase Agreement, (ii) 350,000 commitment shares issued to Lincoln Park as initial commitment shares under the Purchase Agreement and (iii) 812,500 shares of Common Stock that may be issued to Lincoln Park as commitment shares under the Purchase Agreement following the effectiveness of the Registration Statement of which this prospectus is a part.

Common stock to be outstanding after this offering 89,084,809 shares

Use of proceeds

We will receive no proceeds from the sale of shares of Common Stock by Lincoln Park in this offering. We may receive up to \$25,000,000 aggregate gross proceeds under the Purchase Agreement from any sales we make to Lincoln Park pursuant to the Purchase Agreement. Any proceeds that we receive from sales to Lincoln Park under the Purchase Agreement will be used for working capital and general corporate purposes. See "Use of Proceeds".

OTC Markets (OTCQB) symbol

LWLG

Risk factors

This investment involves a high degree of risk. See Risk Factors for a discussion of factors you should consider carefully before making an investment decision.

(1)

The number of shares of our Common Stock set forth above is based on 79,934,809 shares of Common Stock outstanding as of January 22, 2019, and excludes options and warrants to purchase an aggregate of 19,334,867 shares of our Common Stock at exercise prices ranging from \$0.57 - \$1.69 per share with a weighted average exercise price of \$0.90 per share.

The Lincoln Park Transactions

On January 21, 2019, the Company entered into the Purchase Agreement with Lincoln Park, pursuant to which Lincoln Park agreed to purchase from us up to \$25,000,000 of our Common Stock (subject to certain limitations) from time to time over a 36-month period. In connection with the Purchase Agreement, the Company also entered into a registration rights agreement with Lincoln Park whereby the Company agreed to file registration statements, with the SEC covering the shares of the Company's Common Stock that may be issued to Lincoln Park under the Purchase Agreement. After the Registration Statement of which this prospectus is a part is declared effective, the Company may, from time to time and at its sole discretion, direct Lincoln Park to purchase up to 125,000 shares of our Common Stock on any such business day, which may be increased to up to 200,000 shares depending on certain conditions as set forth in the Purchase Agreement (and subject to adjustment for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction as provided in the Purchase Agreement); provided that in no event shall Lincoln Park purchase more than \$500,000 worth of our Common Stock on any single business day (each, a "Regular Purchase"). Under certain circumstances, we may also, in our sole discretion, direct Lincoln Park on each purchase date to make "accelerated purchases" on the following business day up to the lesser of (i) two (2) times the number of shares purchased pursuant to a Regular Purchase or (ii) 30% of the trading volume on the accelerated purchase date at a purchase price equal to the lesser of (i) the closing sale price on the accelerated purchase date and (ii) 95% of the accelerated purchase date's volume weighted average price. Except as described in this prospectus, there are no trading volume requirements or restrictions under the Purchase Agreement, and we control the timing and amount of any sales of our Common Stock to Lincoln Park. The purchase price of the up to 200,000 shares that may be sold to Lincoln Park under the Purchase Agreement on any business day will be based on the market price of our Common Stock immediately preceding the time of sale as computed under the Purchase Agreement without any fixed discount.

The purchase price per share will be equitably adjusted for any reorganization, recapitalization, non-cash dividend, forward or reverse stock split, or other similar transaction occurring during the business days used to compute such price. We may at any time in our sole discretion terminate the Purchase Agreement without fee, penalty or cost upon one business day's prior notice.

The Purchase Agreement contains customary representations, warranties, covenants, closing conditions and indemnification and termination provisions by, among and for the benefit of the parties. Lincoln Park has covenanted not to cause or engage in any manner whatsoever, any direct or indirect short selling or hedging of the Company's Common Stock. Lincoln Park may not assign or transfer its rights and obligations under the Purchase Agreement, and the Purchase Agreement may be terminated by the Company at any time at its discretion without any cost to the Company.

In consideration for entering into the Purchase Agreement, the Company issued to Lincoln Park 350,000 shares of Common Stock as a commitment fee and is obliged to issue up to an additional 812,500 commitment shares, pro rata for no consideration, when and if Lincoln Park purchases (at the Company's discretion) the \$25,000,000 aggregate commitment. For example, if we elect, at our sole discretion, to require Lincoln Park to purchase \$50,000 of our stock then we would issue 1,625 additional commitment shares, which is the product of \$50,000 (the amount we have elected to sell) divided by \$25,000,000 (remaining total amount we can sell Lincoln Park pursuant to the Purchase Agreement) multiplied by 812,500 (the total number of additional commitment shares). The additional commitment shares will only be issued pursuant to this formula if and when we elect at our discretion to sell stock to Lincoln Park.

Until the earlier of (i) April 30, 2019 (ii) such time as we terminate the 2016 Purchase Agreement, (iii) such time as all of the 1,396,995 purchase shares remaining available for purchase under the 2016 Purchase Agreement that are registered under the Prior Registration Statement have been sold to Lincoln Park, or (iv) the Prior Registration Statement is no longer effective, we may continue to direct Lincoln Park to purchase shares of Common Stock under the 2016 Purchase Agreement. After the occurrence of any of the above, and the Registration Statement of which this prospectus is a part has been declared effective, we will only sell shares of our Common Stock to Lincoln Park under the Purchase Agreement. See "The Lincoln Park Transaction" for additional description of the Purchase Agreement.

RISK FACTORS

Before you make a decision to invest in our securities, you should consider carefully the risks described below, together with other information in this prospectus. If any of the following events actually occur, our business, operating results, prospects or financial condition could be materially and adversely affected. This could cause the trading price of our Common Stock to decline and you may lose all or part of your investment. The risks described below are not the only ones that we face. Additional risks not presently known to us or that we currently deem immaterial may also significantly impair our business operations and could result in a complete loss of your investment.

Risks Related to our Business

We have incurred substantial operating losses since our inception and will continue to incur substantial operating losses for the foreseeable future.

Since our inception, we have been engaged primarily in the research and development of our electro-optic polymer materials technologies and potential products. As a result of these activities, we incurred significant losses and experienced negative cash flow since our inception. We incurred a net loss of \$5,749,382 for the year ended December 31, 2017 and \$4,509,172 for the nine months ended September 30, 2018. We anticipate that we will continue to incur operating losses through at least 2019.

We may not be able to generate significant revenue either through customer contracts for our potential products or technologies or through development contracts from the U.S. government or government subcontractors. We expect to continue to make significant operating and capital expenditures for research and development and to improve and expand production, sales, marketing and administrative systems and processes. As a result, we will need to generate significant revenue to achieve profitability. We cannot assure you that we will ever achieve profitability.

We are subject to the risks frequently experienced by early stage companies.

The likelihood of our success must be considered in light of the risks frequently encountered by early stage companies, especially those formed to develop and market new technologies. These risks include our potential inability to:

- Establish product sales and marketing capabilities;
- Establish and maintain markets for our potential products;
- Identify, attract, retain and motivate qualified personnel;
- Continue to develop and upgrade our technologies to keep pace with changes in technology and the growth of markets using polymer based materials;
- Develop expanded product production facilities and outside contractor relationships;
- Maintain our reputation and build trust with customers;
- Scale up from small pilot or prototype quantities to large quantities of product on a consistent basis;
- Contract for or develop the internal skills needed to master large volume production of our products; and
- Fund the capital expenditures required to develop volume production due to the limits of our available financial resources.

If we fail to effectively manage our growth, and effectively transition from our focus on research and development activities to commercially successful products, our business could suffer.

Failure to manage growth of operations could harm our business. To date, a large number of our activities and resources have been directed at the research and development of our technologies and development of potential related products. The transition from a focus on research and development to being a vendor of products requires effective planning and management. Additionally, growth arising from the expected synergies from future acquisitions will require effective planning and management. Future expansion will be expensive and will likely strain management and other resources.

In order to effectively manage growth, we must:

- Continue to develop an effective planning and management process to implement our business strategy;
- Hire, train and integrate new personnel in all areas of our business; and
- Expand our facilities and increase capital investments.

We cannot assure you that we will be able to accomplish these tasks effectively or otherwise effectively manage our growth.

We will require additional capital to continue to fund our operations and if we do not obtain additional capital, we may be required to substantially limit our operations.

Our business does not presently generate the cash needed to finance our current and anticipated operations. Based on our current operating plan and budgeted cash requirements, we believe that we have sufficient funds to finance our operations through May 2019. Although we expect that funds from the sale of purchase shares under the Purchase agreement will fund the Company in the near future, we may need to obtain additional future financing to finance our operations until such time that we can conduct profitable revenue-generating activities. We expect that we will need to seek additional funding through public or private financings, including additional equity financings, and through other arrangements, including collaborative arrangements. Poor financial results, unanticipated expenses or unanticipated opportunities could require us to obtain additional financing sooner than we expect. Other than with respect to the Purchase Agreements we entered into with Lincoln Park, we have no plans or arrangements with respect to the possible acquisition of additional financing, and such financing may be unavailable when we need it or may not be available on acceptable terms.

Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement and involves risks and uncertainties, and actual results could vary as a result of a number of factors, including the factors discussed elsewhere in this Registration Statement. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect.

Additional financing may not be available to us, due to, among other things, our Company not having a sufficient credit history, income stream, profit level, asset base eligible to be collateralized, or market for its securities. If we raise additional funds by issuing equity or convertible debt securities, the percentage ownership of our existing shareholders may be reduced, and these securities may have rights superior to those of our common stock. If adequate funds are not available to satisfy our long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations.

We are entering new markets, and if we fail to accurately predict growth in these new markets, we may suffer substantial losses.

We are devoting significant resources to engineer next-generation organic nonlinear optical materials and devices for future applications to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies as well as our proprietary photonic devices, such as our Polymer Photonic Integrated Circuits P²IC™. We expect to continue to develop products for these markets and to seek to identify new markets. These markets change rapidly, and we cannot assure you that they will grow or that we will be able to accurately forecast market demand, or lack thereof, in time to respond appropriately. Our investment of resources to develop products for these markets may either be insufficient to meet actual demand or result in expenses that are excessive in light of actual sales volumes. Failure to predict growth and demand accurately in new markets may cause us to suffer substantial losses. In addition, as we enter new markets, there is a significant risk that:

- The market may not accept the price and/or performance of our products;
- There may be issued patents we are not aware of that could block our entry into the market or could result in excessive litigation; and
- The time required for us to achieve market acceptance of our products may exceed our capital resources that would require additional investment.

Our plan to develop relationships with strategic partners may not be successful.

Part of our business strategy is to maintain and develop strategic relationships with private firms, and to a lesser extent, government agencies and academic institutions, to conduct research and development of products and technologies. For these efforts to be successful, we must identify partners whose competencies complement ours. We must also successfully enter into agreements with them on terms attractive to us, and integrate and coordinate their resources and capabilities with our own. We may be unsuccessful in entering into agreements with acceptable partners or negotiating favorable terms in these agreements. Also, we may be unsuccessful in integrating the resources or capabilities of these partners. In addition, our strategic partners may prove difficult to work with or less skilled than we originally expected. If we are unsuccessful in our collaborative efforts, our ability to develop and market products could be severely limited.

The failure to establish and maintain collaborative relationships may have a materially adverse affect on our business.

We plan to sell many of our products directly to commercial customers or through potential industry partners. For example, we expect to sell our proprietary electro-optic polymer systems to electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. Our ability to generate revenues depends significantly on the extent to which potential customers and other potential industry partners develop, promote and sell systems that incorporate our products, which, of course, we cannot control. Any failure by potential customers and other potential industry partners to successfully develop and market systems that incorporate our products could adversely affect our sales. The extent to which potential customers and other industry partners develop, promote and sell systems incorporating our products is based on a number of factors that are largely beyond our ability to control.

We may participate in joint ventures that expose us to operational and financial risk.

We may participate in one or more joint ventures for the purpose of assisting us in carrying out our business expansion, especially with respect to new product and/or market development. We may experience with our joint venture partner(s) issues relating to disparate communication, culture, strategy, and resources. Further, our joint venture partner(s) may have economic or business interests or goals that are inconsistent with ours, exercise their rights in a way that prohibits us from acting in a manner which we would like, or they may be unable or unwilling to fulfill their obligations under the joint venture or other agreements. We cannot assure you that the actions or decisions of our joint venture partners will not affect our operations in a way that hinders our corporate objectives or reduces any anticipated cost savings or revenue enhancement resulting from these ventures.

If we fail to develop and introduce new or enhanced products on a timely basis, our ability to attract and retain customers could be impaired and our competitive position could be harmed.

We plan to operate in a dynamic environment characterized by rapidly changing technologies and industry standards and technological obsolescence. To compete successfully, we must design, develop, market and sell products that provide increasingly higher levels of performance and reliability and meet the cost expectations of our customers. The introduction of new products by our competitors, the market acceptance of products based on new or alternative technologies, or the emergence of new industry standards could render our anticipated products obsolete. Our failure to anticipate or timely develop products or technologies in response to technological shifts could adversely affect our operations. In particular, we may experience difficulties with product design, manufacturing, marketing or certification that could delay or prevent our development, introduction or marketing of products. If we fail to introduce products that meet the needs of our customers or penetrate new markets in a timely fashion our Company will be adversely affected.

Our future growth will suffer if we do not achieve sufficient market acceptance of our organic nonlinear optical material products or our proprietary photonic devices.

We are developing our proprietary electro-optic polymer systems to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies, as well as our proprietary photonic devices, such as our Polymer Photonic Integrated Circuits P²IC™. All of our potential products are still in the development stage, and we do not know when a market for these products will develop, if at all. Our success depends, in part, upon our ability to gain market acceptance of our products. To be accepted, our products must meet the technical and performance requirements of our potential customers. OEMs, suppliers or government agencies may not accept polymer-based products. In addition, even if we achieve some degree of market acceptance for our potential products in one industry, we may not achieve market acceptance in other industries for which we are developing products.

Achieving market acceptance for our products will require marketing efforts and the expenditure of financial and other resources to create product awareness and demand by customers. We may be unable to offer products that compete effectively due to our limited resources and operating history. Also, certain large corporations may be predisposed against doing business with a company of our limited size and operating history. Failure to achieve broad acceptance of our products by customers and to compete effectively would harm our operating results.

Our potential customers require our products to undergo a lengthy and expensive qualification process, which does not assure product sales.

Prior to purchasing our products, our potential customers will require that our products undergo extensive qualification processes. These qualification processes may continue for several months or more. However, qualification of a product by a customer does not assure any sales of the product to that customer. Even after successful qualification and sales of a product to a customer, a subsequent revision to the product, changes in our customer's manufacturing process or our selection of a new supplier may require a new qualification process, which may result in additional delays. Also, once one of our products is qualified, it could take several additional months or more before a customer commences volume production of components or devices that incorporate our products. Despite these uncertainties, we are devoting substantial resources, including design, engineering, sales, marketing and management efforts, to qualifying our products with customers in anticipation of sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, sales of our products to a customer may be precluded or delayed, which may impede our growth and cause our business to suffer.

Obtaining a sales contract with a potential customer does not guarantee that a potential customer will not decide to cancel or change its product plans, which could cause us to generate no revenue from a product and adversely affect our results of operations.

Even after we secure a sales contract with a potential customer, we may experience delays in generating revenue from our products as a result of a lengthy development cycle that may be required. Potential customers will likely take a considerable amount of time to evaluate our products; it could take 12 to 24 months from early engagement by our sales team to actual product sales. The delays inherent in these lengthy sales cycles increase the risk that a customer will decide to cancel, curtail, reduce or delay its product plans, causing us to lose anticipated sales. In addition, any delay or cancellation of a customer's plans could materially and adversely affect our financial results, as we may have incurred significant expense and generated no revenue. Finally, our customers' failure to successfully market and sell their products could reduce demand for our products and materially and adversely affect our business, financial condition and results of operations. If we were unable to generate revenue after incurring substantial expenses to develop any of our products, our business would suffer.

Many of our products will have long sales cycles, which may cause us to expend resources without an acceptable financial return and which makes it difficult to plan our expenses and forecast our revenue.

Many of our products will have long sales cycles that involve numerous steps, including initial customer contacts, specification writing, engineering design, prototype fabrication, pilot testing, regulatory approvals (if needed), sales and marketing and commercial manufacture. During this time, we may expend substantial financial resources and management time and effort without any assurance that product sales will result. The anticipated long sales cycle for

some of our products makes it difficult to predict the quarter in which sales may occur. Delays in sales may cause us to expend resources without an acceptable financial return and make it difficult to plan expenses and forecast revenues.

Successful commercialization of our current and future products will require us to maintain a high level of technical expertise.

Technology in our target markets is undergoing rapid change. To succeed in our target markets, we will have to establish and maintain a leadership position in the technology supporting those markets. Accordingly, our success will depend on our ability to:

- Accurately predict the needs of our target customers and develop, in a timely manner, the technology required to support those needs;
- Provide products that are not only technologically sophisticated but are also available at a price acceptable to customers and competitive with comparable products;
- Establish and effectively defend our intellectual property; and
- Enter into relationships with other companies that have developed complementary technology into which our products may be integrated.

We cannot assure you that we will be able to achieve any of these objectives.

One of our significant target markets is the telecommunications market, which historically has not accepted polymer modulators.

One of our significant target markets is the telecommunications market, which demands high reliability optical components. Historically, polymer modulators have not been accepted into this market even though polymer modulators have achieved Telcordia based specifications. It is clear that the telecommunications market is demanding higher and higher data rates for its optical components, and may again decide that polymer based modulators are not suitable even if higher data rates, high reliability, and low power consumption are demonstrated

Another of our significant target markets is the data communications (datacenter and/or high performance computing) market, which may be subject to heavy competition from other PIC based technologies such as silicon photonics and Indium Phosphide.

Another of our significant target markets is the data communications (datacenter and/or high performance computing) market, which may be subject to heavy competition from other PIC based technologies such as silicon photonics and Indium Phosphide. As the demands for high performance, low cost (\$/Gbps) is implemented into next generation architectures, polymer modulators and polymer based PIC products may be subject to significant competition. Furthermore, there is a potential that technologies such as silicon photonics and Indium Phosphide might reach the metric of \$1/Gbps at 400Gbps before ours. Customers may then be less willing to purchase new technology such as ours or invest in new technology development such as ours for next generation systems.

Our inability to successfully acquire and integrate other businesses, assets, products or technologies could harm our business and cause us to fail at achieving our anticipated growth.

We may grow our business through strategic acquisitions and investments, such as our acquisition of BrPhotonics polymer business, and we are actively evaluating acquisitions and strategic investments in businesses, products or technologies that we believe could complement or expand our product offering, create and/or expand a client base, enhance our technical capabilities or otherwise offer growth or cost-saving opportunities. From time to time, we may enter into letters of intent with companies with which we are negotiating potential acquisitions or investments or as to which we are conducting due diligence. Although we are currently not a party to any binding definitive agreement with respect to potential investments in, or acquisitions of, complementary businesses, products or technologies, we may enter into these types of arrangements in the future, which could materially decrease the amount of our available cash or require us to seek additional equity or debt financing. We have limited experience in successfully acquiring and integrating businesses, products and technologies. We may not be successful in negotiating the terms of any potential acquisition, conducting thorough due diligence, financing the acquisition or effectively integrating the acquired business, product or technology into our existing business and operations. Our due diligence may fail to identify all of the problems, liabilities or other shortcomings or challenges of an acquired business, product or

technology, including issues related to intellectual property, product quality or product architecture, regulatory compliance practices, revenue recognition or other accounting practices, or employee or customer issues.

Additionally, in connection with any acquisitions we complete, we may not achieve the synergies or other benefits we expected to achieve, and we may incur write-downs, impairment charges or unforeseen liabilities that could negatively affect our operating results or financial position or could otherwise harm our business. If we finance acquisitions using existing cash, the reduction of our available cash could cause us to face liquidity issues or cause other unanticipated problems in the future. If we finance acquisitions by issuing convertible debt or equity securities, the ownership interest of our existing stockholders may be diluted, which could adversely affect the market price of our stock. Further, contemplating or completing an acquisition and integrating an acquired business, product or technology could divert management and employee time and resources from other matters, which could harm our business, financial condition and operating results.

We may incur debt in the future that might be secured with our intellectual property as collateral, which could subject our Company to the risk of loss of all of our intellectual property.

If we incur debt in the future, we may be required to secure the debt with our intellectual property, including all of our patents and patents pending. In the event we default on the debt, we could incur the loss of all of our intellectual property, which would materially and adversely affect our Company and cause you to lose your entire investment in our Company.

Our quarter-to-quarter performance may vary substantially, and this variance, as well as general market conditions, may cause our stock price to fluctuate greatly and even potentially expose us to litigation.

We have generated no significant sales to date and we cannot accurately estimate future quarterly revenue and operating expenses based on historical performance. Our quarterly operating results may vary significantly based on many factors, including:

- Fluctuating demand for our potential products and technologies;
- Announcements or implementation by our competitors of technological innovations or new products;
- Amount and timing of our costs related to our marketing efforts or other initiatives;
- The status of particular development programs and the timing of performance under specific development agreements;
- Timing and amounts relating to the expansion of our operations;
- Product shortages requiring suppliers to allocate minimum quantities;
- Announcements or implementation by our competitors of technological innovations or new products;
- The status of particular development programs and the timing of performance under specific development agreements;
- Our ability to enter into, renegotiate or renew key agreements;
- Timing and amounts relating to the expansion of our operations;
- Costs related to possible future acquisitions of technologies or businesses; or
- Economic conditions specific to our industry, as well as general economic conditions.

Our current and future expense estimates are based, in large part, on estimates of future revenue, which is difficult to predict. We expect to continue to make significant operating and capital expenditures in the area of research and development and to invest in and expand production, sales, marketing and administrative systems and processes. We may be unable to, or may elect not to, adjust spending quickly enough to offset any unexpected revenue shortfall. If our increased expenses were not accompanied by increased revenue in the same quarter, our quarterly operating results would be harmed.

Our failure to compete successfully could harm our business.

The markets that we are targeting for our proprietary electro-optic polymer systems and photonic devices are intensely competitive. Most of our present and potential competitors have or may have substantially greater research and product development capabilities, financial, scientific, marketing, manufacturing and human resources, name recognition and experience than we have. As a result, these competitors may:

- Succeed in developing products that are equal to or superior to our potential products or that will achieve greater market acceptance than our potential products;
- Devote greater resources to developing, marketing or selling their products;
- Respond more quickly to new or emerging technologies or scientific advances and changes in customer requirements, which could render our technologies or potential products obsolete;
- Introduce products that make the continued development of our potential products uneconomical;
- Obtain patents that block or otherwise inhibit our ability to develop and commercialize our potential products;
- Withstand price competition more successfully than we can;
- Establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.

The failure to compete successfully against these existing or future competitors could harm our business.

We may be unable to obtain effective intellectual property protection for our potential products and technology.

Our intellectual property, or any intellectual property that we have or may acquire, license or develop in the future, may not provide meaningful competitive advantages. Our patents and patent applications, including those we license, may be challenged by competitors, and the rights granted under such patents or patent applications may not provide meaningful proprietary protection. For example, numerous patents held by third parties relate to polymer materials and electro-optic devices. These patents could be used as a basis to challenge the validity or limit the scope of our patents or patent applications. A successful challenge to the validity or limitation of the scope of our patents or patent applications could limit our ability to commercialize our polymer materials technology and, consequently, reduce our revenues.

Moreover, competitors may infringe our patents or those that we license, or successfully avoid these patents through design innovation. To combat infringement or unauthorized use, we may need to resort to litigation, which can be expensive and time-consuming and may not succeed in protecting our proprietary rights. In addition, in an infringement proceeding a court may decide that our patents or other intellectual property rights are not valid or are unenforceable, or may refuse to stop the other party from using the intellectual property at issue on the ground that it is non-infringing. Policing unauthorized use of our intellectual property is difficult and expensive, and we may not be able to, or have the resources to, prevent misappropriation of our proprietary rights, particularly in countries where the laws may not protect these rights as fully as the laws of the United States.

We also rely on the law of trade secrets to protect unpatented technology and know-how. We try to protect this technology and know-how by limiting access to those employees, contractors and strategic partners with a need to know this information and by entering into confidentiality agreements with these parties. Any of these parties could breach the agreements and disclose our trade secrets or confidential information to our competitors, or these competitors might learn of the information in other ways. Disclosure of any trade secret not protected by a patent could materially harm our business.

We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from commercializing our potential products.

Third parties may claim that our potential products or related technologies infringe their patents. Any patent infringement claims brought against us may cause us to incur significant expenses, divert the attention of our management and key personnel from other business concerns and, if successfully asserted against us, require us to pay substantial damages. In addition, as a result of a patent infringement suit, we may be forced to stop or delay developing, manufacturing or selling potential products that are claimed to infringe a patent covering a third party's intellectual property unless that party grants us rights to use its intellectual property. We may be unable to obtain these rights on terms acceptable to us, if at all. Even if we are able to obtain rights to a third party's patented intellectual property, these rights may be non-exclusive, and therefore our competitors may obtain access to the same intellectual property. Ultimately, we may be unable to commercialize our potential products or may have to cease some of our business operations as a result of patent infringement claims, which could severely harm our business.

If our potential products infringe the intellectual property rights of others, we may be required to indemnify customers for any damages they suffer. Third parties may assert infringement claims against our current or potential customers. These claims may require us to initiate or defend protracted and costly litigation on behalf of customers, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of these customers or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, we may be unable to continue selling such products.

Our technology may be subject to government rights.

We may have obligations to government agencies in connection with the technology that we have developed, including the right to require that a compulsory license be granted to one or more third parties selected by certain government agencies. It may be difficult to monitor whether these third parties will limit their use of our technology to these licensed uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse.

The loss of certain of our key personnel, or any inability to attract and retain additional personnel, could impair our ability to attain our business objectives.

Our future success depends to a significant extent on the continued service of our key management personnel, particularly Dr. Michael Leiby, our Chief Executive Officer and James S. Marcelli our President, Chief Operating Officer, Secretary and Principal Financial Officer. Accordingly, the loss of the services of either of these persons would adversely affect our business and our ability to timely commercialize our products, and impede the attainment of our business objectives.

Our future success will also depend on our ability to attract, retain and motivate highly skilled personnel to assist us with product development and commercialization. Competition for highly educated qualified personnel in the polymer industry is intense. If we fail to hire and retain a sufficient number of qualified management, engineering, sales and technical personnel, we will not be able to attain our business objectives.

If we fail to develop and maintain the quality of our manufacturing processes, our operating results would be harmed.

The manufacture of our potential products is a multi-stage process that requires the use of high-quality materials and advanced manufacturing technologies. Also, polymer-related device development and manufacturing must occur in a highly controlled, clean environment to minimize particles and other yield and quality-limiting contaminants. In spite of stringent quality controls, weaknesses in process control or minute impurities in materials may cause a substantial percentage of a product in a lot to be defective. If we are not able to develop and continue to improve on our manufacturing processes or to maintain stringent quality controls, or if contamination problems arise, our operating results would be harmed.

The complexity of our anticipated products may lead to errors, defects and bugs, which could result in the necessity to redesign products and could negatively, impact our reputation with customers.

Products as complex as those we intend to market might contain errors, defects and bugs when first introduced or as new versions are released. Delivery of products with production defects or reliability, quality or compatibility problems could significantly delay or hinder market acceptance of our products or result in a costly recall and could damage our reputation and adversely affect our ability to sell our products. If our products experience defects, we may need to undertake a redesign of the product, a process that may result in significant additional expenses.

We may also be required to make significant expenditures of capital and resources to resolve such problems. There is no assurance that problems will not be found in new products after commencement of commercial production, despite testing by our suppliers, our customers and us.

If we decide to make commercial quantities of products at our facilities, we will be required to make significant capital expenditures to increase capacity.

We lack the internal ability to manufacture products at a level beyond the stage of early commercial introduction. To the extent we do not have an outside vendor to manufacture our products, we will have to increase our internal production capacity and we will be required to expand our existing facilities or to lease new facilities or to acquire entities with additional production capacities. These activities would require us to make significant capital investments and may require us to seek additional equity or debt financing. We cannot assure you that such financing would be available to us when needed on acceptable terms, or at all. Further, we cannot assure you that any increased demand for our potential products would continue for a sufficient period of time to recoup our capital investments associated with increasing our internal production capacity.

In addition, we do not have experience manufacturing our potential products in large quantities. In the event of significant demand for our potential products, large-scale production might prove more difficult or costly than we anticipate and lead to quality control issues and production delays.

We may not be able to manufacture products at competitive prices.

To date, we have produced limited quantities of products for research, development, demonstration and prototype purposes. The cost per unit for these products currently exceeds the price at which we could expect to profitably sell them. If we cannot substantially lower our cost of production as we move into sales of products in commercial quantities, our financial results will be harmed.

We conduct significantly all of our research and development activities at our Englewood, CO facility, and circumstances beyond our control may result in considerable interruptions.

We conduct significantly all of our research and development activities at our Englewood, CO facility. And although we have an agreement with CU Boulder to use their facilities in case of any contingency, a disaster such as a fire, flood or severe storm at or near one of our facilities could prevent us from further developing our technologies or manufacturing our potential products, which would harm our business.

We are subject to regulatory compliance related to our operations.

We are subject to various U.S. governmental regulations related to occupational safety and health, labor and business practices. Failure to comply with current or future regulations could result in the imposition of substantial fines, suspension of production, alterations of our production processes, cessation of operations, or other actions, which could harm our business.

We may be unable to export our potential products or technology to other countries, convey information about our technology to citizens of other countries or sell certain products commercially, if the products or technology are subject to United States export or other regulations.

We are developing certain polymer-based products that we believe the United States government and other governments may be interested in using for military and information gathering or antiterrorism activities. United States government export regulations may restrict us from selling or exporting these potential products into other countries, exporting our technology to those countries, conveying information about our technology to citizens of other countries or selling these potential products to commercial customers. We may be unable to obtain export licenses for products or technology, if they become necessary. We currently cannot assess whether national security concerns would affect our potential products and, if so, what procedures and policies we would have to adopt to comply with applicable existing or future regulations.

We may incur liability arising from the use of hazardous materials.

Our business and our facilities are subject to a number of federal, state and local laws and regulations relating to the generation, handling, treatment, storage and disposal of certain toxic or hazardous materials and waste products that we use or generate in our operations. Many of these environmental laws and regulations subject current or previous owners or occupiers of land to liability for the costs of investigation, removal or remediation of hazardous materials. In addition, these laws and regulations typically impose liability regardless of whether the owner or occupier knew of, or was responsible for, the presence of any hazardous materials and regardless of whether the actions that led to the presence were taken in compliance with the law. In our business, we use hazardous materials that are stored on site. We use various chemicals in our manufacturing process that may be toxic and covered by various environmental controls. An unaffiliated waste hauler transports the waste created by use of these materials off-site. Many environmental laws and regulations require generators of waste to take remedial actions at an off-site disposal location even if the disposal was conducted lawfully. The requirements of these laws and regulations are complex, change frequently and could become more stringent in the future. Failure to comply with current or future environmental laws and regulations could result in the imposition of substantial fines, suspension of production, alteration of our production processes, cessation of operations or other actions, which could severely harm our business.

Our data and information systems and network infrastructure may be subject to hacking or other cyber security threats. If our security measures are breached and an unauthorized party obtains access to our proprietary business information, our information systems may be perceived as being unsecure, which could harm our business and reputation, and our proprietary business information could be misappropriated which could have an adverse effect on our business and results of operations.

Our Company stores and transmits its proprietary information on its computer systems. Despite our security measures, our information systems and network infrastructure may be vulnerable to cyber-attacks or could be breached due to an employee error or other disruption that could result in unauthorized disclosure of sensitive information that has the potential to significantly interfere with our business operations. Breaches of our security measures could expose us to a risk of loss or misuse of this information, litigation and potential liability. Since techniques used to obtain unauthorized access or to sabotage information systems change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventive measures in advance of such an attack on our systems. In addition, we use a vendor that uses cyber or Cloud storage of information as part of their service or product offerings, and despite our attempts to validate the security of such services, our proprietary information may be misappropriated by third parties. In the event of an actual or perceived breach of our security, or the security of one of our vendors, the market perception of the effectiveness of our security measures could be harmed and we could suffer damage to our reputation or our business. Additionally, misappropriation of our proprietary business information could prove competitively harmful to our business.

If we are unable to maintain effective internal controls, our business, financial position and results of operations could be adversely affected.

If we are unable to maintain effective internal controls, our business, financial position and results of operations could be adversely affected. We are subject to the reporting and other obligations under the Securities Exchange Act of 1934 (Exchange Act), including the requirements of Section 404 of the Sarbanes-Oxley Act of 2002, which require annual management assessments of the effectiveness of our internal control over financial reporting. Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States. Any failure to achieve and maintain effective internal controls could have an adverse effect on our business, financial position and results of operations. In addition, our independent registered public accounting firm is required to attest to the effectiveness of our internal control over financial reporting annually. If our independent registered public accounting firm is unable to attest to the effectiveness of our internal control over financial reporting, investor confidence in our reported results will be harmed and the price of our securities may fall. These reporting and other obligations place significant demands on our management and administrative and operational resources, including accounting resources.

Risks Related to Our Common Stock

Sales of shares to Lincoln Park under the Purchase Agreements may affect the price of our Common Stock and make it more difficult to raise additional equity capital.

All 9,500,000 shares registered hereunder which may be sold to Lincoln Park pursuant to the Purchase Agreements are expected to be freely tradable. Currently, 350,000 of such shares have been issued to Lincoln Park as commitment shares, and 9,150,000 of such shares are issuable from time to time under the Purchase Agreement. It is anticipated that such shares registered hereunder will be sold, if at all, before February of 2022 commencing on the date that the Registration Statement of which this prospectus is a part becomes effective. The sale by Lincoln Park of a significant amount of shares registered hereunder at any given time could cause the market price of our Common Stock to decline and to be highly volatile. We may ultimately sell (or issue as commitment shares) all, some or none of the shares of Common Stock issuable under the Purchase Agreement and registered in this offering Lincoln Park. If we sell (or issue as commitment shares) such shares to Lincoln Park, Lincoln Park may sell all, some or none of such shares. Therefore, sales to Lincoln Park by us under the Purchase Agreement may result in substantial dilution to the interests of other holders of our Common Stock. In addition, if we sell a substantial number of shares to Lincoln Park under the Purchase Agreement, or if investors expect that we will do so, the actual sales of shares or the mere existence of our arrangements with Lincoln Park may make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise wish to effect such sales. However, we have the right to control the timing and amount of any sales of our shares to Lincoln Park and the Purchase Agreement may be terminated by

us at any time at our discretion without any cost to us.

There is a limited market for our common stock, which may make it more difficult for you to sell your stock.

Our Company's Common Stock is quoted on the OTCMarkets (OTCQB) under the symbol "LWLG." The trading market for our Common Stock is limited, accordingly, there can be no assurance as to the liquidity of any markets that may develop for our common stock, your ability to sell our common stock, or the prices at which you may be able to sell our common stock.

Shares eligible for future sale may adversely affect the market.

From time to time, certain of the Company's shareholders may be eligible to sell all or some of their shares of Common Stock by means of ordinary brokerage transactions in the open market pursuant to Rule 144, promulgated under the Securities Act of 1933, as amended (the Securities Act), subject to certain limitations. In general, a non-affiliate stockholder who has satisfied a six-month holding period may, under certain circumstances, sell its shares, without limitation. Any substantial sale of the Company's Common Stock pursuant to Rule 144 or pursuant to any resale prospectus may have a material adverse effect on the market price of our common stock.

Our board of directors has the authority, without stockholder approval, to issue preferred stock with terms that may not be beneficial to existing common stockholders and with the ability to affect adversely stockholder voting power and perpetuate their control over us.

Our amended articles of incorporation allow us to issue shares of preferred stock without any vote or further action by our stockholders. Our board of directors has the authority to fix and determine the relative rights and preferences of preferred stock. Our board of directors also has the authority to issue preferred stock without further stockholder approval, including large blocks of preferred stock. As a result, our board of directors could authorize the issuance of a series of preferred stock that would grant to holders thereof the preferred right to our assets upon liquidation, the right to receive dividend payments before dividends are distributed to the holders of Common Stock or other preferred stockholders and the right to the redemption of the shares, together with a premium, prior to the redemption of our Common Stock or existing preferred stock, if any.

Preferred stock could be used to dilute a potential hostile acquirer. Accordingly, any future issuance of preferred stock or any rights to purchase preferred stock may have the effect of making it more difficult for a third party to acquire control of us. This may delay, defer or prevent a change of control or an unsolicited acquisition proposal. The issuance of preferred stock also could decrease the amount of earnings attributable to, and assets available for distribution to, the holders of our Common Stock and could adversely affect the rights and powers, including voting rights, of the holders of our Common Stock and preferred stock.

Our articles of incorporation and bylaws, and certain provisions of Nevada corporate law, as well as certain of our contracts, contain provisions that could delay or prevent a change in control even if the change in control would be beneficial to our stockholders.

Nevada law, as well as our amended articles of incorporation and bylaws, contain anti-takeover provisions that could delay or prevent a change in control of our Company, even if the change in control would be beneficial to our stockholders. These provisions could lower the price that future investors might be willing to pay for shares of our common stock. These anti-takeover provisions:

- authorize our board of directors to create and issue, without stockholder approval, preferred stock, thereby increasing the number of outstanding shares, which can deter or prevent a takeover attempt;
- prohibit cumulative voting in the election of directors, which would otherwise allow less than a majority of stockholders to elect director candidates;
- empower our board of directors to fill any vacancy on our board of directors, whether such vacancy occurs as a result of an increase in the number of directors or otherwise;
- provide that our board of directors be divided into three classes, with approximately one-third of the directors to be elected each year;

- provide that our board of directors is expressly authorized to adopt, amend or repeal our bylaws; and
- provide that our directors will be elected by a plurality of the votes cast in the election of directors.

Nevada Revised Statutes, the terms of our employee stock option agreements and other contractual provisions may also discourage, delay or prevent a change in control of our Company. Nevada Revised Statutes sections 78.378 to 78.3793 provide state regulation over the acquisition of a controlling interest in certain Nevada corporations unless the articles of incorporation or bylaws of the corporation provide that the provisions of these sections do not apply. Our articles of incorporation and bylaws do not state that these provisions do not apply. The statute creates a number of restrictions on the ability of a person or entity to acquire control of a Nevada company by setting down certain rules of conduct and voting restrictions in any acquisition attempt, among other things. The statute contains certain limitations and it may not apply to our Company. Our 2016 Equity Incentive Plan includes change-in-control provisions that allow us to grant options that may become vested immediately upon a change in control. Our board of directors also has the power to adopt a stockholder rights plan that could delay or prevent a change in control of our Company even if the change in control is generally beneficial to our stockholders. These plans, sometimes called poison pills, are oftentimes criticized by institutional investors or their advisors and could affect our rating by such investors or advisors. If our board of directors adopts such a plan, it might have the effect of reducing the price that new investors are willing to pay for shares of our common stock.

Together, these charter, statutory and contractual provisions could make the removal of our management and directors more difficult and may discourage transactions that otherwise could involve payment of a premium over prevailing market prices for our common stock. Furthermore, the existence of the foregoing provisions, as well as the significant Common Stock beneficially owned by our founders, executive officers, and members of our board of directors, could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our Company, thereby reducing the likelihood that you could receive a premium for your Common Stock in an acquisition.

The risks and uncertainties we have described are not the only risks that we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our operations. The occurrence of these known or unknown risks might cause you to lose all or part of your investment.

See also the statements contained under the heading [Forward Looking Statements](#).

FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. The forward-looking statements are contained principally in the sections entitled Prospectus Summary, Risk Factors, Management's Discussion and Analysis of Financial Condition and Results of Operations and Business but are also contained elsewhere in this prospectus. In some cases, you can identify forward-looking statements by the words may, might, will, could, would, should, expect, intend, plan, objective, anticipate, believe, e potential, continue and ongoing, or the negative of these terms, or other comparable terminology intended to identify statements about the future. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. Although we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus, we caution you that these statements are based on a combination of facts and factors currently known by us and our expectations of the future, about which we cannot be certain. Forward-looking statements include, but are not limited to, statements about:

- inability to generate revenue or to manage growth;
- lack of available funding;
- lack of a market for or market acceptance of our products;
- competition from third parties;
- general economic and business conditions;
- competition from third parties;
- intellectual property rights of third parties;
- changes in the price of our stock and dilution;
- regulatory constraints and potential legal liability;
- ability to maintain effective internal controls;
- security breaches, cybersecurity attacks and other significant disruptions in our information technology systems;
- changes in technology and methods of marketing;
- delays in completing various engineering and manufacturing programs;
- changes in customer order patterns and qualification of new customers;
- changes in product mix;
- success in technological advances and delivering technological innovations;
- shortages in components;
- production delays due to performance quality issues with outsourced components;
- those events and factors described by us in the section entitled "Risk Factors";
- other risks to which our Company is subject; and
- other factors beyond the Company's control.

In addition, you should refer to the "Risk Factors" section of this prospectus for a discussion of other important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. As a result of these factors, we cannot assure you that the forward-looking statements in this prospectus will prove to be accurate or that we will achieve the plans, intentions or expectations expressed or implied in our

forward-looking statements. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all. Any forward-looking statements we make in this prospectus speak only as of its date, and we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

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

USE OF PROCEEDS

This prospectus relates to shares of our Common Stock that may be offered and sold from time to time by the selling securityholder. We will receive no proceeds from the sale of shares of Common Stock by Lincoln Park in this offering. However, we may receive gross proceeds of up to \$25,000,000 under the Purchase Agreement, including the sale of up to 8,337,500 shares issued or issuable pursuant to the Purchase Agreement, which are being registered hereunder for resale by Lincoln Park.

We intend to use approximately 65% of any proceeds received under the Purchase Agreement towards our research and development efforts which may include, without limitation, (a) retaining additional management, sales, marketing, technical and other staff to our workforce, (b) expanding our research and development facilities, including the purchase of additional laboratory and production equipment, (c) marketing our future products as they are introduced into the marketplace, (d) developing and maintaining collaborative relationships with strategic partners, (e) developing and improving our manufacturing processes and quality controls, and approximately 35% of any proceeds received may be used for increasing our general and administrative activities related to our operations as a reporting public company and related corporate compliance requirements.

CAPITALIZATION

The following table sets forth our cash and cash equivalents and our capitalization as of September 30, 2018:

	September 30,
	2018
	(Unaudited)
Cash and cash equivalents	\$ 2,204,317
Stockholders' equity:	
Preferred stock, \$0.001 par value, 1,000,000 shares authorized, no shares issued or outstanding	
Common stock, \$0.001 par value, 250,000,000 shares authorized, 77,635,666 issued and outstanding	77,636
Additional paid-in-capital	61,006,130
Accumulated deficit	(56,265,183)
Total stockholders' equity	4,818,583
Total capitalization	\$ 5,237,215

The number of shares of Common Stock outstanding in the table above excludes, as of September 30, 2018, options and warrants to purchase an aggregate of 18,974,867 shares of our Common Stock at exercise prices ranging from \$0.57 - \$1.69 per share with a weighted average exercise price of \$0.91 per share.

MARKET FOR COMMON EQUITY AND RELATED SHAREHOLDER MATTERS**Market Information**

Our Common Stock is quoted on the OTCQB under the symbol **LWLG**. The following table set forth below lists the range of high and low bids for our Common Stock for our two most recent fiscal years and the interim period through January 22, 2019. The prices in the table reflect inter-dealer prices, without retail markup, markdown or commission and may not represent actual transactions or a liquid trading market.

		High	Low
2017	1st Quarter	\$0.86	\$0.63
	2nd Quarter	\$1.73	\$0.71
	3rd Quarter	\$1.53	\$1.04
	4th Quarter	\$1.47	\$1.29
2018	1st Quarter		
	2nd Quarter	\$1.30	\$1.06
	3rd Quarter	\$1.24	\$1.02
	4th Quarter	\$1.07	\$0.64
2019	1st Quarter (through January 22)	\$0.87	\$0.66

As of January 22, 2019, we have a total of 79,934,809 shares of Common Stock outstanding, held by approximately 107 record shareholders. We do not have any shares of preferred stock outstanding.

Dividends

No cash dividends have been declared or paid on our Common Stock to date. No restrictions limit our ability to pay dividends on our common stock. The payment of cash dividends in the future, if any, will be contingent upon our Company's revenues and earnings, if any, capital requirements and general financial condition. The payment of any dividends is within the discretion of our board of directors. Our board of director's present intention is to retain all earnings, if any, for use in our business operations and, accordingly, the board of directors does not anticipate paying any cash dividends in the foreseeable future.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following management's discussion and analysis of financial condition and results of operations provides information that management believes is relevant to an assessment and understanding of our plans and financial condition. The following selected financial information is derived from our historical financial statements and should be read in conjunction with such financial statements and notes thereto set forth elsewhere herein and the Forward-Looking Statements' explanation included herein.

Overview

Lightwave Logic, Inc. is a development stage company whose P²IC™ technology addresses advanced telecommunication, data communications, and data center markets utilizing its advanced organic electro-optic polymer systems. The Company currently has development activities in both polymer materials as well as device design.

Materials Development

The Company designs and synthesizes organic chromophores for use in its own proprietary electro-optic *polymer systems* and photonic device designs. A polymer system is not solely a material, but also encompasses various technical enhancements necessary for its implementation. These include host polymers, poling methodologies, and molecular spacer systems that are customized to achieve specific optical properties. Our organic electro-optic polymer systems compounds are mixed into solution form that allows for thin film application. Our proprietary electro-optic polymers are designed at the molecular level for potentially superior performance, stability and cost-efficiency. We believe they have the potential to replace more expensive, higher power consuming, slower-performance materials and devices used in fiber-optic communication networks.

Our patented and patent pending molecular architectures are based on a well-understood chemical and quantum mechanical occurrence known as *aromaticity*. Aromaticity provides a high degree of molecular stability that enables our core molecular structures to maintain stability under a broad range of operating conditions.

We expect our patented and patent-pending optical materials along with trade secrets and licensed materials, to be the core of and the enabling technology for future generations of optical devices, modules, sub-systems and systems that we will develop or potentially out-license to electro-optic device manufacturers. The Company contemplates future applications that may address the needs of semiconductor companies, optical network companies, Web 2.0 media

companies, high performance computing companies, telecommunications companies, aerospace companies, and government agencies.

Device Design and Development

Electro-optic Modulators

The Company designs its own proprietary electro-optical modulation devices. Electro-optical modulators convert data from electric signals into optical signals that can then be transmitted over high-speed fiber-optic cables. Our modulators are electro-optic, meaning they work because the optical properties of the polymers are affected by electric fields applied by means of electrodes. Modulators are key components that are used in fiber optic telecommunications, data communications, and data centers networks etc., to convey the high data flows that have been driven by applications such as pictures, video streaming, movies etc., that are being transmitted through the internet. Electro-optical modulators are expected to continue to be an essential element as the appetite and hunger for data increases every year.

Polymer Photonic Integrated Circuits (P²ICTM)

The Company also designs its own proprietary polymer photonic integrated circuits (otherwise termed a polymer PIC). A polymer PIC is a photonic device that integrates several photonic functions on a single chip. We believe that our technology can enable the ultra-miniaturization needed to increase the number of photonic functions residing on a semiconductor chip to create a progression like what was seen in the computer integrated circuits, commonly referred to as Moore's Law. One type of integration is to combine several instances of the same photonic functions such as a plurality of modulators to create a 4 channel polymer PIC. In this case, the number of photonic components would increase by a factor of 4. Another type is to combine different types of devices including from different technology bases such as the combination of a semiconductor laser with a polymer modulator. Our P²IC platform encompasses both these types of architecture.

Current photonic technology today is struggling to reach faster device speeds. Our modulator devices, enabled by our electro-optic polymer material systems, work at extremely high frequencies (wide bandwidths) and possess inherent advantages over current crystalline electro-optic material contained in most modulator devices such as lithium niobate (LiNbO₃), indium phosphide (InP), silicon (Si), and gallium arsenide (GaAs). Our advanced electro-optic polymer platform is creating a new class of modulators and associated PIC platforms that can address higher data rates in a lower cost, lower power consuming manner, with much simpler modulation techniques.

Our electro-optic polymers can be integrated with other materials platforms because they can be applied as a thin film coating in a fabrication clean room such as may be found in semiconductor foundries. Our polymers are unique in that they are stable enough to seamlessly integrate into existing CMOS, Indium Phosphide (InP), Gallium Arsenide (GaAs), and other semiconductor manufacturing lines.

Business Strategy

Our business strategy anticipates that our revenue stream will be derived from one or some combination of the following: (i) technology licensing for specific product application; (ii) joint venture relationships with significant industry leaders; or (iii) the production and direct sale of our own electro-optic device components. Our objective is to be a leading provider of proprietary technology and know-how in the electro-optic device market. In order to meet this objective, we intend to:

- Further the development of proprietary organic electro-optic polymer material systems
- Develop photonic devices based on our P²IC™ technology
- Continue to develop proprietary intellectual property
- Grow our commercial device development capabilities
- Grow our product reliability and quality assurance capabilities
- Grow our optoelectronic packaging and testing capabilities
- Grow our commercial material manufacturing capabilities
- Maintain/develop strategic relationships with major telecommunications and data communications companies to further the awareness and commercialization of our technology platform
- Continue to add high-level personnel with industrial and manufacturing experience in key areas of our materials and device development programs.

Create Organic Polymer-Enabled Electro-Optic Modulators

We intend to utilize our proprietary optical polymer technology to create an initial portfolio of commercial electro-optic polymer product devices with applications for various markets, including telecommunications, data

communications and data centers. These product devices will be part of our proprietary photonics integrated circuit (PIC) technology platform.

We expect our initial modulator products will operate at data rates at least 50 Gbaud (capable of 50 Gbps with standard data encoding of NRZ and 100 Gbps with more complex PAM-4 encoding). Our devices are highly linear, enabling the performance required to take advantage of the more advanced complex encoding schemes. We are currently developing our polymer technology to operate at the next industry node of 100Gbaud.

Our Proprietary Products in Development

As part of a two-pronged marketing strategy, our Company is developing several optical devices, which are in various stages of development and that utilize our polymer optical materials. They include:

Ridge Waveguide Modulator

Our ridge electro-optic waveguide modulator was designed and fabricated in our in-house laboratory. The fabrication of our first in-house device is significant to our entire device program and is an important starting point for modulators that are being developed for target markets. We have multiple generations of new materials that we will soon be optimizing for this specific design. In September 2017 we announced that our initial alpha prototype ridge waveguide modulator, enabled by our P²IC polymer system, demonstrated bandwidth performance levels that will enable 50 Gbaud modulation in fiber-optic communications. This device demonstrated true amplitude (intensity) modulation in a Mach-Zehnder modulator structure incorporating our polymer waveguides. This important achievement will allow users to utilize arrays of 4 x 50 Gbaud (4x 100 Gbps) polymer modulators using PAM-4 encoding to access 400 Gbps data rate systems. These ridge waveguide modulators are currently being packaged with our partner into prototype packages. We showed an example packaged modulator at our Annual Shareholders Meeting in May 2018.

These prototype packages will enable potential customers to evaluate the performance at 50 Gbaud. Once a potential customer generates technical feedback on our prototype, we expect to be asked to optimize the performance to their specifications. Assuming this is successful, we expect to enter a qualification phase where our prototypes will be evaluated more fully.

In parallel, we are developing modulators for scalability to higher data rates above 50 Gbaud. In September 2018, we showed in conference presentations the potential of our polymer modulator platform to operate at over 100 GHz bandwidth. This preliminary result corresponds to 100 Gbaud data rates using a simple NRZ data encoding scheme or 200 Gbps with PAM-4 encoding. With 4 channel arrays in our P²IC platform, the Company thus has the potential to address both 400 Gbps and 800 Gbps markets. While customers may start the engagement at 50 Gbaud, we believe potential customers recognize that scalability to higher speeds is an important differentiator of the polymer technology.

We believe the ridge waveguide modulator represents our first commercially viable device and targets the fiber optics communications market. We have completed internal market analysis and are initially targeting interconnect reach distances of greater than 10km. In these markets, the system network companies are looking to implement modulator-based transceivers that can handle aggregated data rates 100 Gbps and above. The market opportunity for greater than 10km is worth over \$1B over the next decade.

Advanced Modulator Structures

As part of supporting further improvement and scalability of our platform, we continue to explore more advanced device structures. Our functional polymer photonics slot waveguide modulator utilizes an existing modulator structure with one of our proprietary electro-optic polymer material systems as the enabling material layer and is functional as an operating prototype device.

Preliminary testing and initial data on our polymer photonics slot waveguide modulators demonstrated several promising characteristics. The tested polymer photonic chip had a 1-millimeter square footprint, enabling the possibility of sophisticated integrated optical circuits on a single silicon substrate. In addition, the waveguide structure was approximately 1/20 the length of a typical inorganic-based silicon photonics modulator waveguide.

With the combination of our proprietary electro-optic polymer material and the extremely high optical field concentration in the slot waveguide modulator, the test modulators demonstrated less than 2.2 volts to operate. Initial speeds exceeded 30-35 GHz in the telecom, 1550 nanometer frequency band. This is equivalent to 4 x 10Gbps, inorganic, lithium niobate modulators that would require approximately 12-16 volts to move the same amount of

information.

We continued with our collaborative development of our polymer photonic slot waveguide modulator in 2014 and continued our collaboration with an associated third-party research group in 2017 and 2018. We are now designing slot modulators to operate at data rates greater than 50 Gbaud.

Our Long-Term Device Development Goal - Multichannel Polymer Photonic Integrated Circuit (P²IC)

Our P²IC platform is positioned to address markets with aggregated data rates of 100 Gbaud, 400 Gbaud, 800 Gbaud and beyond. Our P²IC platform will contain a number of photonic devices that may include, over and above polymer-based modulators, photonic devices such as lasers, multiplexers, demultiplexers, detectors, fiber couplers.

While our polymer-based ridge waveguide and slot modulators are currently under development to be commercially viable products, our long-term device development goal is to produce a platform for the 400 Gbps and beyond transceiver market. This has been stated in our photonics product roadmap that is publicly available on our website. The roadmap shows a progression from: 10 Gbaud ridge waveguide modulators; to 25 Gbaud based ridge waveguide modulators; to 50 Gbaud based ridge waveguide modulators, and potentially 100 Gbaud based ridge waveguide modulators. These modulators are then arrayed to create a multichannel P²IC platform for the 100 Gbps, 400 Gbps, 800 Gbps, and potentially 1.6 Tbps aggregated data-rate markets. As the performance of the modulator is capable of up to 100 Gbaud, the next major milestone on our roadmap will be to create a multichannel polymer-based P²IC platform for the 400 Gbps market. This will be composed of either 4 channels each carrying 100 Gbps, implemented either with NRZ modulation on 100 Gbaud modulators or PAM-4 modulation on 50 Gbaud modulators.

For our device goals, we are developing polymer materials that perform even faster at a serial single channel 100Gbps using a NRZ modulation format. We showed bandwidths of polymer-based modulator devices at a major international conference (ECOC – European Conference on Optical Communications) this year with bandwidths that exceeded 100GHz. We noted that to achieve 100Gbaud, the polymer-based modulator only has to achieve 80GHz bandwidth. We were pleased with the polymer modulator performance, and we are now optimizing the device parameters for very low voltage operation.

Our Target Markets

Cloud computing and data centers

Big data is a general term used to describe the voluminous amount of unstructured and semi-structured data a Company creates -- data that would take too much time and cost too much money to load into a relational database for analysis. Companies are looking to cloud computing in their data centers to access all the data. Inherent speed and bandwidth limits of traditional solutions and the potential of organic polymer devices offer an opportunity to increase the bandwidth, reduce costs and improve speed of access.

Datacenters have grown to enormous sizes with hundreds of thousands and even millions of servers in a single datacenter. The number of so-called hyperscale datacenters are expected to continue to increase in number. Due to their size, a single datacenter may consist of multiple large warehouse-size buildings on a campus or even several locations distributed around a metropolitan area. Data centers are confronted with the problem of moving vast amounts of data not only around a single data center building, but also between buildings in distributed data center architecture. Links within a single datacenter building may be shorter than 500 meters, though some will require optics capable of 2 km. Between datacenter buildings, there is an increasing need for high performance interconnects over 10km in reach.

Our modulators are suitable for single-mode fiber optic links. We believe that our single mode modulator solutions will be competitive at 500m to 10km link distances, but it will be ideally suited at greater than 10km link distances.

Telecommunications/Data Communications

The telecommunications industry has evolved from transporting traditional analogue voice data over copper wire into the movement of digital voice and data. Telecommunication companies are faced with the enormous increasing

challenges to keep up with the resulting tremendous explosion in demand for bandwidth. The metropolitan network is especially under stress now and into the near future. Telecommunications companies provide services to some data center customers for the inter-data center connections discussed above. 5G mobile upgrade, autonomous driving and IoT are expected to increase the need for data stored and processed close to the end user in edge data centers. This application similarly requires optics capable of very high speeds and greater than 10 km reach.

Recent Significant Events and Milestones Achieved

In December 2016 we achieved high-speed modulation in our first all-organic polymer ridge waveguide intensity modulator prototype, which constituted one of the most significant moments in the history of our Company. Our initial "alpha" prototype device, enabled by our P²IC polymer system, demonstrated bandwidth suitable for data rates up to about 10 Gbps. This performance exceeds the telecom OC-48 standard (2.5 Gbps). This device demonstrated true amplitude (intensity) modulation in a Mach-Zehnder modulator structure incorporating our polymer waveguides.

In April 2017 we achieved bandwidth suitable for 25Gbps data rates in an all-organic polymer ridge waveguide intensity modulator prototype, a significant improvement over our initial 10Gbps device modulator prototype. This breakthrough was significant because a 25Gbps data rate is important to the optical networking industry because this data rate is a major node to achieve 100 Gbps (using 4 channels of 25 Gbps). In July 2017 we advanced our high-speed modulation performance to satisfy 28Gbps data rates for QSFP28 standards and 100Gbps data center applications.

In September 2017 we achieved outstanding performance of our ridge waveguide Mach-Zehnder modulators ahead of schedule, with bandwidth performance levels that will enable 50Gbps modulation in fiber-optic communications. This important achievement will allow users to utilize arrays of 4 x 50Gbps polymer modulators using PAM-4 encoding to access 400Gbps data rate systems. Pulse-Amplitude Modulation (PAM-4) is an encoding scheme that can double the amount of data that can be transmitted.

During February and March 2018, we moved our Newark, Delaware synthetic laboratory and our Longmont, Colorado optical testing laboratory and corporate headquarters to our new office, laboratory and research and development space located at 369 Inverness Parkway, Suite 350, Englewood, Colorado. The new 13,420 square foot Englewood facility includes fully functional 1,000 square feet of class 1,000 cleanroom, 500 square feet of class 10,000 cleanroom, chemistry laboratories, and analytic laboratories. The new Englewood facility streamlines all of our Company's research and development workflow for greater operational efficiencies.

During March 2018, our Company, together with our packaging partner, successfully demonstrated packaged polymer modulators designed for 50Gbps, which we believe will allow us to scale our P²IC platform with our Mach-Zehnder ridge waveguide modulator design as well as other photonics devices competitively in the 100Gbps and 400Gbps datacom and telecommunications applications market. We are currently fine-tuning the performance parameters of these prototypes in preparation for customer evaluations.

During June 2018, our Company Acquired the Polymer Technology Intellectual Property Assets of BrPhotonics Productos Optoelectrónicos S.A., a Brazilian corporation, which significantly advanced our patent portfolio of electro-optic polymer technology with 15 polymer chemistry materials, devices, packaging and subsystems patent and further strengthened our design capabilities to solidify our market position as we prepare to enter the 400Gbps integrated photonics marketplace with a highly competitive, scalable alternative to installed legacy systems. Since June 2018, we have made significant progress on integrating this technology into our P²IC (polymer photonic integrated circuit) platform.

Also, during June 2018, our Company promoted polymer PICs and Solidified Polymer PICs as Part of the Photonics Roadmap at the World Technology Mapping Forum in Enschede, Netherlands, which includes our Company's technology of polymers and polymer PICs that have the potential to drive not only 400Gbps aggregate data rate solutions, but also 800Gbps and beyond.

In August 2018 we announced the completion (ahead of schedule) of our fully equipped on-site fabrication facility, where we are expanding our high-speed test and design capabilities. We also announced the continuation of the building of our internal expertise with the hiring of world-class technical personnel with 100Gbps experience.

As we move forward to diligently to meet our goals, we continue to work closely with our packaging partner for the 50Gbaud prototypes, and we are advancing our reliability and characterization efforts to support our prototyping. We are actively engaged with test equipment manufacturers to deliver the most advanced test equipment for our state-of-the-art polymer results. We continue to engage with multiple industry bodies to promote our roadmap. We continue to fine tune our business model with target markets, customers, and technical specifications. Discussions with prospective customers are validating that our modulators are ideally suited for the datacenter and telecommunications markets that are over 10km in length. Details of what these prospective customers are seeking

from a prototype are delivered to our technical team.

Capital Requirements

As a development stage company, we do not generate revenues. We have incurred substantial net losses since inception. We have satisfied our capital requirements since inception primarily through the issuance and sale of our common stock.

Results of Operations

Comparison of three months ended September 30, 2018 to three months ended September 30, 2017

Revenues

As a development stage company, we had no revenues during the three months ended September 30, 2018 and September 30, 2017. The Company is in various stages of photonic device and material development and evaluation. We expect the next revenue stream to be in product development agreements and prototype devices prior to moving into production.

Operating Expenses

Our operating expenses were \$1,443,534 and \$1,205,932 for the three months ended September 30, 2018 and 2017, respectively, for an increase of \$237,602. This increase in operating expenses was due primarily to increases in salaries and wages, depreciation, laboratory materials and supplies, recruiting fees, travel, research and development moving expenses, accounting fees, patent amortization and patent related expenses, general and administrative office expenses, research and development rent and utility expenses and general and administrative consulting expenses offset by decreases in legal, research and development non-cash stock option amortization and laboratory material testing expense and electro-optic device development.

Included in our operating expenses for the three months ended September 30, 2018 was \$984,760 for research and development expenses compared to \$821,331 for the three months ended September 30, 2017, for an increase of \$163,429. This is primarily due to increases in research and development salaries and wages, depreciation, laboratory materials and supplies, moving expenses, patent amortization and patent related expenses, travel and rent and utility expenses offset by decreases in research and development non-cash stock option amortization and laboratory material testing expense and electro-optic device development.

Research and development expenses currently consist primarily of compensation for employees and consultants engaged in internal research, product development activities; laboratory operations, internal material and device fabrication testing and prototype electro-optic device design, development and prototype device processing; costs; and related operating expenses.

We expect to continue to incur substantial research and development expense to develop and commercialize our photonic devices PIC development and electro-optic materials platform. These expenses will increase as a result of accelerated development effort to support commercialization of our non-linear optical polymer materials technology; to build photonic device prototypes in our in-house laboratories; hiring additional technical and support personnel; engaging a senior technical advisor; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

Wages and salaries increased \$92,237 from \$371,523 for the three months ended September 30, 2017 to \$463,760 for the three months ended September 30, 2018. The reason for the variation was primarily due to an increase in full time technical personnel working on device and material development and change in research and development allocation.

Depreciation expenses increased \$72,092 from \$46,210 for the three months ended September 30, 2017 to \$118,302 for the three months ended September 30, 2018. The primary reason for the increase was due to the addition of capital

equipment in the new facility.

Laboratory materials and supplies also increased \$33,973 from \$65,162 for the three months ended September 30, 2017 to \$99,135 for the three months ended September 30, 2018. The primary reason for the increase was fabrication of prototype wafers and devices, and electro-optic polymer material systems.

Moving expenses increased by \$16,099 to \$17,786 for the three months ended September 30, 2018 from \$1,687 for the three months ended September 30, 2017. The primary reason for the increase was the relocation of employees to the new facility.

Patent amortization and patent related expenses increased by \$10,683 to \$20,059 for the three months ended September 30, 2018 from \$9,376 for the three months ended September 30, 2017. The primary reason for the increase was the BrPhotonics patents purchased as part of the asset purchase agreement.

Travel expenses increased \$9,373 from \$17,932 for the three months ended September 30, 2017 to \$27,305 for the three months ended September 30, 2018. The increase was primarily due to employee travel for relocation planning, and conferences.

Rent and utilities increased \$9,285 from \$31,375 for the three months ended September 30, 2017 to \$40,660 for the three months ended September 30, 2018. The primary reason for the increase was due to acquiring a larger facility in order to consolidate all the Company's operations into one facility.

Research and development non-cash stock option amortization decreased \$51,398 from \$96,827 for the three months ended September 30, 2017 to \$45,429 for the three months ended September 30, 2018. The reason for the variation in decreased amortization was the vesting schedules.

Product prototype development and material testing expense decreased \$39,089 from \$56,566 for the three months ended September 30, 2017 to \$17,477 for the three months ended September 30, 2018. The decrease was primarily due to the move to the new facility and transitioning of outside services in-house.

General and administrative expense consists primarily of compensation and support costs for management staff, and for other general and administrative costs, including executive, sales and marketing, investor relations, accounting and finance, legal, consulting and other operating expenses.

General and administrative expenses increased \$74,173 to \$458,774 for the three months ended September 30, 2018 compared to \$384,601 for the three months ended September 30, 2017. The increase is primarily due to increases in general and administrative salary and wages, recruiting fees, accounting fees, travel, office expenses and general and administrative consulting offset by a decrease in legal fees.

Salary and wages increased \$44,480 to \$160,444 for the three months ended September 30, 2018 compared to \$115,964 for the three months ended September 30, 2017. The reason for the increase was hiring of key personnel.

Recruiting fees increased \$24,500 to \$24,500 for the three months ended September 30, 2018 compared to \$0 for the three months ended September 30, 2017. The reason for the increase was hiring of key personnel.

Accounting fees increased \$13,500 to \$39,000 for the three months ended September 30, 2018 compared to \$25,500 for the three months ended September 30, 2017. The primary reason for the increase was due to the additional work being an accelerated filer and general accounting expense.

Travel expenses increased \$13,128 to \$23,767 for the three months ending September 30, 2018 from \$10,639 for the three months ended September 30, 2017. The primary reason for the increase was due to travel expense to the new facility and conferences.

Office expenses increased \$9,455 to \$18,132 for the three months ending September 30, 2018 from \$8,677 for the three months ended September 30, 2017. The reason for the variation was due to relocating into a larger facility.

General and administrative consulting expenses increased \$6,042 to \$6,042 for the three months ending September 30, 2018 from \$0 for the three months ended September 30, 2017. The primary reason for the increase was due to a non-cash consulting expense.

Legal fees decreased \$57,509 to \$29,448 for the three months ending September 30, 2018 from \$86,957 for the three months ended September 30, 2017. The primary reason for the variance was an overall decrease in general legal work.

We expect general and administrative expense to increase in future periods as we increase the level of corporate and administrative activity, including increases associated with our operation as a public company; and significantly increase expenditures related to the future production and sales of our products.

Other Income (Expense)

Other expense decreased \$20,406 to \$54,167 for the three months ended September 30, 2018 from \$74,573 for the three months ended September 30, 2017, relating to the commitment fee associated with the purchase of shares by Lincoln Park under the 2016 Purchase Agreement.

Net Loss

Net loss was \$1,497,701 and \$1,280,505 for the three months ended September 30, 2018 and 2017, respectively, for an increase of \$217,196, due primarily to increases in salaries and wages, depreciation, laboratory materials and supplies, recruiting fees, travel, research and development moving expenses, accounting fees, patent amortization and patent related expenses, general and administrative office expenses, research and development rent and utility expenses and general and administrative consulting expenses offset by decreases in legal, research and development non-cash stock option amortization, laboratory material testing expense and electro-optic device development and commitment fee associated with the purchase of shares by Lincoln Park under the 2016 Purchase Agreement.

Comparison of nine months ended September 30, 2018 to nine months ended September 30, 2017

Revenues

As a development stage company, we had no revenues during the nine months ended September 30, 2018 and September 30, 2017. The Company is in various stages of photonic device and material development and evaluation. We expect the next revenue stream to be in product development agreements and prototype devices prior to moving into production.

Our operating expenses were \$4,374,026 and \$4,032,323 for the nine months ended September 30, 2018 and 2017, respectively, for an increase of \$341,703. This increase in operating expenses was due primarily to increases in research and development salaries and wages, depreciation, rent and utility expenses, laboratory materials and supplies, moving expenses, office expenses, travel expenses, accounting fees, auditing fees, recruiting fees, general and administrative consulting expenses, repair, other tax expenses and director and officer insurance expenses offset by decreases in non-cash stock option and warrant amortization, laboratory material testing expense and electro-optic device development, legal, general and administrative salary and wages, royalty fees and patent amortization and patent related expenses.

Included in our operating expenses for the nine months ended September 30, 2018 was \$2,830,785 for research and development expenses compared to \$2,388,861 for the nine months ended September 30, 2017, for an increase of \$441,924. This is primarily due to increases in research and development salaries and wages, depreciation, laboratory materials and supplies, rent and utility expenses, research and development moving expenses, travel expenses, repair and office expenses offset by decreases in non-cash stock option amortization, laboratory material testing expense and electro-optic device development, royalty fees and patent amortization and patent related expenses.

Research and development expenses currently consist primarily of compensation for employees and consultants engaged in internal research, product development activities; laboratory operations, internal material and device fabrication testing and prototype electro-optic device design, development and prototype device processing; costs; and related operating expenses.

We expect to continue to incur substantial research and development expense to develop and commercialize our photonic devices PIC development and electro-optic materials platform. These expenses will increase as a result of accelerated development effort to support commercialization of our non-linear optical polymer materials technology; to build photonic device prototypes in our in-house laboratories; hiring additional technical and support personnel; engaging a senior technical advisor; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

Wages and salaries increased \$335,112 from \$967,448 for the nine months ended September 30, 2017 to \$1,302,560 for the nine months ended September 30, 2018. The reason for the variation was primarily due to an increase in full time technical personnel working on device and material development and change in research and development allocation.

Depreciation expense increased \$137,448 from \$133,408 for the nine months ended September 30, 2017 to \$270,856 for the nine months ended September 30, 2018. The primary reason for the increase was due to the addition of capital equipment in the new facility.

Laboratory materials and supplies increased \$116,200 from \$141,526 for the nine months ended September 30, 2017 to \$257,726 for the nine months ended September 30, 2018. The primary reason for the increase was fabrication of prototype wafers and devices, and electro-optic polymer material systems.

Rent and utility expenses increased \$87,400 from \$93,827 for the nine months ended September 30, 2017 to \$181,227 for the nine months ended September 30, 2018. The primary reason for the increase was due to acquiring a larger facility in order to consolidate all the Company's operations into one facility.

Moving expenses increased by \$59,239 to \$61,885 for the nine months ended September 30, 2018 from \$2,646 for the nine months ended September 30, 2017. The primary reason for the increase was the relocation of employees to the new facility.

Travel expenses increased by \$32,706 to \$81,742 for the nine months ended September 30, 2018 from \$49,036 for the nine months ended September 30, 2017. The increase was primarily due to employee travel for relocation planning, and conferences.

Repair and maintenance expenses increased by \$17,705 to \$41,461 for the nine months ended September 30, 2018 from \$23,756 for the nine months ended September 30, 2017. The primary reason for the increase was due to general maintenance in the new Colorado facility, and repairs to Delaware facility.

Office expenses increased by \$14,640 to \$19,410 for the nine months ended September 30, 2018 from \$4,770 for the nine months ended September 30, 2017. The increase was primarily due furnishing the new Colorado facility.

Research and development non-cash stock option amortization decreased \$210,903 from \$408,396 for the nine months ended September 30, 2017 to \$197,493 for the nine months ended September 30, 2018. The reason for the variation in decreased amortization was the vesting schedules.

Product prototype development and material testing expense decreased \$111,668 from \$167,209 for the nine months ended September 30, 2017 to \$55,541 for the nine months ended September 30, 2018. The decrease was primarily due to the move to the new facility and transitioning of outside services in-house.

Royalty expenses decreased \$22,500 to \$0 for the nine months ended September 30, 2018 from \$22,500 for the nine months ended September 30, 2017. The primary reason for the decrease was the termination of a license agreement.

Patent amortization and patent related expenses decreased by \$18,992 to \$44,956 for the nine months ended September 30, 2018 from \$63,948 for the nine months ended September 30, 2017. The primary reason for the decrease was lower cost in patent application prosecution.

General and administrative expense consists primarily of compensation and support costs for management staff, and for other general and administrative costs, including executive, sales and marketing, investor relations, accounting and finance, legal, consulting and other operating expenses.

General and administrative expenses decreased \$100,221 to \$1,543,241 for the nine months ended September 30, 2018 compared to \$1,643,462 for the nine months ended September 30, 2017. The decrease is primarily due to decreases in general and administrative non-cash stock option and warrant amortization, legal fees and general and administrative salary and wages offset by increases in office expenses, rent and utility expenses, accounting fees, auditing fees, travel, moving expenses, recruiting fees, general and administrative consulting, other tax expenses and director and officer insurance expenses.

General and administrative non-cash stock option and warrant amortization decreased by \$257,532 to \$204,314 for the nine months ended September 30, 2018 from \$461,846 for the nine months ended September 30, 2017. The reason for the variation was due to stock options and warrants vesting schedules.

Legal fees decreased \$93,129 to \$202,680 for the nine months ended September 30, 2018 from \$295,809 September 30, 2017. The primary reason for the variance was an overall decrease in general legal work.

Salary and wages decreased \$23,556 to \$399,243 for the nine months ending September 30, 2018 from \$422,799 for the nine months ending September 30, 2017. The primary reason for the variance is a decrease in management salaries and change in general and administrative allocation.

Office expenses increased \$64,412 from \$29,763 for the nine months ended September 30, 2017 to \$94,175 for the nine months ended September 30, 2018. The reason for the variation was due to relocating into a larger facility.

Rent and utility expenses increased \$46,534 from \$24,823 for the nine months ended September 30, 2017 to \$71,357 for the nine months ended September 30, 2018. The primary reason was due to support of the new larger facility and old operations facilities.

Accounting fees increased \$27,166 to \$106,750 for the nine months ended September 30, 2018 from to \$79,584 for the nine months ended September 30, 2017. The primary reason for the increase was due to the additional work being an accelerated filer and general accounting expense.

Auditing fees increased \$25,150 to \$78,600 for the nine months ending September 30, 2018 from \$53,450 for the nine months ending September 30, 2017. The primary reason for the increase was due to the Company's change in status to an accelerated filer, which requires additional testing by the auditors.

Travel expenses increased \$21,177 to \$49,605 for the nine months ending September 30, 2018 from \$28,428 for the nine months ending September 30, 2017. The primary reason for the increase was due to travel expense to the new facility and conferences.

Moving expenses increased \$20,606 to \$20,606 for the nine months ending September 30, 2018 from \$0 for the nine months ending September 30, 2017. The reason for the variation was due to moving to a new facility.

Recruiting fees increased \$20,500 to \$40,500 for the nine months ending September 30, 2018 from \$20,000 for the nine months ending September 30, 2017. The reason for the increase was hiring of personnel.

General and administrative consulting expenses increased \$18,125 to \$18,125 for the nine months ended September 30, 2018 from \$0 for the nine months ended September 30, 2017. The primary reason for the increase was due to a non-cash consulting expense.

Other tax expenses increased \$14,833 to \$26,694 for the nine months ended September 30, 2018 from \$11,861 for the nine months ended September 30, 2017. The primary reason for the increase was due to sales and use tax on capital equipment for new facility.

Director and officer insurance expenses increased \$13,781 to \$109,319 for the nine months ended September 30, 2018 from \$95,538 for the nine months ended September 30, 2017. The primary reason for the increase was an increase in insurance premiums.

We expect general and administrative expense to increase in future periods as we increase the level of corporate and administrative activity, including increases associated with our operation as a public company; and significantly increase expenditures related to the future production and sales of our products.

Other Income (Expense)

Other expense increased \$6,776 to \$135,146 for the nine months ended September 30, 2018 from \$128,370 for the nine months ended September 30, 2017, relating to the commitment fee associated with the purchase of shares by Lincoln Park under the 2016 Purchase Agreement.

Net Loss

Net loss was \$4,509,172 and \$4,160,693 for the nine months ended September 30, 2018 and 2017, respectively, for an increase of \$348,479, due primarily to increases in research and development, salaries and wages, depreciation, rent and utility expenses, laboratory materials and supplies, moving expenses, office expenses, travel expenses, accounting fees, auditing fees, recruiting fees, general and administrative consulting expenses, repair, other tax expenses and director and officer insurance expenses offset by decreases in non-cash stock option and warrant amortization, laboratory material testing expense and electro-optic device development, legal, general and administrative salary and wages, royalty fees, patent amortization and patent related expenses and commitment fee associated with the purchase of shares by Lincoln Park under the 2016 Purchase Agreement.

Comparison of Fiscal 2017 to Fiscal 2016

Revenues

As a development stage company, we had no revenues during the years ended December 31, 2017 and December 31, 2016. The Company is in various stages of photonic device and material development and evaluation. Our revenue stream will be derived from one or some combination of the following: (i) technology licensing for specific product application; (ii) joint venture relationships with significant industry leaders; or (iii) the production and direct sale of our own electro-optic device components.

Operating Expenses

Our operating expenses were \$5,523,538 and \$4,135,578 for the years ended December 31, 2017 and 2016, respectively, for an increase of \$1,387,960. The increase in operating expenses is primarily due to increases in non-cash stock option and warrant amortization, research and development salaries, legal fees, patent amortization and patent related expenses, product development consulting expenses, product prototype development and material testing expenses, laboratory materials and supplies, recruiting fees, fees for disposal of obsolete materials, rent, license fees, insurance expense, accounting fees, shareholder annual meeting expenses and other tax expenses offset by decreases in general and administrative salaries, general and administrative consulting, investor relations expenses, software expenses, general and administrative travel expenses and internet and web design fees.

Included in our operating expenses for the year ended December 31, 2017 was \$3,519,129 for research and development expenses compared to \$2,474,689 for the year ended December 31, 2016, for an increase of \$1,044,440. The increase in research and development expenses is primarily due to increases in non-cash stock option and warrant amortization, research and development salaries, patent amortization and patent related expenses, product development consulting expenses, product prototype development and material testing expenses, laboratory materials and supplies, fees for disposal of obsolete materials, rent and license fees.

Research and development expenses currently consist primarily of compensation for employees and consultants engaged in internal research, product development activities; laboratory operations, internal material and device fabrication testing and prototype electro-optic device design, development and prototype device processing; costs; and related operating expenses.

We expect to continue to incur substantial research and development expense to develop and commercialize our photonic devices PIC development and electro-optic materials platform. These expenses will increase as a result of accelerated development effort to support commercialization of our non-linear optical polymer materials technology; to build photonic device prototypes in our in-house laboratories; hiring additional technical and support personnel; engaging a senior technical advisor; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

Non-cash stock compensation and stock option and warrant amortization increased \$351,348 from \$362,435 for the year ended December 31, 2016 to \$713,783 for the year ended December 31, 2017.

Wages and salaries and benefits increased \$261,710 from \$1,095,884 for the year ended December 31, 2016 to \$1,357,594 for the year ended December 31, 2017.

Patent amortization and write-off of previously capitalized patent costs increased \$114,374 from \$15,891 for the year ended December 31, 2016 to \$130,265 for the year ended December 31, 2017.

Product development consulting expenses increased \$80,698 from \$292,283 for the year ended December 31, 2016 to \$372,981 for the year ended December 31, 2017.

Product prototype development and material testing expense increased \$68,939 from \$150,711 for the year ended December 31, 2016 to \$219,650 for the year ended December 31, 2017.

Laboratory materials and supplies also increased \$50,697 from \$151,607 for the year ended December 31, 2016 to \$202,304 for the year ended December 31, 2017.

Disposal of obsolete materials increased \$39,963 from \$3,565 for the year ended December 31, 2016 to \$43,528 for the year ended December 31, 2017.

Rent expense increased \$34,157 from \$117,775 for the year ended December 31, 2016 to \$151,932 for the year ended December 31, 2017 for the new headquarter facility in Colorado.

License fees increased \$30,000 to \$30,000 for the year ended December 31, 2017 from \$0 for the year ended December 31, 2016.

General and administrative expense consists primarily of compensation and support costs for management staff, and for other general and administrative costs, including executive, sales and marketing, investor relations, accounting and finance, legal, consulting and other operating expenses.

General and administrative expenses increased \$343,520 to \$2,004,409 for the year ended December 31, 2017 from \$1,660,889 for the year ended December 31, 2016. The increase is primarily due to increases in non-cash stock option and warrant amortization, legal fees, recruiting fees, insurance expense, accounting fees, rent and utilities expenses, shareholder annual meeting expenses and other tax expenses offset by decreases in salaries, general and administrative consulting, investor relations expenses, software expenses, general and administrative travel expenses and internet and web design fees.

Non-cash stock compensation and stock option amortization increased \$249,737 from \$248,152 for the year ended December 31, 2016 to \$497,889 for the year ended December 31, 2017.

Legal fees increased \$178,712 to \$353,437 for the year ended December 31, 2017 from \$174,725 for the year ended December 31, 2016.

Recruiting fees increased \$50,500 to \$50,500 for the year ended December 31, 2017 compared to \$0 for the year ended December 31, 2016.

Insurance expense increased \$19,002 from \$112,785 for the year ended December 31, 2016 to \$131,787 for the year ended December 31, 2017.

Accounting fees increased \$12,084 from \$93,000 for the year ended December 31, 2016 to \$105,084 for the year ended December 31, 2017.

Rent and utility expenses increased \$10,684 to \$43,553 for the year ended December 31, 2017 from \$32,869 for the year ended December 31, 2016 primarily for the expenses of the new headquarter facility in Colorado.

Expenses for the annual shareholder meeting increased \$6,702 from \$44,506 for the year ended December 31, 2016 to \$51,208 for the year ended December 31, 2017.

Other tax expenses increased \$6,131 from \$6,593 for the year ended December 31, 2016 to \$12,724 for the year ended December 31, 2017.

General and administrative wages and salaries decreased \$102,307 from \$635,982 for the year ended December 31, 2016 to \$533,675 for the year ended December 31, 2017.

General and administrative consulting expenses decreased \$42,958 from \$27,000 for the year ending December 31, 2016 to (\$15,958) for the year ending December 31, 2017.

Investor relations expenses decreased by \$19,674 from \$37,454 for the year ended December 31, 2016 to \$17,780 for the year ended December 31, 2017.

Software expenses decreased \$10,876 from \$17,339 for the year ended December 31, 2016 to \$6,463 for the year ended December 31, 2017.

Travel expenses decreased \$10,003 from \$51,300 for the year ended December 31, 2016 to \$41,297 for the year ended December 31, 2017.

Internet and web design fees decreased \$6,191 to \$10,992 for the year ended December 31, 2017 from \$17,183 for the year ended December 31, 2016.

We expect general and administrative expense to increase in future periods as we increase the level of corporate and administrative activity, including increases associated with our operation as a public company; and significantly increase expenditures related to the future production and sales of our products.

Other Income (Expense)

Other expense decreased \$45,786 to \$225,844 for the year ended December 31, 2017 from \$271,630 for the year ended December 31, 2016, relating to the commitment fee associated with the purchase of shares by Lincoln Park under the 2016 Purchase Agreement.

In December 2017, the Tax Cuts and Jobs Act was enacted, which reduces the U.S. statutory corporate tax rate from a maximum rate of 35% to 21% for tax years beginning 2018. The Company remeasured certain deferred tax assets and valuation allowance based on the rates at which they are expected to reverse. The remeasurement incorporates assumptions made based upon the best available interpretation of the Act and may change as the Company receives additional clarification and implementation guidance.

Net Loss

Net loss was \$5,749,382 and \$4,407,208 for the years ended December 31, 2017 and 2016, respectively, for an increase of \$1,342,174, due primarily to increases in non-cash stock option and warrant amortization, research and development salaries, legal fees, patent amortization and patent related expenses, product development consulting expenses, product prototype development and material testing expenses, laboratory materials and supplies, recruiting fees, fees for disposal of obsolete materials, rent, license fees, insurance expense, accounting fees, shareholder annual meeting expenses and other tax expenses offset by decreases in general and administrative salaries, commitment fee associated with the purchase of shares by Lincoln Park under the 2016 Purchase Agreement, general and administrative consulting, investor relations expenses, software expenses, general and administrative travel expenses and internet and web design fees.

Significant Accounting Policies

Our discussion and analysis of our financial condition and results of operations are based on our financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates based upon historical experience and various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Our actual results may differ materially from these estimates.

We believe our significant accounting policies affect our more significant estimates and judgments used in the preparation of our financial statements. Our Annual Report on Form 10-K for the year ended December 31, 2017 and our Quarterly Report on 10-Q for the nine months ended September 30, 2018 contain a discussion of these significant accounting policies.

Recently Adopted Accounting Pronouncements. In June 2018, the FASB issued ASU No. 2018-07, Compensation Stock Compensation (Topic 718), Improvements to Nonemployee Share-Based Payment Accounting. The amendments in this Update expand the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. Prior to this Update, Topic 718 applied only to share-based transactions to employees. Consistent with the accounting requirement for employee share-based payment awards, nonemployee share-based payment awards within the scope of Topic 718 are measured at grant-date fair value of the equity instruments that an entity is obligated to issue when the good has been delivered or the service has been rendered and any other conditions necessary to earn the right to benefit from the instruments have been satisfied. The amendments in this Update are effective for public business entities for fiscal years beginning after December 15, 2018, including interim periods within that fiscal year. Early adoption is permitted, but no earlier than an entity's adoption date of Topic 606. The adoption of this pronouncement on June 30, 2018 had no material impact on the Company's financial statements.

Reclassifications. Certain reclassifications have been made to the 2017 financial statement in order to conform to the 2018 financial statement presentation.

Liquidity and Capital Resources

For the Nine Months Ended September 30, 2018

During the nine months ended September 30, 2018, net cash used in operating activities was \$3,404,846 and net cash used in investing activities was \$1,266,594, which was due primarily to the Company's research and development activities, general and administrative expenditures and capital expenditures. Net cash provided by financing activities for the nine months ended September 30, 2018 was \$3,393,430. At September 30, 2018, our cash and cash equivalents totaled \$2,204,317, our assets totaled \$5,237,215, our liabilities totaled \$418,632, and we had stockholders' equity of \$4,818,583.

For the year ended December 31, 2017

During the year ended December 31, 2017, net cash used in operating activities was \$4,409,696 and net cash used in investing activities was \$265,532, which was due primarily to the Company's research and development activities and general and administrative expenditures. Net cash provided by financing activities for the year ended December 31, 2017 was \$6,200,711. At December 31, 2017, our cash and cash equivalents totaled \$3,482,327, our assets totaled \$5,849,770, our liabilities totaled \$833,055 and we had stockholders' equity of \$5,016,715.

Sources and Uses of Cash

Our future expenditures and capital requirements will depend on numerous factors, including: the progress of our research and development efforts; the rate at which we can, directly or through arrangements with original equipment manufacturers, introduce and sell products incorporating our polymer materials technology; the costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights; market acceptance of our products and competing technological developments; and our ability to establish cooperative development, joint venture and licensing arrangements. We expect that we will incur approximately \$526,000 of expenditures per month over the next 12 months. Based upon our current cash position and expenditures of approximately \$526,000 per month and no debt service, we believe our Company has sufficient funds to finance its operations through May 2019. Our cash requirements are expected to increase at a rate consistent with the Company's path to revenue growth as we expand our activities and operations with the objective of commercializing our electro-optic polymer technology.

On January 21, 2019, the Company entered into the Purchase Agreement with Lincoln Park, pursuant to which Lincoln Park agreed to purchase from us up to \$25,000,000 of our Common Stock (subject to certain limitations) from time to time over a 36-month period. Pursuant to the Purchase Agreement, Lincoln Park is obligated to make purchases as the Company directs in accordance with the Purchase Agreement, which may be terminated by the Company at any time, without cost or penalty. Sales of shares will be made in specified amounts and at prices that are based upon the market prices of our Common Stock immediately preceding the sales to Lincoln Park. We expect this financing to provide us with sufficient funds to maintain our operations for the foreseeable future. With the additional capital, we expect to achieve a level of revenues attractive enough to fulfill our development activities and adequate enough to support our business model for the foreseeable future. We cannot assure you that we will meet the conditions of the Purchase Agreement with Lincoln Park in order to obligate Lincoln Park to purchase our shares of common stock. In the event we fail to do so, and other adequate funds are not available to satisfy long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations. This limitation of operations may include reductions in capital expenditures and reductions in staff and discretionary costs.

There are no trading volume requirements or restrictions under the Purchase Agreement and we will control the timing and amount of any sales of our Common Stock to Lincoln Park. Lincoln Park has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the Purchase Agreement. We can also accelerate the amount of Common Stock to be purchased under certain circumstances. There are no limitations on use of proceeds, financial or business covenants, restrictions on future funding, rights of first refusal, participation rights, penalties or liquidated damages in the Purchase Agreement. Lincoln Park may not assign or transfer its rights and obligations under the purchase agreement.

We expect that our cash used in operations will continue to increase during 2019 and beyond as a result of the following planned activities:

- The addition of management, sales, marketing, technical and other staff to our workforce;
- Increased spending for the expansion of our research and development efforts, including purchases of additional laboratory and production equipment;

- Increased spending in marketing as our products are introduced into the marketplace;
- Developing and maintaining collaborative relationships with strategic partners;
- Developing and improving our manufacturing processes and quality controls; and
- Increases in our general and administrative activities related to our operations as a reporting public company and related corporate compliance requirements.

Analysis of Cash Flows

For the Nine Months Ended September 30, 2018

Net cash used in operating activities was \$3,404,846 for the nine months ended September 30, 2018, primarily attributable to the net loss of \$4,509,172 adjusted by \$62,731 in warrants issued for services, \$339,076 in options issued for services, \$135,333 in Common Stock issued for services, \$322,495 in depreciation expenses and patent amortization expenses, \$10,084 net loss on disposal of equipment, \$268,560 in prepaid expenses and (\$33,953) in accounts payable and accrued expenses. Net cash used in operating activities consisted of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure.

Net cash used by investing activities was \$1,266,594 for the nine months ended September 30, 2018, consisting of \$371,320 in cost for intangibles and \$897,774 in asset additions primarily for the new Colorado headquarter facility offset by proceeds of \$2,500 on the sale of equipment.

Net cash provided by financing activities was \$3,393,430 for the nine months ended September 30, 2018 and consisted of \$3,612,400 in proceeds from resale of Common Stock to Lincoln Park and \$161,500 in proceeds from exercise of warrants and options offset by \$380,470 repayment of equipment purchased.

For the year ended December 31, 2017

Net cash used in operating activities was \$4,409,696 for the year ended December 31, 2017, primarily attributable to the net loss of \$5,749,382 adjusted by \$416,934 in warrants issued for services, \$794,738 in options issued for

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services, \$270,343 in Common Stock issued for services, \$325,946 in depreciation expenses and patent amortization expenses, (\$447,977) in prepaid expenses and (\$20,298) in accounts payable and accrued expenses. Net cash used in operating activities consisted of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure.

Net cash used by investing activities was \$265,532 for the year ended December 31, 2017, consisting of \$81,743 in cost for intangibles and \$183,789 in asset additions primarily for the new Colorado headquarters facility.

Net cash provided by financing activities was \$6,200,711 for the year ended December 31, 2017 and consisted of \$5,722,060 proceeds from Common Stock and \$502,500 proceeds from the exercise of warrants offset by \$23,849 repayment of equipment purchased.

For the year ended December 31, 2016

Net cash used in operating activities was \$3,153,292 for the year ended December 31, 2016, primarily attributable to the net loss of \$4,407,208 adjusted by \$174,359 in warrants issued for services, \$436,228 in options issued for services, \$295,885 in Common Stock issued for services, \$195,610 in depreciation expenses and patent amortization expenses, \$127,549 in prepaid expenses, \$24,929 in accounts payable and accrued expenses and \$644 gain on disposal of property and equipment. Net cash used in operating activities consisted of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure.

Net cash used by investing activities was \$173,759 for the year ended December 31, 2016, consisting of \$64,096 for purchase of intangibles, \$129,163 in asset additions primarily for the Colorado lab facility and \$19,500 in proceeds from sale of equipment.

Net cash provided by financing activities was \$1,553,1