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

FORM 10-Q

(Mark One)

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

For the quarterly period ended June 30, 2022

OR

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

For the transition period from _____ to _____

Commission File Number 001-40766

Lightwave Logic, Inc.
(Exact name of registrant as specified in its charter)

Nevada	**82-0497368**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
369 Inverness Parkway, Suite 350 Englewood, CO	**80112**
(Address of principal executive offices)	(Zip Code)

(720) 340-4949
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of exchange on which registered
Common Stock, $0.001 par value per share	LWLG	The NASDAQ Stock Market

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

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

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

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

The number of shares of the registrant's common stock outstanding as of August 9, 2022 was 112,086,109.

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Forward-Looking Statements

This report on Form 10-Q contains, and our officers and representatives may from time to time make, "forward-looking statements" within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements can be identified by words such as: "anticipate," "intend," "plan," "goal," "seek," "believe," "project," "estimate," "expect," "continuing," "ongoing," "strategy," "future," "likely," "may," "should," "could," "will" and similar references to future periods. Examples of forward-looking statements include, among others, statements we make regarding expected operating results, such as anticipated revenue; anticipated levels of capital expenditures for our current fiscal year; our belief that we have, or will have, sufficient liquidity to fund our business operations during the next 12 months; strategy for gaining customers, growth, product development, market position, financial results and reserves.

Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based only on our current beliefs, expectations, and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict and many of which are outside of our control. Our actual results and financial condition may differ materially from those indicated in the forward-looking statements. Therefore, you should not rely on any of these forward-looking statements. Important factors that could cause our actual results and financial condition to differ materially from those indicated in the forward-looking statements include, among others, the following: lack of available funding; general economic and business conditions; deterioration in global economic and financial market conditions generally including as a result of pandemic health issues caused by COVID-19 and its recent variants and their effects, competition from third parties; intellectual property rights of third parties; regulatory constraints; changes in technology and methods of marketing; delays in completing various engineering and manufacturing programs; changes in customer order patterns; 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; and other factors beyond the Company's control.

The ultimate correctness of these forward-looking statements depends upon a number of known and unknown risks and events. We discuss our known material risks under Item 1.A "Risk Factors" contained in our Company's Annual Report on Form 10-K for the year ended December 31, 2021 and under Part II, Item 1.A. "Risk Factors" contained in this report on Form 10-Q. Many factors could cause our actual results to differ materially from the forward-looking statements. In addition, we cannot assess the impact of each factor on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements.

The forward-looking statements speak only as of the date on which they are made, and, except as required by law, we undertake no obligation to update any forward-looking statement to reflect events or circumstances after the date on which the statement is made or to reflect the occurrence of unanticipated events.

PART I – FINANCIAL INFORMATION

Item 1 Financial Statements

LIGHTWAVE LOGIC, INC.

FINANCIAL STATEMENTS

JUNE 30, 2022

(UNAUDITED)

LIGHTWAVE LOGIC, INC.
BALANCE SHEETS

	June 30, 2022 (Unaudited)	December 31, 2021
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	$ 24,829,749	$ 23,432,612
Prepaid expenses and other current assets	783,296	232,308
	25,613,045	23,664,920
PROPERTY AND EQUIPMENT - NET	2,098,819	2,179,075
OTHER ASSETS		
Intangible assets - net	846,405	848,133
Operating Lease - Right of Use - Building	448,795	536,447
	1,295,200	1,384,580
TOTAL ASSETS	$ 29,007,064	$ 27,228,575
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Accounts payable	$ 333,147	$ 215,734
Accrued bonuses and accrued expenses	76,447	1,118,080
Accounts payable and accrued expenses - related parties	88,534	32,189
Deferred lease liability	41,778	41,778
Operating lease liability	184,062	178,192
	723,968	1,585,973
LONG TERM LIABILITIES		
Deferred lease liability	59,186	80,075
Operating lease liability	264,733	358,255
	323,919	438,330
TOTAL LIABILITIES	1,047,887	2,024,303
STOCKHOLDERS' EQUITY		
Preferred stock, $0.001 par value, 1,000,000 authorized, No shares issued or outstanding	—	—
Common stock $0.001 par value, 250,000,000 authorized, 111,887,124 and 110,555,459 issued and outstanding at June 30, 2022 and December 31, 2021	111,888	110,556
Additional paid-in-capital	125,040,332	114,696,597
Deferred compensation	(231,803)	—
Accumulated deficit	(96,961,240)	(89,602,881)
TOTAL STOCKHOLDERS' EQUITY	27,959,177	25,204,272
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 29,007,064	$ 27,228,575

See accompanying notes to these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENTS OF COMPREHENSIVE LOSS
FOR THE THREE MONTHS AND SIX MONTHS ENDING JUNE 30, 2022 AND 2021
(UNAUDITED)

	For the Three Months Ending June 30, 2022	For the Three Months Ending June 30, 2021	For the Six Months Ending June 30, 2022	For the Six Months Ending June 30, 2021
NET SALES	$ —	$ —	$ —	$ —
COST AND EXPENSE				
Research and development	2,781,215	2,797,505	5,406,355	4,160,308
General and administrative	987,137	658,738	1,872,566	1,191,706
	3,768,352	3,456,243	7,278,921	5,352,014
LOSS FROM OPERATIONS	(3,768,352)	(3,456,243)	(7,278,921)	(5,352,014)

OTHER INCOME (EXPENSE)				
Paycheck Protection Program loan forgiveness	—	—		410,700
Interest income	13,398	105	28,419	413
Commitment fee	(47,644)	(1,083,347)	(107,857)	(1,333,628)
NET LOSS	$ (3,802,598)	$ (4,539,485)	$ (7,358,359)	$ (6,274,529)
LOSS PER SHARE				
Basic	$ (0.03)	$ (0.04)	$ (0.07)	$ (0.06)
Diluted	$ (0.03)	$ (0.04)	$ (0.07)	$ (0.06)
WEIGHTED AVERAGE NUMBER OF SHARES				
Basic	111,593,709	104,125,843	111,243,676	101,969,122
Diluted	111,593,709	104,125,843	111,243,676	101,969,122

See accompanying notes to these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENT OF STOCKHOLDERS' EQUITY
(UNAUDITED)

SIX-MONTH PERIOD ENDED JUNE 30, 2022

	Number of Shares	Common Stock	Additional Paid-in Capital	Deferred Compensation	Accumulated Deficit	Total
BALANCE AT DECEMBER 31, 2021	110,555,459	$ 110,556	$ 114,696,597	$ —	$ (89,602,881)	$ 25,204,272
Common stock issued to institutional investor	875,000	875	6,704,818	—	—	6,705,693
Common stock issued for commitment shares	12,319	12	107,845	—	—	107,857
Exercise of options	238,250	238	181,937	—	—	182,175
Cashless exercise of 4,375 options	2,596	3	35,015	—	—	35,018
Exercise of warrants	175,000	175	240,575	—	—	240,750
Options issued for services	—	—	2,798,550	—	—	2,798,550
Restricted stock awards issued for future services	28,500	29	274,995	(275,024)	—	—
Deferred compensation	—	—	—	43,221	—	43,221
Net loss for the six months ending June 30, 2022	—	—	—	—	(7,358,359)	(7,358,359)
BALANCE AT JUNE 30, 2022 (UNAUDITED)	111,887,124	$ 111,888	$ 125,040,332	$ (231,803)	$ (96,961,240)	$ 27,959,177

SIX-MONTH PERIOD ENDED JUNE 30, 2021

	Number of Shares	Common Stock	Additional Paid-in Capital	Deferred Compensation	Accumulated Deficit	Total
BALANCE AT DECEMBER 31, 2020	97,775,789	$ 97,776	$ 76,649,170	$ —	$ (70,971,500)	$ 5,775,446
Common stock issued to institutional investor	8,062,500	8,063	13,965,186	—	—	13,973,249
Common stock issued for commitment shares	454,138	454	1,333,174	—	—	1,333,628
Exercise of options	710,000	710	618,790	—	—	619,500
Cashless exercise of 240,627 options	132,683	133	863,705	—	—	863,838
Exercise of warrants	200,000	200	127,050	—	—	127,250
Options issued for services	—	—	528,249		—	528,249
Warrants issued for services	—	—	10,242	—	—	10,242
Net loss for the six months ending June 30, 2021	—	—	—	—	(6,274,529)	(6,274,529)
BALANCE AT JUNE 30, 2021 (UNAUDITED)	107,335,110	$ 107,336	$ 94,095,566	$ —	$ (77,246,029)	$ 16,956,873

See accompanying notes to these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENT OF STOCKHOLDERS' EQUITY (CONTINUED)
(UNAUDITED)

THREE-MONTH PERIOD ENDED JUNE 30, 2022

	Number of Shares	Common Stock	Additional Paid-in Capital	Deferred Compensation	Accumulated Deficit	Total
BALANCE AT MARCH 31, 2022 (UNAUDITED)	111,098,328	$ 111,099	$ 120,118,908	$ (252,094)	$ (93,158,642)	$ 26,819,271
Common stock issued to institutional investor	400,000	400	3,018,476	—	—	3,018,876
Common stock issued for commitment shares	5,546	6	47,638	—	—	47,644
Exercise of options	208,250	208	155,117	—	—	155,325
Exercise of warrants	175,000	175	240,575			240,750
Options issued for services	—	—	1,459,618	—	—	1,459,618
Deferred compensation	—	—	—	20,291	—	20,291
Net loss for the three months ending June 30, 2022	—	—	—	—	(3,802,598)	(3,802,598)
BALANCE AT JUNE 30, 2022 (UNAUDITED)	111,887,124	$ 111,888	$ 125,040,332	$ (231,803)	$ (96,961,240)	$ 27,959,177

THREE-MONTH PERIOD ENDED JUNE 30, 2021

	Number of Shares	Common Stock	Additional Paid-in Capital	Deferred Compensation	Accumulated Deficit	Total
BALANCE AT MARCH 31, 2021 (UNAUDITED)	101,758,709	$ 101,759	$ 82,119,653	$ —	$ (72,706,544)	$ 9,514,868
Common stock issued to institutional investor	4,270,589	4,271	9,015,006	—	—	9,019,277
Common stock issued for commitment shares	293,129	293	1,083,054	—	—	1,083,347
Exercise of options	680,000	680	597,820	—	—	598,500
Cashless exercise of 210,627 options	132,683	133	863,705	—	—	863,838
Exercise of warrants	200,000	200	127,050	—	—	127,250
Options issued for services	—	—	287,001	—	—	287,001
Warrants issued for services	—	—	2,277	—	—	2,277
Net loss for the three months ending June 30, 2021	—	—	—	—	(4,539,485)	(4,539,485)
BALANCE AT JUNE 30, 2021 (UNAUDITED)	107,335,110	$ 107,336	$ 94,095,566	$ —	$ (77,246,029)	$ 16,956,873

See accompanying notes to these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENTS OF CASH FLOW
FOR THE SIX MONTHS ENDING JUNE 30, 2022 AND 2021
(UNAUDITED)

	For the Six Months Ending June 30, 2022	For the Six Months Ending June 30, 2021
CASH FLOWS FROM OPERATING ACTIVITIES		
Net loss	$ (7,358,359)	$ (6,274,529)
Adjustment to reconcile net loss to net cash used in operating activities		
Warrants issued for services	—	10,242
Stock options issued for services	2,798,550	528,249
Amortization of deferred compensation	43,221	—
Cashless option exercise	106,659	1,317,223
Common stock issued for services and fees	107,857	1,333,628

Depreciation and amortization of patents	496,549	417,414
Paycheck Protection Program loan forgiveness	—	(410,700)
(Increase) decrease in assets		
Prepaid expenses and other current assets	(550,988)	134,668
(Decrease) increase in liabilities		
Accounts payable	117,413	(34,357)
Accrued bonuses and accrued expenses	(1,041,633)	(15,022)
Accounts payable and accrued expenses- related parties	56,345	22,194
Deferred lease liability	(20,889)	(20,889)
Net cash used in operating activities	(5,245,275)	(2,991,879)
CASH FLOWS FROM INVESTING ACTIVITIES		
Cost of intangibles	(41,905)	(18,221)
Purchase of property and equipment	(372,660)	(636,478)
Net cash used in investing activities	(414,565)	(654,699)
CASH FLOWS FROM FINANCING ACTIVITIES		
Exercise of options and warrants	422,925	746,750
Cashless option exercise tax payments	(71,641)	(453,385)
Issuance of common stock, institutional investor	6,705,693	13,973,249
Repayment of equipment purchase payable	—	(13,107)
Net cash provided by financing activities	7,056,977	14,253,507
NET INCREASE IN CASH AND CASH EQUIVALENTS	1,397,137	10,606,929
CASH AND CASH EQUIVALENTS - BEGINNING OF PERIOD	23,432,612	3,306,590
CASH AND CASH EQUIVALENTS - END OF PERIOD	$ 24,829,749	$ 13,913,519

See accompanying notes to these financial statements.

LIGHTWAVE LOGIC, INC.
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2022 AND 2021

NOTE 1 – NATURE OF BUSINESS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Financial Statements

The accompanying unaudited financial statements have been prepared by Lightwave Logic, Inc. (the "Company"). These statements include all adjustments (consisting only of its normal recurring adjustments) which management believes necessary for a fair presentation of the statements and have been prepared on a consistent basis using the accounting polices described in the Summary of Significant Accounting Policies included in the financial statements and notes thereto included in the Company's Annual Report on Form 10-K for the year ended December 31, 2021, as filed with the Securities and Exchange Commission on March 1, 2022 (the "2021 Annual Report"). Certain financial information and footnote disclosures normally included in financial statements prepared in accordance with accounting principles generally accepted in the United States have been condensed or omitted pursuant to the rules and regulations of the Securities and Exchange Commission, although the Company firmly believes that the accompanying disclosures are adequate to make the information presented not misleading. The financial statements should be read in conjunction with the financial statements and notes thereto included in the 2021 Annual Report. The interim operating results for the three and six months ending June 30, 2022 may not be indicative of operating results expected for the full year.

Nature of Business

Lightwave Logic, Inc. is a technology company focused on the development of next generation photonic devices and non-linear optical polymer materials systems for applications in high speed fiber-optic data communications and optical computing markets. Currently the Company is in various stages of photonic device and materials development and evaluation with potential customers and strategic partners. The Company expects to obtain a revenue stream from technology licensing agreements, technology transfer agreements and the production and direct sale of its own electro-optic device components.

The Company's current development activities are subject to significant risks and uncertainties, including failing to secure additional funding to operationalize the Company's technology now under development.

Stock-based Payments

The Company accounts for stock-based compensation under the provisions of Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) 718, "Compensation - Stock Compensation", which requires the measurement and recognition of compensation expense for all stock-based awards made to employees and directors based on estimated fair values on the grant date. The fair value of restricted stock awards is estimated by the market price of the Company's common stock at the date of grant. Restricted stock awards are being amortized to expense over the vesting period. The Company estimates the fair value of option and warrant awards on the date of grant using the Black-Scholes model. The value of the portion of the award that is ultimately expected to vest is recognized as expense over the requisite service periods using the straight-line method. In June 2018, the FASB issued ASU No. 2018-07, Compensation – Stock Compensation (Topic 718), Improvements to Nonemployee Share-Based Payment Accounting (the "2018 Update). The amendments in the 2018 Update expand the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. Prior to the 2018 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 Company has elected to account for forfeiture of stock-based awards as they occur.

LIGHTWAVE LOGIC, INC.
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2022 AND 2021

NOTE 1 - NATURE OF BUSINESS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Loss Per Share

The Company follows FASB ASC 260, "Earnings per Share", resulting in the presentation of basic and diluted earnings per share. Because the Company reported a net loss in 2022 and 2021, common stock equivalents, including stock options and warrants were anti-dilutive; therefore, the amounts reported for basic and dilutive loss per share were the same.

Comprehensive Income

The Company follows FASB ASC 220.10, "Reporting Comprehensive Income (Loss)." Comprehensive income (loss) is a more inclusive financial reporting methodology that includes disclosure of certain financial information that historically has not been recognized in the calculation of net income (loss). Since The Company has no items of other comprehensive income (loss), comprehensive income (loss) is equal to net income (loss).

Recently Issued Accounting Pronouncements Not Yet Adopted

As of June 30, 2022, there are no recently issued accounting standards not yet adopted which would have a material effect on The Company's financial statements.

Recently Adopted Accounting Pronouncements

As of June 30, 2022 and for the period then ended, there are no recently adopted accounting standards that have a material effect on the Company's financial statements.

Reclassifications

Certain reclassifications have been made to the 2021 financial statement in order to conform to the 2022 financial statement presentation.

NOTE 2 – MANAGEMENT'S PLANS

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 $1,300,000 of expenditures per month over the next 12 months. Our current cash position enables us to finance our operations through February 2024. On July 2, 2021, the Company filed a $100,000,000 universal shelf registration statement with the U.S. Securities and Exchange Commission which became effective on July 9, 2021. On October 4, 2021, the Company entered into a purchase agreement with the institutional investor to sell up to $33,000,000 of common stock over a 36-month period (described in Note 9). Pursuant to the purchase agreement, the Company received $1,612,350 in July and August 2022 and a remaining available amount of $8,304,532 is available to the Company per the agreement. Our cash requirements are expected to increase at a rate consistent with the Company's path to revenue as we expand our activities and operations with the objective of commercializing our electro-optic polymer technology. We currently have no debt to service.

LIGHTWAVE LOGIC, INC.
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2022 AND 2021

NOTE 3 – PREPAID EXPENSES AND OTHER CURRENT ASSETS

Prepaid expenses and other current assets consist of the following:

	June 30, 2022	December 31, 2021
Insurance	$ 430,633	$ 123,877
Equipment deposit	138,474	—
Licence	88,093	38,865
Investor expenses	40,500	—
Rent	36,525	36,525
Other	49,071	33,041
	$ 783,296	$ 232,308

NOTE 4 – PROPERTY AND EQUIPMENT

Property and equipment consist of the following:

	June 30, 2022	December 31, 2021
Office equipment	$ 109,274	$ 95,516
Lab equipment	5,311,836	4,952,933
Furniture	33,128	33,128
Leasehold improvements	183,387	254,350
	5,637,625	5,335,927
Less: Accumulated depreciation	3,538,806	3,156,852

	$ 2,098,819	$ 2,179,075

Depreciation expense for the six months ending June 30, 2022 and 2021 was $452,916 and $373,527. Depreciation expense for the three months ending June 30, 2022 and 2021 was $230,827 and $199,522. During the three and six months ending June 30, 2022 and 2021, the Company did not retire or sell property and equipment.

NOTE 5 – INTANGIBLE ASSETS

This represents legal fees and patent fees associated with the prosecution of patent applications. The Company has recorded amortization expense on patents granted, which are amortized over the remaining legal life. Maintenance patent fees are paid to a government patent authority to maintain a granted patent in force. Some countries require the payment of maintenance fees for pending patent applications. Maintenance fees paid after a patent is granted are expensed, as these are considered ongoing costs to "maintain a patent". Maintenance fees paid prior to a patent grant date are capitalized to patent costs, as these are considered "patent application costs". No amortization expense has been recorded on the remaining patent applications since patents on these applications have yet to be granted.

Patents consist of the following:

	June 30, 2022	December 31, 2021
Patents	$ 1,387,554	$ 1,345,649
Less: Accumulated amortization	541,149	497,516
	$ 846,405	$ 848,133

Amortization expense for the six months ending June 30, 2022 and 2021 was $43,633 and $43,887. Amortization expense for the three months ending June 30, 2022 and 2021 was $21,554 and $21,314. There were no patent costs written off for the three and six months ending June 30, 2022 and 2021.

NOTE 6 – COMMITMENTS

On October 30, 2017, the Company entered into a lease agreement to lease approximately 13,420 square feet of office, laboratory and research and development space located in Colorado for the Company's principal executive offices and research and development facility. The term of the lease is sixty- one (61) months, beginning on November 1, 2017 and ending on November 30, 2022. During January 2022, the term was extended for an additional twenty-four (24) months. Base rent for the first year of the lease term is approximately $168,824, with an increase in annual base rent of approximately 3% in each subsequent year of the lease term. As specified in the lease, the Company paid the landlord (i) all base rent for the period November 1, 2017 and ending on October 31, 2019, in the sum of $347,045; and (ii) the estimated amount of tenant's proportionate share of operating expenses for the same period in the sum of $186,293. Commencing on November 1, 2019, monthly installments of base rent and one-twelfth of landlord's estimate of tenant's proportionate share of annual operating expenses shall be due on the first day of each calendar month. The lease also provides that (i) on November 1, 2019 landlord shall pay the Company for the cost of the cosmetic improvements in the amount of $3.00 per rentable square foot of the premises, and (ii) on or prior to November 1, 2019, the Company shall deposit with Landlord the sum of $36,524 as a security deposit which shall be held by landlord to secure the Company's obligations under the lease. On October 30, 2017, the Company entered into an agreement with the tenant leasing the premise from the landlord ("Original Lessee") whereby the Original Lessee agreed to pay the Company the sum of $260,000 in consideration of the Company entering into the lease and landlord agreeing to the early termination of the Original Lessee's lease agreement with landlord. The consideration of $260,000 was received on November 1, 2017.

NOTE 6 – COMMITMENTS (CONTINUED)

Due to the adoption of the new lease standard, the Company has capitalized the present value of the minimum lease payments commencing November 1, 2019, including the additional option period using an estimated incremental borrowing rate of 6.5%. The minimum lease payments do not include common area annual expenses which are considered to be non-lease components.

As of January 1, 2019 the operating lease right-of-use asset and operating lease liability amounted to $885,094 with no cumulative-effect adjustment to the opening balance of retained earnings/accumulated deficit. The Company has elected not to recognize right-of-use assets and lease liabilities arising from short-term leases.

There are no other material operating leases.

The Company is obligated under the operating lease for office and laboratory space. The aggregate minimum future lease payments under the operating leases, including the extended term are as follows:

YEARS ENDING DECEMBER 31,	AMOUNT
2022	$ 104,296
2023	213,781
2024	182,624
	500,701
Less discounted interest	(51,906)
TOTAL	$ 448,795

Rent expense amounting to $69,197 and $23,066 is included in research and development and general and administrative expenses for the six months ended June 30, 2022. Rent

expense amounting to $66,933 and $22,311 is included in research and development and general and administrative expenses for the six months ended June 30, 2021. Rent expense amounting to $34,599 and $11,533 is included in research and development and general and administrative expenses for the three months ended June 30, 2022. Rent expense amounting to $33,466 and $11,155 is included in research and development and general and administrative expenses for the three months ended June 30, 2021.

NOTE 7 – PAYCHECK PROTECTION PROGRAM ADVANCE

On April 24, 2020, the Company received $410,700 in loan funding from the Paycheck Protection Program, established pursuant to the Coronavirus Aid, Relief, and Economic Security Act enacted on March 27, 2020 and administered by the U.S. Small Business Administration. The unsecured loan is evidenced by a promissory note of the Company dated April 23, 2020 in the principal amount of $410,700, to Community Banks of Colorado, a division of NBH Bank, the lender. The loan proceeds have been used to cover payroll costs, rent and utility costs. The loan was eligible for forgiveness as part of the CARES Act if certain requirements were met. The loan was forgiven by the Small Business Administration in its entirety on January 22, 2021.

NOTE 8 – INCOME TAXES

There is no income tax benefit for the losses for the six months ended June 30, 2022 and 2021 since management has determined that the realization of the net deferred tax asset is not assured and has created a valuation allowance for the entire amount of such benefits.

The Company's policy is to record interest and penalties associated with unrecognized tax benefits as additional income taxes in the statement of operations. As of January 1, 2022, the Company had no unrecognized tax benefits, or any tax related interest or penalties. There were no changes in the Company's unrecognized tax benefits during the period ended June 30, 2022. The Company did not recognize any interest or penalties during 2021 related to unrecognized tax benefits. With few exceptions, the U.S. and state income tax returns filed for the tax years ending on December 31, 2018 and thereafter are subject to examination by the relevant taxing authorities.

NOTE 9 – STOCKHOLDERS' EQUITY

Preferred Stock

Pursuant to the Company's Articles of Incorporation, the Company's board of directors is empowered, without stockholder approval, to issue series of preferred stock with any designations, rights and preferences as they may from time to time determine. The rights and preferences of this preferred stock may be superior to the rights and preferences of the Company's common stock; consequently, preferred stock, if issued could have dividend, liquidation, conversion, voting or other rights that could adversely affect the voting power or other rights of the common stock. Additionally, preferred stock, if issued, could be utilized, under special circumstances, as a method of discouraging, delaying or preventing a change in control of the Company's business or a takeover from a third party.

Common Stock, Options and Warrants

In January 2019, the Company signed a purchase agreement with the institutional investor to sell up to $25,000,000 of common stock. The Company registered 9,500,000 shares pursuant to a registration statement filed on January 30, 2019 which became effective February 13, 2019. The Company issued 350,000 shares of common stock to the institutional investor as an initial commitment fee valued at $258,125, fair value, and 812,500 shares of common stock are reserved for additional commitment fees to the institutional investor in accordance with the terms of the purchase agreement. The Company registered an additional 6,000,000 shares pursuant to a registration statement filed on January 24, 2020 which became effective February 4, 2020. The Company registered an additional 8,000,000 shares pursuant to a registration statement filed on November 20, 2020 which became effective November 20, 2020. During the period January 2019 through June 30, 2022 the institutional investor purchased 22,337,500 shares of common stock for proceeds of $23,773,924 and the Company issued 772,666 shares of common stock as additional commitment fee, valued at $1,575,509, fair value, leaving 39,834 in reserve for additional commitment fees. During the three and six month periods ending June 30, 2022, the institutional investor did not purchase any shares of common stock. All the registered shares under the purchase agreement have been issued as of June 30, 2022.

NOTE 9 – STOCKHOLDERS' EQUITY (CONTINUED)

Common Stock, Options and Warrants (Continued)

On July 2, 2021, the Company filed a $100,000,000 universal shelf registration statement with the U.S. Securities and Exchange Commission which became effective on July 9, 2021. On October 4, 2021, the Company entered into a purchase agreement with the institutional investor to sell up to $33,000,000 of common stock over a 36-month period. Concurrently with entering into the purchase agreement, the Company also entered into a registration rights agreement which provides the institutional investor with certain registration rights related to the shares issued under the purchase agreement. Pursuant to the purchase agreement, the Company issued 30,312 shares of common stock to the institutional investor as an initial commitment fee valued at $279,174, fair value, and 60,623 shares of common stock are reserved for additional commitment fees to the institutional investor in accordance with the terms of the purchase agreement. During the period October 4, 2021 through June 30, 2022, the institutional investor purchased 2,102,511 shares of common stock for proceeds of $23,083,117 and the Company issued 42,405 shares of common stock as additional commitment fee, valued at $554,520, fair value, leaving 18,218 in reserve for additional commitment fees. During the six month period ending June 30, 2022, pursuant to the purchase agreement, the institutional investor purchased 875,000 shares of common stock for proceeds of $6,705,693 and the Company issued 12,319 shares of common stock as additional commitment fee, valued at $107,857, fair value. During the three month period ending June 30, 2022, pursuant to the purchase agreement, the institutional investor purchased 400,000 shares of common stock for proceeds of $3,018,876 and the Company issued 5,546 shares of common stock as additional commitment fee, valued at $47,644, fair value. During July and August 2022, pursuant to the purchase agreement, the institutional investor purchased 175,000 shares of common stock for proceeds of $1,612,350 and the Company issued 2,960 shares of common stock as additional commitment fee, valued at $30,393, fair value, leaving 15,258 in reserve for additional commitment fees.

Restricted Stock Awards

On January 18, 2022, the Compensation Committee of the Board of Directors approved grants totaling 28,500 Restricted Stock Awards to the Company's five outside directors. Each RSA had a grant date fair value of $9.65 which shall be amortized on a straight-line basis over the vesting period into director's compensation expenses within the Consolidated Statement of Comprehensive Loss. Such RSAs were granted under the 2016 Equity Incentive Plan ("2016 Plan") and vest in total 9,504 shares on December 31, 2022, 9,498 shares on December 31, 2023 and 9,498 shares on December 31, 2024. Upon the occurrence of a Change in Control, 100% of the unvested Restricted Stock shall vest as of the date of the Change in Control. Upon vesting, the restrictions on the shares lapse.

NOTE 10 – STOCK BASED COMPENSATION

During 2007, the Board of Directors of the Company adopted the 2007 Employee Stock Plan ("2007 Plan") that was approved by the shareholders. Under the 2007 Plan, the Company is authorized to grant options to purchase up to 10,000,000 shares of common stock to directors, officers, employees and consultants who provide services to the Company. The 2007 Plan is intended to permit stock options granted to employees under the 2007 Plan to qualify as incentive stock options under Section 422 of the Internal Revenue Code of 1986, as amended ("Incentive Stock Options"). All options granted under the 2007 Plan, which are not intended to qualify as Incentive Stock Options are deemed to be non-qualified options ("Non-Statutory Stock Options"). Effective June 24, 2016, the 2007 Plan was terminated. As of June 30, 2022, options to purchase 2,895,000 shares of common stock have been issued and are outstanding.

NOTE 10 – STOCK BASED COMPENSATION (CONTINUED)

During 2016, the Board of Directors of the Company adopted the 2016 Plan that was approved by the shareholders at the 2016 annual meeting of shareholders on May 20, 2016. Under the 2016 Plan, the Company is authorized to grant awards of incentive and non-qualified stock options and restricted stock to purchase up to 3,000,000 shares of common stock to employees, directors and consultants. Effective May 16, 2019, the number of shares of the Company's common stock available for issuance under the 2016 Plan was increased from 3,000,000 to 8,000,000 shares. As of June 30, 2022, options to purchase 4,332,123 shares of common stock have been issued and are outstanding and 28,500 restricted shares of common stock have been granted. As of June 30, 2022, 2,435,250 shares of common stock remain available for grants under the 2016 Plan.

Both plans are administered by the Company's Board of Directors or its compensation committee which determines the persons to whom awards will be granted, the number of awards to be granted, and the specific terms of each grant. Subject to the provisions regarding Ten Percent Shareholders, (as defined in the 2016 Plan), the exercise price per share of each option cannot be less than 100% of the fair market value of a share of common stock on the date of grant. Options granted under the 2016 Plan are generally exercisable for a period of 10 years from the date of grant and may vest on the grant date, another specified date or over a period of time.

The Company uses the Black-Scholes option pricing model to calculate the grant-date fair value of an award, with the following assumptions for 2022: no dividend yield in all years, expected volatility, based on the Company's historical volatility, 74.7% to 75.3%, risk-free interest rate between 1.87% to 3.46% and expected option life of 10 years. The expected life is based on the estimated average of the life of options using the "simplified" method, as prescribed in FASB ASC 718, due to insufficient historical exercise activity during recent years.

As of June 30, 2022, there was $3,808,205 of unrecognized compensation expense related to non-vested market-based share awards that is expected to be recognized through April 2024.

Share-based compensation was recognized as follows:

	For The Six Months Ending June 30, 2022	For the Six Months Ending June 30, 2021
2007 Employee stock option Plan	$ —	$ —
2016 Equity Incentive Plan	2,798,550	528,249
2016 Equity Incentive Plan restricted stock awards	—	10,242
Warrants	—	—
Total share-based compensation	$ 2,798,550	$ 538,491

NOTE 10 – STOCK BASED COMPENSATION (CONTINUED)

The following tables summarize all stock option and warrant activity of the Company during the six months ended June 30, 2022:

	Non-Qualified Stock Options and Warrants Outstanding and Exercisable		
	Number of Shares	Exercise Price	Weighted Average Exercise Price
Outstanding, December 31, 2021	7,886,248	$0.51 - $16.81	$ 1.02
Granted	746,500	$5.81 - $9.65	$ 9.38
Expired	(25,000)	$1.69	$ 1.69
Exercised	(417,625)	$0.64 - $1.48	$ 1.02
Outstanding, June 30, 2022	8,190,123	$0.51 - $16.81	$ 1.78
Exercisable, June 30, 2022	7,463,530	$0.51 - $16.81	$ 1.28

The aggregate intrinsic value of options and warrants outstanding and exercisable as of June 30, 2022 was $40,374,965. The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying options and warrants and the closing stock price of $6.54 for the Company's common stock on June 30, 2022. During the six month period ending June 30, 2022, 238,250 options were exercised for proceeds of $182,175 and 4,375 options were exercised via cashless method. during the six month period ending June 30, 2022, 175,000 warrants were exercised for proceeds of $240,750.

Non-Qualified Stock Options and Warrants Outstanding			
Range of Exercise Prices	Number Outstanding Currently Exercisable at June 30, 2022	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price of Options and Warrants Currently Exercisable
$0.51 - $16.81	7,463,530	5.12 Years	$1.28

The fair value of restricted stock awards is estimated by the market price of the Company's common stock at the date of grant. Restricted stock activity during the six and three month period ending June 30, 2022 and 2021 are as follows:

	Restricted Stock Awards Six month period ended			
	June 30, 2022		June 30, 2021	
	Number of Shares	Weighted Average Grant Date Fair Value per Share	Number of Shares	Weighted Average Grant Date Fair Value per Share
Non-vested, beginning of period	—	$ —	—	$ —
Granted	28,500	9.65	—	—
Vested	—	—	—	—
Cancelled and forfeited	—	—	—	—
Non-vested, end of period	28,500	$ 9.65	—	$ —

Restricted stock awards are being amortized to expense over the vesting period. As of June 30, 2022 and 2021, the unamortized value of the RSAs was $231,803 and $0, respectively.

NOTE 11 – RELATED PARTY

At June 30, 2022 the Company had a legal accrual to a related party of $81,950, travel and office expense accruals of officers in the amount of $28,519 and accounting service fee accrual and expense reimbursement to a related party of $2,065 offset by prepaid director operations committee fees in the amount of $24,000. At December 31, 2021 the Company had office expense accruals of officers in the amount of $24,000, a legal accrual to related party of $6,130 and accounting service fee accrual and expense reimbursements to related parties of $2,059.

NOTE 12 – RETIREMENT PLAN

The Company established a 401(k) retirement plan covering all eligible employees beginning November 15, 2013. For the six months ending June 30, 2022 and 2021, a contribution of $27,087 and $28,431 was charged to expense for all eligible non-executive participants. For the three months ending June 30, 2022 and 2021, a contribution of $13,999 and $15,127 was charged to expense for all eligible non-executive participants.

Item 2 Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis should be read in conjunction with our financial statements, included herewith. This discussion should not be construed to imply that the results discussed herein will necessarily continue into the future, or that any conclusion reached herein will necessarily be indicative of actual operating results in the future. Such discussion represents only the best present assessment of our management. This information should also be read in conjunction with our audited historical financial statements which are included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the Securities and Exchange Commission on March 1, 2022.

Overview

Lightwave Logic, Inc. is a development stage company moving toward commercialization of next generation electro-optic photonic devices made on its P^2IC™ technology platform which we have detailed as: 1) Polymer Stack™, 2) Polymer Plus™, and Polymer Slot™. Our unique polymer technology platform uses in-house proprietary high-activity and high-stability organic polymers. Electro-optical devices called modulators convert data from electric signals into optical signals for multiple applications.

Our differentiation at the modulator device level is in higher speed, lower power consumption, simplicity of manufacturing, small footprint (size), and reliability. We have demonstrated higher speed and lower power consumption in packaged devices, and during 2022, we continue to make advances in techniques to translate material properties to efficient, reliable modulator devices. We are currently focused on testing and demonstrating the simplicity of manufacturability and reliability of our devices, including in conjunction with the silicon photonics manufacturing ecosystem. In 2022 we discussed the addition of a number of silicon-based foundry partners to help scale in volume our polymer modulator devices. Silicon-based foundries are large semiconductor fabrication plants developed for the electronics IC business, that are now engaging with silicon photonics to increase their wafer throughput. Partnering with silicon-based foundries not only demonstrates that our polymer technology can be transferred into standard production lines using standard equipment, and also allows us to efficiently utilize our capital.

Our extremely strong and broad patent portfolio allows us to optimize our business model in three areas: 1) Traditional focus on product development, 2) Patent licensing, 3) Technology transfer to foundries.

We are initially targeting applications in data communications and telecommunications markets and are exploring other applications that include automotive/LIDAR, sensing, displays etc., for our polymer technology platform. Our goal is to have our unique polymer technology platform become ubiquitous.

Materials Development

Our 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 our proprietary and unique polymers have the potential to replace more expensive, higher power consuming, slower-performance materials such as semiconductor modulator devices that are used in fiber-optic communication networks today.

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, contract manufacturers, original equipment manufacturers, etc. Our Company contemplates future applications that may address the needs of semiconductor companies, optical network companies, Web 2.0/3.0 media companies, high performance computing companies, telecommunications companies, aerospace companies, automotive companies, as well as for example, government agencies.

Device Design and Development

Electro-optic Modulators

Our 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 as well as the drive towards lower power consumption, and smaller footprint (size).

Polymer Photonic Integrated Circuits

Our 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 multi-channel polymer PIC. The number of channels can be varied depending on application. For example, the number of photonic components could increase by a factor of 8 or 16. Another type of integration 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 P^2IC™ platform encompasses both these types of architecture.

Current semiconductor 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 bulk 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 such as the Polymer Stack ™ , Polymer Plus™, Polymer Slot™, and associated PIC platforms that can address higher data rates in a lower cost, lower power consuming manner, smaller footprint (size) with much simpler data encoding 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 using standard clean room tooling. This approach we call Polymer Plus™. 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. Of particular relevance are the integrated silicon photonics platforms that combine optical and electronic functions. These include a miniaturized modulator for ultra-small footprint applications in which we term the Polymer Slot™. This design is based on a slot modulator fabricated into semiconductor wafers that include both silicon and indium phosphide.

Our Company has a fabrication facility in Colorado to apply standard fabrication processes to our electro-optic polymers which create modulator devices. While our internal fabrication facility is capable of manufacturing modulator devices, we have partnered with commercial silicon-based fabrication companies that are called foundries who can scale our technology with volume quickly and efficiently. The process recipe for fabrication plants or foundries is called a 'process development kit' or PDK. We are currently working with commercial foundries to implement our electro-optic polymers into accepted PDKs by the foundries. Our work with the foundries is being focused with the Polymer Plus™ and the Polymer Slot™ polymer modulators.

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; and (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 P2ICTM technology
- Continue to develop proprietary intellectual property

- Grow our commercial device development capabilities
- Partner with silicon-based foundries who can scale volume quickly
- 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 advance complex encoding schemes. We are currently developing our polymer technology to operate at the next industry node of 100Gbaud using a single channel.

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, Polymer Stack ™

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 P^2IC™ 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.

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 P^2IC™ 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 Polymer Stack™ 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

Ridge Waveguide Modulator, Polymer Plus™

Using the ridge waveguide design, we are developing a more compact modulator to be implemented directly with existing integrated photonics platforms such as silicon photonics and Indium Phosphide. As our electro-optic polymers are applied in liquid form, they can be deposited as a thin film coating in a fabrication clean room such as may be found in semiconductor foundries. This approach we call Polymer Plus™. The advantage of this approach is that it allows existing semiconductor integrated photonics platforms such as silicon photonics and indium phosphide to be upgraded with higher speed modulation functionality with the use of polymers in a straight-forward and simple approach. Further, 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.

A large majority of commercial silicon photonics platforms utilize large silicon photonics foundries such as those that manufacture IC products for a number of applications such as communications, computing, consumer, etc. In order to seamlessly integrate our polymer materials to upgrade for example, silicon photonics designs, partnering with a silicon foundry is necessary.

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 which is called Polymer Slot™, 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 are continuing our collaborative development of our polymer photonic slot waveguide modulators (Polymer Slot™) with a partner that has advanced device design capabilities. We are now designing Polymer Slot™ modulators to operate at data rates greater than 50 Gbaud

Our Long-Term Device Development Goal - Multichannel Polymer Photonic Integrated Circuit (P^2IC™)

Our P^2IC™ platform is positioned to address markets with aggregated data rates of 100 Gbaud, 400 Gbaud, 800 Gbaud and beyond. Our P^2IC™ 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, 800 Gbps, and beyond fiber optic transceiver market. This has been stated in our photonics product roadmap that is publicly available on our website. The roadmap shows a progression in speed from 50 Gbaud based ridge waveguide modulators to 100 Gbaud based ridge waveguide modulators. The roadmap shows a progression in integration in which the modulators are arrayed to create a flexible, multichannel P^2IC™ platform that spans 100 Gbps, 400 Gbps, 800 Gbps, and a scaling philosophy that will grow to 1.6 Tbps aggregated data-rate markets.

We showed bandwidths of polymer-based modulator devices at a major international conference (ECOC – European Conference on Optical Communications 2018) with bandwidths that exceeded 100GHz. We noted that to achieve 100Gbaud, the polymer-based modulator only needs to achieve 80GHz bandwidth. During ECOC 2019, we showed environmental stability. We continue to develop our polymer materials and device designs to optimize additional metrics. 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, improve speed of access, and to reduce power consumption both at the device as well as the system level.

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.

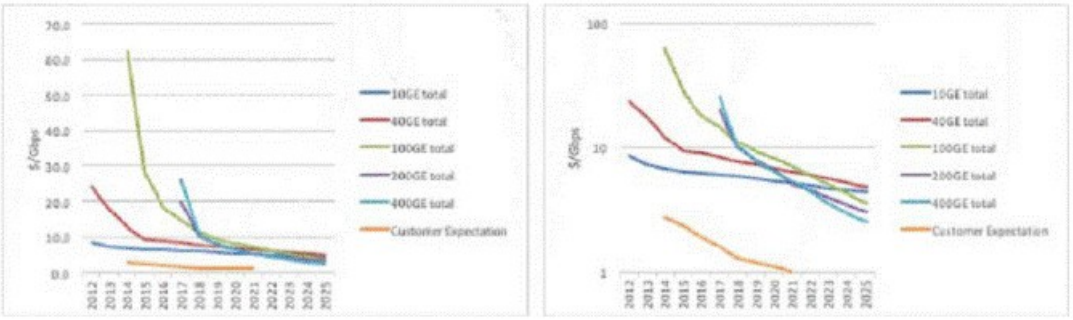
Telecommunications/Data Communications

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.

Industry issues of scaling

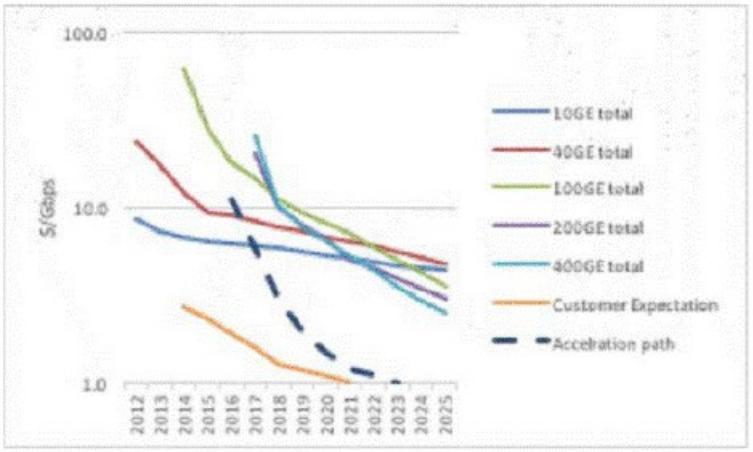
The key issues facing the fiber-optic communications industry are the economic progress and scalability of any PIC based technological platform. Our polymer platform is unique in that it is truly scalable. Scalable means being able to scale up for high-speed data rates, while simultaneously being able to scale down in cost, and lower power consumption. This allows a competitive cost per data rate or cost per Gbps metric to be achieved.

Fiber optic datacenter and high-performance computing customers want to achieve the metric of $1/Gbps @ 400Gbps (this essentially means a single mode fiber optic link that has a total cost of $400 and operates with a data rate of 400Gbps ➔ which also means that each transceiver at each end of the fiber optic link must be able to be priced at $200), but as industry tries to match this target, it is already falling behind as can be seen in the Figure below which plots generic typical PIC based technology:



In the above figures that forecast $/Gbps to 2025 (where the left-hand graph is a linear vertical scale, and the right-hand graph is a log scale), it can be seen that the orange curve plots the customer expectation, while the other color curves show $/Gbps improvement over time for various high-speed data rate transceivers using PIC based technologies. A gap is appearing between what customer expect and what the technologists can produce.

Polymers play an important role in PICs over the next decade as they can reduce or close the gap between customer expectations and technical performance through effective scaling increase of high performance with low cost. This is shown below how polymers have the potential to scale to the needs of the customers over the next 5years.



Some of the things needed to achieve the scaling performance of polymers in integrated photonics platforms is within sight today:

1. Increased r33 (which leads to very low Vpi in modulator devices) and we are currently optimizing our polymers for this.

2. Increase temperature stability so that the polymers can operate at broader temperature ranges effective, where we have made significant progress over the past few years.

3. Low optical loss in waveguides and active/passive devices for improved optical budget metrics which is currently an ongoing development program at our Company.

4. Higher levels of hermeticity for lower cost packaging of optical sub-assemblies within a transceiver module, where our advanced designs are being implemented into polymer-based packages.

Scalability in terms of cost reduction and high-volume manufacturing can be enhanced by:

1. Leverage of commercial silicon photonics manufacturing capacity through the use of silicon-based foundries. Our Polymer Plus™ platform seeks to be additive to standard silicon photonics circuits.

2. Reduction of optical packaging costs by integration at the chip level of multiple modulators and also with other optical devices. Our P2IC™ platform seeks to address device integration.

Recent Significant Events and Milestones Achieved

During February and March 2018, we moved our Newark, Delaware synthetic laboratory and our Longmont, Colorado optical testing laboratory and corporate headquarters to office, laboratory and research and development space located at 369 Inverness Parkway, Suite 350, Englewood, Colorado. The 13,420 square feet 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 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 P^2IC™ 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.

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.

In February 2019 we announced a major breakthrough in our development of clean technology polymer materials that target the insatiable demand for fast and efficient data communications in the multi-billion-dollar telecom and data markets supporting Internet, 5G and IoT (Internet of Things) webscale services. The improved thermally stable polymer has more than double the electro-optic response of our previous materials, enabling optical device performance of well over 100 GHz with extremely low power requirements. This addition to the family of Perkinamine® polymers will hold back run-away consumption of resources and energy needed to support ever-growing data consumption demands. We continue to conduct testing of the material and assessment of associated manufacturing processes and device structures prior to release to full development.

In March 2019 we created an Advisory Board comprised of three world-class leaders in the photonics industry: Dr. Craig Ciesla, Dr. Christoph S. Harder, and Mr. Andreas Umbach. The Advisory Board is working closely with our Company leadership to enhance our Company's product positioning and promote our polymer modulator made on our proprietary *Faster by Design*™ polymer P^2IC™ platform. The mission of the Advisory Board is initially to increase our Company's outreach into the datacenter interconnect market and later to support expansion into other billion-dollar markets. The Advisory Board members have each been chosen for their combination of deep technical expertise, breadth of experience and industry relationships in the fields of fiber optics communications, polymer and semiconductor materials. Each of the Advisory Board members has experience at both innovators like Lightwave Logic and large industry leaders of the type most likely to adopt game-changing polymer-based products. In addition, they possess operational experience with semiconductor and polymer businesses.

Also, in March 2019, our Company received the "Best Achievement in PIC Platform" award for our 100 GHz polymer platform from the PIC International Conference. The award recognizes innovative advances in the development and application of key materials systems driving today's photonic integrated circuits (PICs) and providing a steppingstone to future devices.

During the second quarter of 2019, our Company promoted its polymers at CoInnovate in May and the World Technology Mapping Forum in June. CoInnovate is a meeting of semiconductor industry experts. The World Technology Mapping Forum is a group authoring a photonics roadmap out to 2030.

In September 2019 at the prestigious European Conference on Communications (ECOC) in Dublin, Ireland, we showed measured material response over frequency and the resulting optical data bits stream on our clean technology polymer materials, the newest addition to our family of Perkinamine® polymers, that meet and exceed of our near-term target speed of 80 GHz. We also released data demonstrating stability under elevated temperatures in the activated (poled to create data carrying capability) state.

In October 2019, we reported that energy-saving polymer technology is highlighted in the recently published Integrated Photonics Systems Roadmap - International (IPSR-I). The roadmap validates the need for low-voltage, high-speed technologies such as ours.

In May 2020, we announced that our latest electro-optic polymer material has exceeded target performance metrics at 1310 nanometers (nm), a wavelength commonly used in high-volume datacenter fiber optics. This material demonstrates an attractive combination at 1310 nm of high electro-optic coefficient, low optical loss and good thermal stability at 85^0 Celsius. The material is expected to enable modulators with 80 GHz bandwidth and low drive power, and has an electro-optic coefficient of 200 pm/V, an industry measure of how responsive a material is to an applied electrical signal. This metric, otherwise known as r33, is very important in lowering power consumption when the material is used in modulator devices. This technology is applicable to shorter reach datacenter operators, for whom decreasing power consumption is imperative to the bottom line of a facility. We considered this a truly historic moment—not only in our Company's history, but in our industry–as we have demonstrated a polymer material that provides the basis for a world-class solution at the 1310 nm wavelength, something which other companies have spent decades attempting to achieve.

In July 2020, we announced the official launch of our new corporate website www.lightwavelogic.com, reflecting ongoing efforts to provide up-to-date information for investors and potential strategic partners. The revamped website offers a clean, modern design integrated with helpful tools and investor relations resources, including a new corporate explainer video, to illustrate the target markets and advantages of Lightwave Logic's proprietary electro-optic polymers.

In August 2020, we announced the addition of Dr. Franky So, a leading authority in the OLED industry, to our Advisory Board. Dr. So is the Walter and Ida Freeman Distinguished Professor in the Department of Materials Science and Engineering at North Carolina State University. Previously, he was the Head of Materials and Device research for OLEDs at OSRAM Opto Semiconductors, as well as Motorola's corporate research lab in the 1990s. Dr. So was an early researcher in electro-optic (EO) polymer modulators at Hoechst Celanese. As a member of the Company's advisory board, Dr. So will work closely with management to enhance Lightwave's product positioning for, as well as the promotion of, its polymer modulators made on its proprietary platform. In addition, he will provide technical support and advisory services to the Lightwave materials and device teams.

On October 7, 2020 we announced the receipt of U.S. Patent number 10,754,093 that improves both the performance and reliability of our high-speed, low-power electro-optic polymer modulators intended for datacenter and telecommunications applications. The patent allows multi-layered electro-optic polymer modulators to perform more efficiently through the design of custom interfaces. These interfaces are designed into the cladding layers that allow optical transmission, electrical conductivity, material integrity, as well as a prevention of solvents affecting adjacent polymer materials. The net impact of all of this allows for our Company's modulators to improve performance across the board, enabling higher reliability in the fiber optic communications environment.

On October 15, 2020, we announced that our proprietary polymer technologies are compatible with currently available integrated photonics platforms. Our proprietary electro-optic materials are currently in the prototyping phase and are fabricated onto standard silicon wafers, and this Polymer Plus™ advancement, driven by the feedback our Company received from potential customers to-date, has allowed our materials to be suitable for additive integration to integrated photonics platforms such as silicon photonics, as well as indium phosphide and other standard platforms – therefore enabling simpler integration by customers. We believe this breakthrough allows a polymer modulator to enhance the performance of existing integrated photonics solutions in the marketplace, enabling higher speed and lower power consumption on foundry-fabricated photonics designs. Since our technology is additive to existing platforms such as silicon photonics, our electro-optic polymers are not actually competing with integrated photonic platforms, but rather enabling them to be more competitive in the marketplace, and it further validates our EO polymer platform as ideally suited to enable optical networking more efficiently than ever.

On October 21, 2020, we announced that we have optimized a robust, photo-stable organic polymer material for use in our next-generation modulators intended to be trialed with potential customers under NDA. Our materials show high tolerance to high-intensity infrared light, common in a fiber optic communications environment and increasingly important as higher density of devices access the network, directly resulting in higher intensity infrared light levels. Our preliminary results suggest that our recently developed electro-optic polymer material, designed based on potential customer input, displays unrivaled light tolerance (also known as photostability) compared to any organic commercial solution in use today. Our results meet both our current internal criteria and address potential customer feedback.

On November 2, 2020, we disclosed results on our polymer material stability testing including further results for electro-optic efficiency for our Company's materials that operate both at 1550nm as well as 1310nm. We demonstrated test materials results for electro-optic efficiency to 4000hrs, improvement in sensitivity to oxygen as part of a broadband exposure test, and stability for polymers exposed to 1310nm light at 100mW.

On November 20, 2020 we announced the receipt of U.S. Patent number 10,591,755 that details an important invention that allows users of electro-optic polymer modulators to not only operate the devices with high speed and low power directly from CMOS IC chips, but gives them the opportunity to avoid the expense, physical footprint and power consumption of high-speed modulator driver ICs. Furthermore, this patent strengthens our freedom of manufacturing, and directly enables our modulators to become more competitive in the marketplace.

On December 16, 2020 we announced the development of a new sealant for our future Chip-on-Board (COB) packaged polymer platform. The sealant, which blocks oxygen and other atmospheric gases, is a key step in our Company's development towards a polymer modulator without a package, an important enabling technology for the industry. We plan to develop the sealant for commercial implementation in our future modulators. Recent results suggest that our electro-optic polymer sealant material displays encouraging barrier properties and is expected to translate to significant improvement in bare chip robustness against atmospheric gases, as compared to existing EO polymer commercial solutions in use today. While the initial measurements are highly promising, our Company plans to continue development work to further optimize the sealant material and barrier performance towards the chip-on-board goal.

On January 13, 2021, we announced the receipt of U.S. Patent number 10,886,694 that details an invention that allows electro-optic polymer modulators to be packaged in a hermetic environment using well-known, high-volume and low-cost fabrication processes that are available in a typical semiconductor fabrication foundry – improving suitability for mass production. Further, the design of this capsule package can improve both the reliability and the coupling interface between fiber optic cables and their laser sources for arrayed photonic integrated circuit solutions. The package can also interpose signals from an underlying circuit board to the polymer modulators, lasers, and other components for data transfer. The hermetic capsule is built from a semiconductor base that contains electrical and optical circuits and components. A hermetic capsule chamber is created by the design of a semiconductor lid that is sealed to the semiconductor base platform by a metallization process. Using standardized fabrication techniques we can now create a package that achieves the performance, reliability, cost, and volume requirements that has been a challenge for the photonics industry for years.

On May 11, 2021, we announced the receipt of U.S. Patent number 10,989,871 that details an invention that allows for improved protective polymer layers in modulators when designed into advanced integrated photonic platforms, better positioning them for high-volume manufacturing processes. The protective layers will enhance electro-optic polymer devices' performance through higher reliability, better optical performance and enable the use of standardized manufacturing processes best suited for mass-production.

On June 7, 2021, we announced that our company's common stock was added to the Solactive EPIC Core Photonics EUR Index NTR as part of the index's semi-annual additions. The index includes global public companies with a common theme of optoelectronics, photonics, and optical technologies in general that range from components, modules, manufacturers, and optical network system companies. This inclusion broadens our exposure to the capital markets community, as well as credibility with potential partners and customers.

On June 16, 2021, we announced test results from new modulators fabricated in 2021, which exceeded bandwidth design targets and achieved triple the data rate as compared to competing devices in use today. The breakthrough new devices demonstrated 3dB electro-optical with electrical bandwidths that exceed 100GHz – with measurements coming close to our Company's state-of-the-art 110GHz test equipment capability. We expect this advancement to have a profound impact on the traffic flow on the internet.

On June 24, 2021, we announced the receipt of U.S. patent number 11,042,051 that details a breakthrough new device design that enables mass-volume manufacturing when designed into advanced integrated photonic platforms. The device design enhances reliability, improves optical mode control and most important, lowers by consumption through the use of direct-drive, low-voltage operation. The patent is entitled, "Direct drive region-less polymer modulator methods of fabricating and materials therefor" and is expected to open the opportunity for low power consumption electro-optic polymers to be developed into large foundry PDKs (process development kits) and be ready for mass volume commercialization. The patent emphasizes our technology platform using fabrication techniques that would naturally fit into foundry PDKs.

On August 4, 2021, we announced that we developed improved thermal design properties for electro-optic polymers used in our Polymer Plus™ and Polymer Slot™ modulators, enabling the speed, flexibility and stability needed for high-volume silicon foundry processes. We successfully created a 2x improvement in r33, while allowing higher stability during poling and post-poling. This provides better thermal performance and enables greater design flexibility in high-volume silicon foundry PDK (process development kit) processes.

On August 9, 2021, we announced the receipt of U.S. patent number 11,067,748 entitled "Guide Transition Device and Method" that covers a new invention that enables enhanced optical routing architectures for polymer-based integrated photonics that can be scaled with partner foundries. This new invention will enable innovative, highly scalable optical routing architectures for integrated photonic platforms. The patent provides novel optical waveguide transition designs using two planes of optical waveguides that are expected to be critical for optical signal routing and optical switching, opening the opportunity for high speed, energy efficient electro-optic polymers to be implemented into foundry PDKs (process development kits) to improve the performance of integrated photonic circuits. This breakthrough technology opens the door for advanced integrated photonics architectural design. We believe the simplicity of the design is ideal for production in foundries and will best position our Company to enable increased data traffic on the internet while using less power.

On September 1, 2021, our Company's common shares began trading on the Nasdaq Capital Market ("Nasdaq"). The Company's Nasdaq listing will help to expand our potential shareholder base, improve liquidity, elevate our public profile within the industry and should ultimately enhance shareholder value.

On September 15, 2021, we announced the receipt of the 2021 Industry Award for Optical Integration from the European Conference on Optical Communications (ECOC), a premier industry exhibition that was held in Bordeaux from September 13-15, 2021. ECOC created the fiber communication industry awards in six categories to put the spotlight on innovation happening within the industry. The awards recognize and highlight key industry achievements in advancing optical components, photonic integration, optical transport and data center innovation. The awards are selected from top industry players, representing significant innovation in photonics integration at our prestigious exhibition.

On September 16, 2021, we announced the achievement of world-record performance for a polymer modulator, as demonstrated in an optical transmission experiment by ETH Zurich, using our Company's proprietary, advanced Perkinamine® chromophores and Polariton Technologies Ltd.'s newest plasmonic EO modulator, a silicon-photonics-based plasmonic racetrack modulator offering energy-efficient, low-loss, and high-speed modulation in a compact footprint. The groundbreaking results were presented as a post-deadline paper at the prestigious European Conference on Optical Communications (ECOC) industry exhibition and conference in Bordeaux on September 16, 2021. Polariton's plasmonic modulator transmitted 220 Gbit/s OOK and 408 Gbit/s 8PAM. Transmission of an optical signal was conducted over 100 m using a low-voltage electrical drive of 0.6Vp, an on-chip loss of 1 dB, and an optical 3 dB bandwidth of beyond 110 GHz.

On January 3, 2022, we announced the publication of our patent application 20210405504A1 by the United States Patent and Trademark Office (USPTO) – entitled *'Nonlinear Optical Chromophores Having a Diamondoid Group Attached Thereto, Methods of Preparing the Same, and Uses Thereof'* – which significantly improves the overall stability and performance of our electro-optic polymers. The Company's electro-optic chromophores are designed to have one or more diamondiod molecular groups attached to the chromophore. When such chromophores are dispersed in a host polymer matrix, the electro-optic materials result in improved macroscopic electro-optic properties, increased poling efficiency, increased loading as well as increased stability of these materials after poling. The impact of this technology is that it will accelerate the path for very high-speed, low-power electro-optic polymers to be implemented into large foundry process development kits ("**PDKs**") to boost performance of integrated photonic circuits.

On January 3, 2022, we announced that we enhanced our Company's Foundry Process Development Kit Offering with the addition of Optical Grating Couplers. This expanded design tool kit will enable silicon foundries to implement PDKs and fabricate modulators and optical gratings in a single fab run, further enhancing modulator efficacy. We are continuing to work on additional design tool kit components to enable an expedited commercialization process through a more simplified manufacturing process for our foundry partners.

On January 3, 2022, we announced that we appointed respected industry leader Dr. Craig Ciesla to our Board of Directors and that retired director Dr. Joseph A. Miller transitioned to our Company's Advisory Board. Dr. Ciesla is currently the Vice President, Head of the Advanced Platforms and Devices Group at Illumina, a leading provider of DNA sequencing and array technologies. There he leads a team driving innovation in sequencing platforms, microfluidics, electronics, and nanofabrication. Prior to Illumina, he was Vice President of Engineering at Kaiam, where he was responsible for the development and production of 100G transceivers for the data-center market. He was also the founding CEO of Tactus Technology, an innovator in the user interface industry, where he was the co-inventor of Tactus' polymer morphing screen technology. Before Tactus he had a variety of roles at Intel, JDSU (now Lumentum), Bookham (now Oclaro) and Ignis Optics developing a wide range of products in the fiber-optics market. He started his career at Toshiba Research Europe, where he performed early terahertz images of skin cancer. Dr. Ciesla holds a BSc (Hons.) in Applied Physics and Ph.D. in Physics from Heriot-Watt University in Edinburgh.

On February 10, 2022, we announced breakthrough photostability results on our electro-optic polymer modulators that are compatible with high-volume silicon foundry processes. The improved photostability of our polymers are expected to minimize any optical losses and provide a more robust platform for silicon foundries. This breakthrough photostability performance is incredibly important as we optimize our polymers for high-volume silicon foundry processes.

On March 7, 2022, we announced the receipt of U.S. patent number 11,262,605 entitled, "Active region-less polymer modulator integrated on a common PIC platform and method." This invention will simplify modulator integration for high-volume foundry manufacturing operations while enhancing polymer reliability to enable a more effective photonic engine. The essence of the invention is a complete optical engine that fits into fiber optic transceivers (either pluggable or co-packaged) that are used in routers, servers and elsewhere in optical networks. The engine is designed for high-volume manufacturing operations using silicon foundry infrastructure. The patent illustrates the use of our

polymer modulators as a high speed, low power engine not only for data communication and telecommunication applications, but other new market opportunities as well.

On March 22, 2022 we announced the achievement of world-class results for a polymer modulator, as demonstrated in an enhanced stability and high-speed measurement by Polariton Technologies and ETH Zurich. The results were generated using the Company's proprietary, advanced Perkinamine® chromophores in Polariton's silicon-photonics-based plasmonic racetrack modulator that offers energy-efficient, low-loss, and high-speed modulation in a compact footprint that is ideal for pluggable and/or co-packaging transceiver modules. The plasmonic modulator performance was compared to that of silicon photonic microring modulators. The plasmonic device, using Lightwave Logic's electro-optic polymer material, was shown to be 250-3000x more stable than the silicon devices relative to operating condition changes. In addition, the plasmonic modulator was tested for 70+ minutes at 100 Gbps NRZ at 80C with no decrease in performance. The world-class results were presented as a contributed peer-reviewed paper at the prestigious 2022 Optical Fiber Conference (OFC2022), the optical communication industry's leading international technical conference and trade show, in San Diego on March 10, 2022.

On April 19, 2022, we announced the publication of our patent application 2022/0113566 A1 entitled "TFP (thin film polymer) optical transition device and method" that illustrates the design of a simpler to fabricate, lower cost hybrid integrated photonics chip using electro-optic polymers which are more advantageous for high-volume production. The invention will simplify polymer modulator fabrication when integrated with silicon photonics for high-volume foundry manufacturing applications. The simplified fabrication approach enables us to simplify the production of very high speed, low power proprietary polymer modulators that will enable significantly faster data rates in the internet environment. The essence of the invention is a hybrid polymer-silicon photonics engine that fits into fiber optic transceivers (either pluggable or co-packaged) that are used in the routers, servers and network equipment that are proliferating with the growth of data centers, cloud computing and optical communications capacity. The hybrid polymer-silicon photonics engine is designed to use high-volume silicon foundry infrastructure.

On May 25, 2022, we announced enhanced photostability results on our Company's proprietary electro-optic polymer modulators – demonstrating the reliability necessary for commercial deployments – all based on a technology which can be ported into high-volume silicon foundries and integrated onto a silicon photonics platform with other optical devices. Photostability is a critical performance metric required both in high volume manufacturing processes (such as photolithography) and in offering the high reliability and network availability required for commercial deployments. In the tests conducted, subjecting the Company's latest polymers to high intensity optical power for over 3000 hours produced no change in device performance. The ability of our proprietary polymers to pass this accelerated photostability aging test provides assurance that they will both tolerate the optical exposures which occur in high-volume manufacturing and support the reliability over the required operating life of optical transceivers and network elements.

On June 21, 2022, we announced the publication of our patent application 2022/0187637A1 entitled "Hybrid electro-optic polymer modulator with silicon photonics" that details a novel fabrication process that allows our Company’s proprietary polymers to be fabricated by silicon foundries in a high-volume manufacturing environment. The published patent application also details a more efficient process that allows for high yielding, high stability poling of polymers in a high-volume foundry manufacturing environment. The development of the PDK for this new optical hybrid optical modulator design is now in progress with our Company’s foundry partners.

June 23, 2022, we announced the publication of our patent application 2022/0187638A1 entitled " Hybrid electro-optic polymer modulator with atomic layer deposition (ALD) sealant layer" that allows our Company’s proprietary polymers to be sealed to moisture and other atmospheric gases in a very low temperature and quasi-hermetic environment through the use of a chip-scale packaging approach that can be applied in parallel at wafer level (i.e. in volume) and that eliminates the need for a separate hermetic enclosure or "gold box." Chip-scale packaging is a technique that has been gathering momentum in the silicon electronics industry for the past decade to reduce device chip packaging costs and increase device performance – enabling high-volume front and back-end manufacturing as well as extremely small sizes in miniaturization. Specifically, our electro-optic polymer modulators are sealed with a low-temperature conformal atomic layer deposition dielectic layers that are supported on a silicon substrate with passive silicon photonics waveguides.

On June 27, 2022 our Company's common stock was added to the Russell 3000® Index. We expect that the awareness of being included in one of the most widely followed benchmarks will not only benefit our existing shareholders but will lead to a broader base of institutional investors." The annual Russell index reconstitution captures the 4,000 largest US stocks as of May 6, ranking them by total market capitalization. Our membership in the US all-cap Russell 3000® Index, which remains in place for one year, means automatic inclusion in the small-cap Russell 2000® Index as well as the appropriate growth and value style indexes.

As we move forward to diligently meet our goals, we continue to work closely with our packaging and foundry partners for the 50Gbaud and 100 Gbaud prototypes, and we are advancing our reliability and characterization efforts to support our prototyping. We partnered with silicon-based foundries in 2021 so that we can scale commercial volumes of electro-optic polymer modulator devices using large silicon wafers, and we are currently working to have our fabrication processes accepted into foundry PDKs (process development kits). These are the recipes that foundries use to manufacture devices in their fabrication plants.

We are actively engaged with test equipment manufacturers of the most advanced test equipment to test our state-of-the-art polymer devices. 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. Our business model includes the licensing of our strong IP and Patent portfolio, as well as technology transfer to entities such as foundries. 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 and feedback 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 June 30, 2022 to three months ended June 30, 2021

Revenues

As a development stage company, we had no revenues during the three months ended June 30, 2022 and June 30, 2021. The Company is in various stages of photonic device and materials development and evaluation with potential customers and strategic partners. The Company expects to obtain a revenue stream from technology licensing agreements, technology transfer agreements and the production and direct sale of its own electro-optic device components.

Operating Expenses

For the Three Months Ending June 30, 2022	For the Three Months Ending June 30, 2021	Change from Prior Three Month Period	Percent Change from Prior Three Month Period

Research and development	$ 2,781,215	$ 2,797,505	$ (16,290)	-1%
General and administrative	987,137	658,738	328,399	50%
	$ 3,768,352	$ 3,456,243	$ 312,109	9%

Research and development expenses decreased for the three months ended June 30, 2022, as compared to the three months ended June 30, 2021, primarily due to a decrease in expense for cashless option exercises offset by increases in non-cash stock option amortization, prototype device development expenses, laboratory and wafer fabrication materials and supplies, consulting expenses, travel expenses and depreciation. The expense for research and development cashless option exercises decreased by $1,275,342 in the three months ended June 30, 2022, compared to the same period in 2021. Research and development non-cash stock option amortization expenses increased by $933,805 in the three months ended June 30, 2022, compared to the same period in 2021. Prototype device development expenses increased by $179,376 in the three months ended June 30, 2022, compared to the same period in 2021. Laboratory and wafer fabrication materials and supplies increased by $50,624 in the three months ended June 30, 2022, compared to the same period in 2021. Research and development consulting expenses increased by $48,710 in the three months ended June 30, 2022, compared to the same period in 2021. Research and development travel expenses increased by $38,205 in the three months ended June 30, 2022, compared to the same period in 2021. Depreciation expenses increased by $30,292 in the three months ended June 30, 2022, compared to the same period in 2021.

We expect to continue to incur substantial research and development expense developing and commercializing our photonic devices, and electro-optic materials platform. These expenses will increase as a result of accelerated development effort to support commercialization of our electro-optic polymer materials technology; to build photonic device prototypes; hiring additional technical and support personnel; engaging senior technical advisors; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

General and administrative expenses increased for the three months ended June 30, 2022, as compared to the three months ended June 30, 2021, primarily due to increases in non-cash stock option amortization, director fees, investor expenses and auditing fees offset by decrease in salary expenses. General and administrative non-cash stock option amortization expenses increased by $256,827 in the three months ended June 30, 2022, compared to the same period in 2021. Director fees increased by $41,250 in the three months ended June 30, 2022, compared to the same period in 2021. Investor expenses increased by $32,830 in the three months ended June 30, 2022, compared to the same period in 2021 primarily for the uplist of the Company to the Nasdaq Capital Market in the fall of 2021. Auditing expenses increased by $29,570 in the three months ended June 30, 2022, compared to the same period in 2021. General and administrative salary expenses decreased by $118,332 in the three months ended June 30, 2022, compared to the same period in 2021 primarily for bonus payments in 2021.

Other Income (Expense)

	For the Three Months Ending June 30, 2022	For the Three Months Ending June 30, 2021	Change from Prior Three Month Period	Percent Change from Prior Three Month Period
Other Income/(Expense)	$ (34,246)	$ (1,083,242)	$ 1,048,996	-97%

Other income (expenses) decreased for the three months ended June 30, 2022, as compared to the three months ended June 30, 2021, primarily due to a decrease in commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement.

Net Loss

	For the Three Months Ending June 30, 2022	For the Three Months Ending June 30, 2021	Change from Prior Three Month Period	Percent Change from Prior Three Month Period
Net Loss	$ 3,802,598	$ 4,539,485	$ (736,887)	-16%

Net loss was $3,802,598 and $4,539,485 for the three months ended June 30, 2022 and 2021, respectively, for a decrease of $736,887, due primarily to decreases in cashless option exercise expenses, commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement and general and administrative salary expenses offset by increases in non-cash stock option amortization, prototype device development expenses, laboratory and wafer fabrication materials and supplies, research and development consulting expenses, research and development travel expenses, director fees, investor expenses, depreciation and auditing fees.

Comparison of six months ended June 30, 2022 to six months ended June 30, 2021

Revenues

As a development stage company, we had no revenues during the six months ended June 30, 2022 and June 30, 2021. The Company is in various stages of photonic device and materials development and evaluation with potential customers and strategic partners. The Company expects to obtain a revenue stream from technology licensing agreements, technology transfer agreements and the production and direct sale of its own electro-optic device components.

Operating Expenses

	For the Six Months Ending June 30, 2022	For the Six Months Ending June 30, 2021	Change from Prior Six Month Period	Percent Change from Prior Six Month Period
Research and development	$ 5,406,355	$ 4,160,308	$ 1,246,047	30%
General and administrative	1,872,566	1,191,706	680,860	57%
	$ 7,278,921	$ 5,352,014	$ 1,926,907	36%

Research and development expenses increased for the six months ended June 30, 2022, as compared to the six months ended June 30, 2021, primarily due to increases in research and development non-cash stock option amortization, prototype device development expenses, research and development salary expenses, laboratory and wafer fabrication materials and supplies, depreciation, research and development consulting expenses and research and development travel expenses offset by a decrease in expense for cashless option exercises. Research and development non-cash stock option amortization expenses increased by $1,790,338 in the six months ended June 30, 2022, compared to the

same period in 2021. Prototype device development expenses increased by $211,334 in the six months ended June 30, 2022, compared to the same period in 2021. Research and development salary expenses increased by $120,020 in the six months ended June 30, 2022, compared to the same period in 2021 primarily for additional salary expenses. Laboratory and wafer fabrication materials and supplies increased by $106,290 in the six months ended June 30, 2022, compared to the same period in 2021. Depreciation expenses increased by $77,595 in the six months ended June 30, 2022, compared to the same period in 2021. Research and development consulting expenses increased by $70,510 in the six months ended June 30, 2022, compared to the same period in 2021. Research and development travel expenses increased by $69,661 in the six months ended June 30, 2022, compared to the same period in 2021. The expense for research and development cashless option exercises decreased by $1,209,843 in the six months ended June 30, 2022, compared to the same period in 2021.

We expect to continue to incur substantial research and development expense developing and commercializing our photonic devices, and electro-optic materials platform. These expenses will increase as a result of accelerated development effort to support commercialization of our electro-optic polymer materials technology; to build photonic device prototypes; working with semiconductor foundries; hiring additional technical and support personnel; engaging senior technical advisors; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

General and administrative expenses increased for the six months ended June 30, 2022, as compared to the six months ended June 30, 2021, primarily due to increases in general and administrative non-cash stock option amortization, director fees, investor expenses, general and administrative travel expenses, auditing expenses, shareholder meeting expenses, insurance and legal expenses offset by a decrease in general and administrative salary expenses. General and administrative non-cash stock option amortization increased by $512,942 in the six months ended June 30, 2022, compared to the same period in 2021. Director fees increased by $79,000 in the six months ended June 30, 2022, compared to the same period in 2021. Investor expenses increased by $44,403 in the six months ended June 30, 2022, compared to the same period in 2021 primarily for the uplist of the Company to the Nasdaq Capital Market in the fall of 2021. General and administrative travel expenses increased by $40,879 in the six months ended June 30, 2022, compared to the same period in 2021. Auditing expenses increased by $29,570 in the six months ended June 30, 2022, compared to the same period in 2021. Shareholder meeting expenses increased by $28,998 in the six months ended June 30, 2022, compared to the same period in 2021. Insurance expenses increased by $28,417 in the six months ended June 30, 2022, compared to the same period in 2021. Legal expenses increased by $24,958 in the six months ended June 30, 2022, compared to the same period in 2021. General and administrative salary expenses decreased by $150,234 in the six months ended June 30, 2022, compared to the same period in 2021 primarily for bonus payments in 2021.

Other Income (Expense)

	For the Six Months Ending June 30, 2022	For the Six Months Ending June 30, 2021	Change from Prior Six Month Period	Percent Change from Prior six Month Period
Other Income/(Expense)	$ (79,438)	$ (922,515)	$ 842,077	-91%

Other income (expenses) decreased for the six months ended June 30, 2022, as compared to the six months ended June 30, 2021, primarily due to a decrease in commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement.

Net Loss

	For the Six Months Ending June 30, 2022	For the Six Months Ending June 30, 2021	Change from Prior Six Month Period	Percent Change from Prior Six Month Period
Net Loss	$ 7,358,359	$ 6,274,529	$ 1,083,830	-17%

Net loss was $7,358,359 and $6,274,044 for the six months ended June 30, 2022 and 2021, respectively, for an increase of $1,083,830 due primarily to increases in non-cash stock option amortization, prototype device development expenses, research and development salary expenses, travel expenses, laboratory and wafer fabrication materials and supplies, director fees, depreciation, research and development consulting fees, investor expenses, auditing expenses, shareholder meeting expenses, insurance and legal expenses offset by decreases in commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement, research and development expense for cashless option exercises and general and administrative salary expenses.

Significant Accounting Policies

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, 2021 contains a discussion of these significant accounting policies.

Liquidity and Capital Resources

Sources and Uses of Cash

Our primary source of operating cash inflows was proceeds from the sale of common stock to an institutional investor pursuant to purchase agreements with an institutional investor as described in Note 9 to the Financial Statements and proceeds received pursuant to the exercise of options.

All of the registered shares under the January 21, 2019 purchase agreement with the institutional investor have been issued as of June 30, 2021. On July 2, 2021, the Company filed a $100 million universal shelf registration statement which became effective on July 9, 2021. On October 4, 2021, the Company entered into a new purchase agreement with the institutional investor to sell up to $33 million of common stock over a 36-month period, with $8,304,532 remaining on the purchase agreement as of the date of this filing.

During the six months ended June 30, 2022, the Company received $6,705,693 in proceeds pursuant to the purchase agreements with the institutional investor and $422,925 in proceeds pursuant to the exercise of options and warrants. During the year ended December 31, 2021, the Company received $30,350,674 in proceeds pursuant to the purchase agreements with the institutional investor and $2,379,225 in proceeds pursuant to the exercise of options and warrants.

During the six months ended June 30, 2022, our primary sources of cash outflows from operations included payroll, rent, utilities, payments to vendors including prototypes development and foundries expenses and third-party service providers and payroll taxes related to cashless option exercise. During the year ended December 31, 2021,

our primary sources of cash outflows from operations included payroll, payroll taxes related to cashless option exercise, rent, utilities, payments to vendors including prototypes development and foundries expenses and third-party service providers.

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 $1,300,000 of expenditures per month over the next 12 months.

We expect our October 4, 2021 purchase agreement with the institutional investor to provide us with sufficient funds to maintain our operations for the next 12 months if required. However, any additional funds provided by the institutional investor may not be available on terms that are acceptable to us, or at all. Market volatility resulting from recessionary factors or other factors could adversely impact our ability to access capital as and when needed. If adequate funds are not available to us on a timely basis, we may be required to delay or limit our operations, including research and development efforts relating to the commercializing our electro-optic polymer technology. Our current cash position enables us to finance our operations through February 2024 before we will be required to replenish our cash reserves pursuant to our October 4, 2021 purchase agreement or otherwise. 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. We currently have no debt to service.

We expect that our cash used in operations will continue to increase through 2022 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;
- Partnering with commercial foundries to implement our electro-optic polymers into accepted PDKs by the foundries;
- 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 six months ended June 30, 2022

Net cash used in operating activities was $5,245,275 for the six months ended June 30, 2022, primarily attributable to the net loss of $7,358,359 adjusted by $2,798,550 in options issued for services, $43,221 amortization of deferred compensation, $107,857 in common stock issued for services, $496,549 in depreciation expenses and patent amortization expenses, ($550,988) in prepaid expenses, ($888,764) in accounts payable, accrued bonuses and accrued expenses and $106,659 in cashless option exercise expense. 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 $414,565 for the six months ended June 30, 2022, consisting of $41,905 in cost for intangibles and $372,660 in asset additions for the Colorado headquarter facility and labs.

Net cash provided by financing activities was $7,056,977 for the six months ended June 30, 2022 and consisted of $422,925 in proceeds from exercise of options and warrants, $6,705,693 in proceeds from resale of common stock to an institutional investor offset by $71,641 in cashless option exercise tax payments.

On June 30, 2022, our cash and cash equivalents totaled $24,829,749, our assets totaled $29,007,064, our liabilities totaled $1,047,887 and we had stockholders' equity of $27,959,177.

For the six months ended June 30, 2021

Net cash used in operating activities was $2,991,879 for the six months ended June 30, 2021, primarily attributable to the net loss of $6,274,529 adjusted by $10,242 in warrants issued for services, $528,249 in options issued for services, $1,333,628 in common stock issued for services, $417,414 in depreciation expenses and patent amortization expenses, ($410,700) in Paycheck Protection Program loan forgiveness $134,668 in prepaid expenses, ($48,074) in accounts payable and accrued expenses and $1,317,223 in cashless option exercise expense. 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 $654,699 for the six months ended June 30, 2021, consisting of $18,221 in cost for intangibles and $636,478 in asset additions primarily for the Colorado headquarter facility and labs.

Net cash provided by financing activities was $14,253,507 for the six months ended June 30, 2021 and consisted of $746,750 in proceeds from exercise of options and warrants, $13,973,249 in proceeds from resale of common stock to an institutional investor offset by $453,385 in cashless option exercise tax payments and $13,107 repayment of equipment purchased.

Contractual Commitments

See "Note 6–Commitments" to the notes to the financial statements contained within this Quarterly Report on Form 10-Q for a discussion of our contractual commitments.

Off-Balance Sheet Arrangements

As of June 30, 2022, we do not have an interest in any off-balance sheet arrangements as defined in Item 303(a)(4) of Regulation S-K that have or are reasonably likely to have a current or future effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures, or capital resources that is material to investors.

Item 3 Quantitative and Qualitative Disclosures About Market Risk

At June 30, 2022, we had $24,829,749 million in cash and cash equivalents. For the purposes of this Item 3 we consider all highly liquid instruments with maturities of three months or less at the time of purchase to be cash equivalents. The fair value of all of our cash equivalents is determined based on "Level 1" inputs, which are based upon quoted prices for identical or similar instruments in markets that are active. We do not use any market risk sensitive instruments to hedge any risks, and we hold no market risk sensitive instruments for trading or speculative purposes. We place our cash investments in instruments that meet credit quality standards. At June 30, 2022, we had deposits with a financial institution that exceeded the Federal Depository Insurance coverage.

Market Interest Rate Risk

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates. If a 10% change in interest rates had occurred on June 30, 2022, this change would not have had a material effect on the fair value of our investment portfolio as of that date.

Due to the short holding period of our investments and the nature of our investments, we have concluded that we do not have a material financial market risk exposure.

Item 4 Controls and Procedures

Evaluation of Disclosure Controls and Procedures. The Company's management, with the participation of the Company's Principal Executive Officer and Principal Financial Officer, evaluated the effectiveness of the Company's disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended) as of June 30, 2022. Based on this evaluation, the Company's Principal Executive Officer and Principal Financial Officer concluded that, as of June 30, 2022 the Company's disclosure controls and procedures were effective, in that they provide reasonable assurance that information required to be disclosed by the Company in the reports that it files or submits under the Securities Exchange Act of 1934, as amended, is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms, and is accumulated and communicated to the Company's management, including the Company's Principal Executive Officer and Principal Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting. There were no changes in our internal control over financial reporting during the quarter ended June 30, 2022 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II – OTHER INFORMATION

Item 1 Legal Proceedings

None.

Item 1A Risk Factors

In addition to the information set forth in this Form 10-Q, you should carefully consider the risk factors discussed in *Part I, Item 1A. Risk Factors* in our 2021 Form 10-K, which could materially affect our business, financial condition or future results. The risks described in this Form 10-Q, and in our 2021 Form 10-K are not the only risks facing our Company. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition or future results.

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 $7,358,359 for the six months ended June 30, 2022 and a net loss of $18,631,381 for the year ended December 31, 2021. As of June 30, 2022, we had an accumulated deficit of $96,961,240. We anticipate that we will continue to incur operating losses through at least 2022.

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 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 February 2024; however, we will need to obtain additional future financing after that time 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 equity financings, and through other arrangements, including collaborative arrangements. Poor financial results, unanticipated expenses or unanticipated opportunities could require additional financing sooner than we expect. Other than with respect to the purchase agreement for $33 million we entered into with an institutional investor on October 4, 2021, 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. We currently have a remaining amount of $8,304,532 that is available to our Company pursuant to the purchase agreement.

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 Quarterly Report. 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.

Item 2 Unregistered Sales of Equity Securities and Use of Proceeds

During the period covered by this report, we sold the following securities without registering the securities under the Securities Act:

Date	Security
April 6, 2022	Common Stock — 150,000 shares of Common Stock at $1.48 per share pursuant to a warrant exercise.
June 3, 2022	Common Stock — 25,000 shares of Common Stock at $0.75 per share pursuant to a warrant exercise.

No underwriters were utilized, and no commissions or fees were paid with respect to any of the above transactions. These persons were the only offerees in connection with these transactions. We relied on Section 4(a)(2) and Rule 506 of Regulation D of the Securities Act since the transaction does not involve any public offering.

Item 3 Defaults Upon Senior Securities

None.

Item 4 Mine Safety Disclosures

Not Applicable.

Item 5 Other Information

None.

Item 6 Exhibits

The following exhibits are included herein:

Exhibit No.	Description of Exhibit	Location
31.1	Certification pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934, as amended, executed by the Principal Executive Officer of the Company.	Filed herewith
31.2	Certification pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934, as amended, executed by the Principal Financial Officer of the Company.	Filed herewith
32.1	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, executed by the Principal Executive Officer of the Company.	Filed herewith
32.2	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, executed by the Principal Financial Officer of the Company.	Filed herewith
101.INS	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)	
101.SCH	Inline XBRL Taxonomy Extension Schema Document	
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)	

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

LIGHTWAVE LOGIC, INC.

Registrant

By: /s/ Michael S. Lebby
Michael S. Lebby,
Chief Executive Officer
(Principal Executive Officer)

Date: August 9, 2022

By: /s/ James S. Marcelli
James S. Marcelli,
President, Chief Operating Officer
(Principal Financial Officer)

Date: August 9, 2022

Exhibit 31.1

CERTIFICATION

I, Michael S. Lebby, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Lightwave Logic, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 9, 2022

/s/ Michael S. Lebby

Michael S. Lebby,
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, James S. Marcelli, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Lightwave Logic, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 9, 2022

/s/ James S. Marcelli

James S. Marcelli,
President, Chief Operating Officer
(Principal Financial Officer)

Exhibit 32.1

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

In connection with the Quarterly Report on Form 10-Q of Lightwave Logic, Inc. (the "Company") for the period ending June 30, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Michael S. Lebby, Chief Executive Officer of our Company, certify, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C. Section 1350, that, to my knowledge:

1. The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of our Company.

Date: August 9, 2022

/s/ Michael S. Lebby

Michael S. Lebby,
Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

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

In connection with the Quarterly Report on Form 10-Q of Lightwave Logic, Inc. (the "Company") for the period ending June 30, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, James S. Marcelli, Chief Operating Officer of our Company, certify, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C. Section 1350, that, to my knowledge:

1. The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of our Company.

Date: August 9, 2022

/s/ James S. Marcelli

James S. Marcelli,
President, Chief Operating Officer
(Principal Financial Officer)