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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2019
OR

o **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 001-33351

NEUROMETRIX, INC.

(Exact name of registrant as specified in its charter)

Delaware	**04-3308180**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)

4B Gill Street, Woburn, Massachusetts	**01801**
(Address of Principal Executive Offices)	(Zip Code)

(781) 890-9989
(Registrant's Telephone Number, Including Area Code)

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

Title of each class	Name of exchange on which registered
Common Stock, $0.0001 par value per share	**The Nasdaq Stock Market LLC**
Preferred Stock Purchase Rights	**The Nasdaq Stock Market LLC**
Warrants to Purchase Common Stock	**The Nasdaq Stock Market LLC**

Securities registered pursuant to Section 12(g) of the Act
None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes o No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes o No ☒

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

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) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No o

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

Large accelerated filer o Accelerated filer o Non-accelerated filer o Smaller reporting company x Emerging growth company o

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

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

As of June 30, 2019, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the voting stock held by non-affiliates of the registrant was approximately $3,893,251 based on the closing sale price of the common stock as reported on the Nasdaq Capital Market on June 30, 2019.

As of January 24, 2020, there were 1,400,674 shares of Common Stock outstanding.

In addition, there were 41,627 warrants to purchase shares of Common Stock listed under NUROW on the Nasdaq Capital Market stock exchange outstanding as of January 24, 2020.

DOCUMENTS INCORPORATED BY REFERENCE

The following documents (or parts thereof) are incorporated by reference into the following parts of this Form 10-K: Certain information required by Part III of this Annual Report on Form 10-K is incorporated from the Registrant's Proxy Statement for the Annual Meeting of Stockholders to be held on April 28, 2020, or the 2020 Annual Meeting of Stockholders.

NEUROMETRIX, INC.

ANNUAL REPORT ON FORM 10-K
FOR THE YEAR ENDED DECEMBER 31, 2019

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All share amounts in the Annual Report on Form 10-K have been adjusted to reflect a 1-for-10 reverse stock split that was effected on November 18, 2019.

PART I

The statements contained in this Annual Report on Form 10-K, including under the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and other sections of this Annual Report, include forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, including, without limitation, statements regarding our or our management's expectations, hopes, beliefs, intentions or strategies regarding the future, such as our estimates regarding anticipated operating losses, future revenues and projected expenses, our future liquidity and our expectations regarding our needs for and ability to raise additional capital; our ability to manage our expenses effectively and raise the funds needed to continue our business; our belief that there are unmet needs for the management of chronic pain and in the diagnosis and treatment of diabetic neuropathy; our expectations surrounding Quell and DPNCheck; our expected timing and our plans to develop and commercialize our products; our ability to meet our proposed timelines for the commercial availability of our products; our ability to obtain and maintain regulatory approval of our existing products and any future products we may develop; regulatory and legislative developments in the United States and foreign countries; the performance of our third-party manufacturers; our ability to obtain and maintain intellectual property protection for our products; the successful development of our sales and marketing capabilities; the size and growth of the potential markets for our products and our ability to serve those markets; our estimate of our customer returns of our products; the rate and degree of market acceptance of any future products; our reliance on key scientific management or personnel; the payment and reimbursement methods used by private or government third party payers; and other factors discussed elsewhere in this Annual Report on Form 10-K or any document incorporated by reference herein. The words "believe," "may," "will," "estimate," "continue," "anticipate," "intend," "expect," "plan" and similar expressions may identify forward-looking statements, but the absence of these words does not mean that a statement is not forward-looking. The forward-looking statements contained in this Annual Report on Form 10-K are based on our current expectations and beliefs concerning future developments and their potential effects on us. There can be no assurance that future developments affecting us will be those that we have anticipated. These forward-looking statements involve a number of risks, uncertainties (some of which are beyond our control) or other assumptions that may cause actual results or performance to be materially different from those expressed or implied by these forward-looking statements. These risks and uncertainties include, but are not limited to, those factors described in the section titled "Risk Factors." Should one or more of these risks or uncertainties materialize, or should any of our assumptions prove incorrect, actual results may vary from those projected in these forward-looking statements. We undertake no obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as may be required under applicable securities laws. Unless the context otherwise requires, all references to "we", "us", the "Company", or "NeuroMetrix" in this Annual Report on Form 10-K refer to NeuroMetrix, Inc.

ITEM 1. BUSINESS

Our Business — An Overview

NeuroMetrix develops and commercializes health care products that utilize non-invasive neurostimulation and digital medicine. Our core expertise in biomedical engineering has been refined over two decades of designing, building and marketing medical devices that stimulate nerves and analyze nerve response for diagnostic and therapeutic purposes. We created the market for point-of-care nerve testing and were first to market with sophisticated wearable technology for symptomatic relief of chronic pain. Our business is fully integrated with in-house capabilities spanning research and development, manufacturing, regulatory affairs and compliance, sales and marketing, product fulfillment and customer support. We derive revenues from the sale of medical devices and after-market consumable products and accessories. Our products are sold in the United States and select overseas markets. They are cleared by the U.S. Food and Drug Administration (FDA) and regulators in foreign jurisdictions where appropriate. We have two principal product lines:

- Point-of-care neuropathy diagnostic tests
- Wearable neurostimulation devices

Diabetes is a worldwide epidemic with an estimated affected population of over 400 million people. Within the United States there are over 30 million people with diabetes and another 80 million with pre-diabetes. The annual direct cost of treating diabetes in the United States exceeds $100 billion. Although there are dangerous acute manifestations of diabetes, the primary burden of the disease is in its long-term complications which include cardiovascular disease, nerve disease and resulting conditions such as foot ulcers which may require amputation, eye disease leading to blindness, and kidney failure. The most

common long-term complication of diabetes, affecting over 50% of the diabetic population, is nerve disease or neuropathy. Diabetic peripheral neuropathy (DPN) is the primary trigger for diabetic foot ulcers which may progress to the point of requiring amputation. People with diabetes have a 15-25% lifetime risk of foot ulcers and approximately 15% of foot ulcers lead to amputation. Foot ulcers are the most expensive complication of diabetes with a typical cost of $5,000 to $50,000 per episode. In addition, between 16% and 26% of people with diabetes suffer from chronic pain in the feet and lower legs.

Early detection of DPN is important because there are no treatment options once the nerves have degenerated. Today's diagnostic methods for DPN range from a simple monofilament test for lack of sensory perception in the feet to a nerve conduction study performed by a specialist. Our DPNCheck technology provides a rapid, low cost, quantitative test for peripheral nerve disease, including DPN. It addresses an important medical need and is particularly effective in screening large populations. DPNCheck has been validated in numerous clinical studies.

Chronic pain is a significant public health problem. It is defined by the National Institutes of Health (NIH) as pain lasting more than 12 weeks. This contrasts with acute pain which is a normal bodily response to injury or trauma. Chronic pain conditions include low back pain, arthritis, fibromyalgia, neuropathic pain, cancer pain and many others. Chronic pain may be triggered by an injury or there may be an ongoing cause such as disease or illness. There may also be no clear cause. Pain signals continue to be transmitted in the nervous system over extended periods of time often leading to other health problems. These can include fatigue, sleep disturbance, decreased appetite, and mood changes which cause difficulty in carrying out important activities and contributing to disability and despair. In general, chronic pain cannot be cured. Treatment of chronic pain is focused on reducing pain and improving function. The goal is effective pain management.

Chronic pain affects over 100 million adults in the United States and more than 1.5 billion people worldwide. The estimated incremental impact of chronic pain on health care costs in the United States is over $250 billion per year and lost productivity is estimated to exceed $300 billion per year. The most common approach to chronic pain management is pain medication. This includes over-the-counter (OTC) internal and external analgesics as well as prescription pain medications, both non-opioid or opioid. The approach to treatment is individualized, drug combinations may be employed, and the results are often inadequate. Side effects, including the potential for addiction are substantial. Increasingly, restrictions are being imposed on access to prescription opioids. Reflecting the complexity of chronic pain and the difficulty in treating it, we believe that inadequate relief leads 25% to 50% of pain sufferers to seek alternatives to prescription pain medications. These alternatives include nutraceuticals, acupuncture, chiropractic care, non-prescription analgesics, electrical stimulators, braces, sleeves, pads and other items. In total these pain relief products and services account for approximately $20 billion in annual out-of-pocket spending in the United States.

Nerve stimulation is a long-established category of treatment for chronic pain. This treatment approach is available through implantable spinal cord stimulation requiring surgery with its attendant risks. Non-invasive approaches involving transcutaneous electrical nerve stimulation (TENS) have achieved limited efficacy in practice due to device limitations, ineffective dosing and low patient adherence. Our app-enabled Quell wearable technology for chronic pain is designed to address many of the limitations of traditional TENS.

Goals and Strategy

Our leading commercial products, and the focus of our strategic attention, are DPNCheck and Quell.

DPNCheck is our well-established testing technology for DPN. DPNCheck has been deployed in multiple clinical trials. It contributes attractive gross margins and has posted average growth rates exceeding 25% over the five years through 2018. Growth in 2019, which is below trend, reflects the offsetting effects of strong U.S. market demand and a downturn in demand in Mexico. We expect a growth rebound in 2020, which we are prepared to support with product supply and user training resources. Also, we are investing R&D resources in the next generation DPNCheck technology which will enhance the user experience, improve manufacturing, and restrict the potential use of non-compliant biosensors. Release of the new DPNCheck technology, forecast for late 2020, may also provide opportunity for customer upgrades, new pricing and margin-expansion.

Quell is our app-enabled wearable technology for chronic pain. Over the past year we have worked to restructure the Quell commercial model to achieve a positive net operating contribution after direct costs. We believe that our continued efforts will position us to crossover to a net positive contribution during 2020. Most of our sales are direct-to-consumer via our e-commerce platform, www.QuellRelief.com.

When we are confident that we have secured this core commercial model, including efficient ad spending, our objective will turn to growth. This could encompass greater ad promotion in order to more rapidly expand the Quell user population, and it could include additional applications for the technology and, potentially, other markets.

Our GlaxoSmithKline (GSK) collaboration on Quell continues to be productive as we support GSK's progress toward launch in markets outside the U.S. This collaboration was initiated in early 2018 and has delivered approximately $20.5 million to us in development milestones plus additional co-funded R&D. There remains outstanding approximately $4.5 million in commercialization milestones under the 2018 GSK agreement.

Both DPNCheck and Quell are sophisticated neurotechnology products that are unique in their markets. Our goal for both products is the same: to optimize market positioning and financial performance for the benefit of our shareholders. It is possible that at a point in the future either of the product lines could be monetized, in whole or in part. This could follow the model we employed in selling to GSK rights to the Quell technology for markets outside the U.S.

Research and Development Innovation for Competitive Advantage

Our products are proprietary and were developed in-house by our R&D team. We believe that continual product innovation, focusing in our unique competency of precision neurostimulation, is essential to profitable growth and competitive advantage. Our 2020 R&D efforts include development of the DPNCheck Generation 2 product. We will also continue to innovate the Quell platform and provide support to GSK under our joint development collaboration.

Our Business Model

Our products typically consist of a medical device used in conjunction with a consumable electrode or biosensor. Other accessories and consumables are also available to customers. Our commercial objective is to build an installed base of active customer accounts that regularly order high-margin aftermarket products. We successfully implemented this model with our original NC-stat system and have applied it to subsequent product generations including ADVANCE. Our more recent products, DPNCheck and Quell, conform to this model.

Primary Marketed Products

DPNCheck

DPNCheck is a fast, accurate, and quantitative nerve conduction test that is used to evaluate systemic neuropathies such as DPN. It is designed to be used by primary care physicians, endocrinologists, podiatrists and other clinicians at the point-of-care to objectively detect, stage, and monitor DPN. The device measures nerve conduction velocity and response amplitude of the sural nerve, a nerve in the lower leg and ankle. These parameters are widely recognized as sensitive and specific biomarkers of DPN. DPNCheck is comprised of: (1) an electronic hand-held device and (2) a single patient-use biosensor. In addition, we provide users with PC-based software that links to the device via a USB connection thereby allowing physicians to generate reports and manage their test data.

DPNCheck is a modified version of our previously marketed NC-stat nerve testing device that has the same clinical indications with respect to DPN. The modified device costs less than the original device but has the same functionality with respect to sural nerve testing. More than 3 million patient studies have been performed using our NC-stat technology. Our technology has been the subject of over 20 peer-reviewed studies, including several studies specifically addressing the accuracy and clinical utility of the device in assessment of DPN. Cumulatively through 2019 approximately 5,500 DPNCheck devices have been shipped to customers.

Quell

Quell is an app-enabled wearable device for symptomatic relief of chronic pain. It incorporates a collection of proprietary approaches designed to optimize the effectiveness of nerve stimulation. These include high power electrical stimulation hardware with precise control, algorithms that automatically determine therapeutic stimulation intensity and compensate for nerve desensitization, and automated detection of user sleep and appropriate adjustment of stimulation level. Quell is comprised of (1) an electronic device that is placed in a neoprene band worn on the upper calf, (2) an electrode that attaches to the device and is the interface between the device and the skin, and (3) a smartphone app to control the device and visualize, understand and optimize data relating to chronic pain and health. The app is integrated with the Quell Health Cloud for storage of user data, data analytics and scientific research. The device is lightweight and can be worn during the day while active, and at night while sleeping. It has been cleared by the FDA for symptomatic relief of chronic pain and is available OTC via e-commerce. The device was made commercially available in June 2015. Cumulatively through 2019 over 200,000 Quell devices have been shipped to customers.

ADVANCE System

Our legacy neurodiagnostics business is primarily the ADVANCE System which is a comprehensive platform for the performance of traditional nerve conduction studies. The ADVANCE System is comprised of: (1) the ADVANCE device and related modules, (2) various types of electrodes, and (3) a communication hub that enables a physician's office to network the device to their office computers and to our servers for data archiving, report generation, and other services. The ADVANCE System is used with proprietary nerve specific electrode arrays. These electrode arrays combine multiple individual electrodes and embedded microelectronic components into a single patient-use disposable unit. We currently market seven different nerve-specific electrode arrays but do not actively market the ADVANCE device.

Historically, the ADVANCE System was marketed to a broad range of physician specialties including neurologists, orthopedic surgeons, primary care physicians, and endocrinologists, and utilized for a variety of different clinical indications including assessment of carpal tunnel syndrome, or CTS, low back and leg pain, and DPN. It is most commonly used in the assessment of CTS. Over 20 peer-reviewed studies have been published on the use of this technology in this clinical application. As of December 31, 2019, we had an installed base of approximately 200 active customers for the ADVANCE System.

The following chart summarizes our previously and currently marketed products.

Product	Time on Market	Technology	Primary Clinical Indications	No. Patients Tested/Treated
Quell	Q2 2015 – present	Transcutaneous Electrical Nerve Stimulation	Symptomatic relief of chronic, intractable pain (OTC)	> 200,000
SENSUS	Q1 2013 – present	Transcutaneous Electrical Nerve Stimulation	Symptomatic relief of chronic, intractable pain (prescription)	> 11,000
DPNCheck	Q4 2011 – present	Nerve Conduction	Diagnosis and evaluation of peripheral neuropathies, such as DPN	> 1,300,000
ADVANCE	Q2 2008 – present	Nerve Conduction	Diagnosis and evaluation of CTS, low back pain, peripheral neuropathies (including DPN)	> 1,900,000 (ADVANCE and NC-stat)
NC-stat	Q2 1999 – Q3 2010	Nerve Conduction	Diagnosis and evaluation of CTS, low back pain, peripheral neuropathies (including DPN)	

Customers

DPNCheck customers include managed care organizations, endocrinologists, podiatrists and primary care physicians in the United States and distributors in Europe, Japan, China, the Middle East and Mexico. Cumulatively through December 31, 2019, nearly 5,700 DPNCheck devices have been shipped to customers. Quell customers primarily include consumers and health care professionals (physicians and clinics) in the United States. Cumulatively through December 31, 2019, over 200,000 Quell devices have been shipped. Our legacy ADVANCE System customers include approximately 200 active accounts covering primary care, internal medicine, orthopedic and hand surgeons, pain medicine physicians, neurologists, physical medicine and rehabilitation physicians, and neurosurgeons.

At December 31, 2019, two customers accounted for 42% of accounts receivable and one customer accounted for 19% of revenue.

Sales, Marketing, and Distribution

Our U.S. sales efforts for DPNCheck focus on Medicare Advantage organizations and providers who assume financial responsibility and the associated risks for the health care costs of their patients. We believe that DPNCheck presents an attractive clinical case with early detection of neuropathy allowing for earlier clinical intervention to help mitigate the effects of neuropathy on both patient quality of life and cost of care. Also, the diagnosis and documentation of neuropathy provided by DPNCheck helps clarify the patient health profile which, in turn, may have a direct, positive effect on the Medicare Advantage

premiums received by the provider. Outside the United States, in Japan DPNCheck is sold by our distribution partner Fukuda Denshi; in China DPNCheck is sold by Omron Medical (Beijing) Ltd.; and in Mexico DPNCheck is sold by Scienta Farma.

Quell is distributed in the United States primarily via the Company's e-commerce website *www.quellrelief.com*, and via health care professionals. Digital advertising is used to expand product awareness.

Our installed base of ADVANCE accounts is supported by marketing and our customer service department. We are not actively pursuing new ADVANCE customers. Internationally, ADVANCE sales and account support is handled by our network of independent distributors.

Sales and marketing efforts for DPNCheck and ADVANCE are led by our Senior Vice President, General Manager, Diagnostics. Quell sales and marketing efforts are led by our Senior Vice President and Chief Commercial Officer. We provide technical, clinical, and business practices training for our customer service employees.

Manufacturing and Supply

We perform final assembly and servicing of our Quell and DPNCheck devices at our manufacturing facility in Massachusetts. The ADVANCE device which is no longer in production but for which we continue to sell accessories, is serviced by us. Outside suppliers provide the sub-assemblies and components that we use in manufacturing Quell and DPNCheck, as well as our consumable products including biosensors and electrodes. Reflecting the relatively small volumes of our products being manufactured and sold, we do not have alternative suppliers for many of the key components of our products. Rather we rely on regular contact and close working relationships with local suppliers developed over many years. In outsourcing, we target companies that meet FDA, International Organization for Standardization, or ISO, and other quality standards supported by internal policies and procedures. Supplier performance is maintained and managed through a corrective action program ensuring all product requirements are met or exceeded. Following the receipt of products or product components from our third-party manufacturers, we conduct the necessary inspection, final assembly, packaging, and labeling at our manufacturing facility. We believe that our manufacturing relationships minimize our capital investment, provide us with manufacturing expertise, and help control costs.

Sunburst EMS, Inc., or Sunburst, has been manufacturing devices and providing sub-assemblies to us since 2005. Sunburst currently manufactures sub-assemblies for Quell and DPNCheck at a facility in Massachusetts. Johnson Medtech, LLC, or Johnson, has been manufacturing ADVANCE electrodes for us since 1999, currently at a facility in Illinois. Katecho, Inc., a full service original equipment manufacturer (OEM) based in Iowa and specializing in medical and cosmetic devices, manufactures DPNCheck biosensors and Quell electrodes under normal commercial terms contained in our purchase orders.

We are registered with the FDA and subject to compliance with FDA quality system regulations. As a registered device manufacturer, we undergo regularly scheduled FDA quality system inspections, are subject to periodic inspections by state agencies and, if deemed necessary by the FDA, additional inspections may occur. We are also ISO registered and undergo frequent quality system audits by a European agency. ADVANCE and DPNCheck are cleared for marketing within the United States, Canada and the European Union. DPNCheck is also cleared for marketing in Japan, China and Mexico. Our neurostimulation systems for chronic pain, are cleared for marketing in the United States, Canada, the European Union, and Australia; however, under terms of the 2018 agreement with GSK, our accessible market for Quell is restricted to the United States.

Research and Development

We believe that we have research and development (R&D) capability that is unique to the industry with over two decades of experience in developing diagnostic and therapeutic devices involving the precision stimulation and measurement of nerve signals for clinical purposes. Our company has extensive experience in neurophysiology, biomedical instrumentation, signal processing, biomedical sensors, and information systems.

Our R&D team works closely with marketing and customers to design products that are focused on improving clinical outcomes. The team consists of seven people including two who hold M.D. degrees. Our founder and Chief Executive Officer leads our R&D efforts. He holds both M.D. and Ph.D. degrees and coordinates our clinical programs.

R&D efforts planned for 2020 will address our two commercial products:

- *DPNCheck Generation 2.* DPNCheck, our quantitative nerve conduction test for peripheral neuropathies including DPN, has been on the market since 2011 without any significant engineering changes. While the product has performed well and we believe that demand is growing, some features need to be added to improve the user experience, improve the manufacturing process, and restrict the potential use of non-compliant biosensors. This technology upgrade will be a primary R&D activity during 2020.
- *Quell R&D.* During 2020 Quell engineering support will be provided to the GSK product launch efforts in markets outside the U.S. Also, certain product modifications jointly agreed and co-funded with GSK may be undertaken. We will also investigate additional clinical applications for the Quell platform.
- *Support clinical studies for our wearable technology.* We plan to continue to build the body of evidence from clinical studies that is foundational to Quell and supports our marketing efforts.

Clinical Program

Our clinical program operates under the direction of our Chief Executive Officer. This may from time-to-time be comprised of internal, collaborative, and external clinical studies. Internal clinical studies are designed and implemented directly by us for the purposes of product design and early clinical validation. Collaborative studies are conducted together with leading researchers around the world to provide clinical validation and to explore the clinical utility of our products. External studies are entirely independent of us, although in many cases the researchers request unrestricted grants for financial and/or material support, such as for devices and consumables. External studies may examine the clinical performance and utility of our products or our products may be used as outcomes measures. We actively seek to publish our clinical study results in leading peer-reviewed journals while also encouraging our clinical collaborators and clinical study grant recipients to do the same.

Competition

We believe there is no direct competition to our Quell wearable neurostimulation device for the symptomatic relief of chronic pain. The most common approach to chronic pain is pain medication. This includes over-the-counter drugs (such as Advil and Motrin), and prescription drugs including anti-convulsants (such as Lyrica and Neurontin) and anti-depressants (such as Cymbalta and Elavil). Topical creams may also be used (such as Zostrix and Bengay). With severe pain, narcotic or opioid pain medications may be prescribed (such as codeine, fentanyl, morphine, and oxycodone). The approach to treatment is individualized, drug combinations may be employed, and the results are often inadequate. Side effects, including the potential for addiction, are substantial.

Reflecting the difficulty in treating chronic pain, inadequate relief leads many pain sufferers to turn to the over-the-counter market for supplements or alternatives to prescription pain medications. These include non-prescription medications, topical creams, lotions, transcutaneous electrical nerve stimulation (TENS) devices, dietary products, braces, sleeves, pads and other items. In the United States, over $4 billion is spent annually on such pain relief products.

Nerve stimulation is an established treatment for chronic pain. It is available through implantable spinal cord stimulation; however, this approach requires surgery and has attendant risks. Non-invasive approaches to neurostimulation (transcutaneous electrical nerve stimulation, or TENS) have achieved limited success in practice due to device limitations, ineffective dosing and low patient adherence. We believe that the personalization features of our wearable technology for chronic pain and sleep, including app control, the high power and automation, and the digital health integration characteristics place Quell in a unique neurostimulation category. There are numerous manufacturers of transcutaneous electrical nerve stimulation devices including widely marketed over-the-counter TENS such as Sanofi’s IcyHot SmartRelief, Omron PM3030 and Aleve Direct Therapy.

We believe that DPNCheck is currently the only objective and standardized test for DPN widely available at the point-of-care. The American Diabetes Association and other organizations recommend at least annual evaluation of all people with diabetes for DPN. Due to cost and availability, the evaluation is typically performed using a simple (5.07/10g) monofilament. The method is subjective and only identifies late stage neuropathy where intervention is generally limited to foot care. Experts in the field have indicated that there is an unmet need for a practical, objective, and sensitive test for diabetic neuropathy that can be widely deployed in the regular care of all people with diabetes. Monofilaments (5.07/10g) are a commodity sold by a number of medical supply companies.

There are several companies that sell neurodiagnostic devices that may compete with our ADVANCE System. These companies include Cadwell Laboratories, Inc. and Natus Medical Incorporated, both of which have substantially greater financial resources than NeuroMetrix. Natus Medical Incorporated and Cadwell Laboratories, Inc. have established reputations

as having effective worldwide distribution channels for medical instruments to neurologists and physical medicine and rehabilitation physicians.

Intellectual Property

We rely on a combination of patents, trademarks, copyrights, trade secrets, and other intellectual property laws, nondisclosure agreements and other measures to protect our proprietary technology, intellectual property rights, and know-how. We hold issued utility patents covering a number of important aspects of our Quell, SENSUS, DPNCheck and ADVANCE products. We believe that in order to have a competitive advantage, we must develop and maintain the proprietary aspects of our technologies. We also require our employees, consultants and advisors, whom we expect to work on our products, to agree to disclose and assign to us all inventions conceived, or developed using our property, or which relate to our business. Despite any measures taken to protect our intellectual property, unauthorized parties may attempt to copy aspects of our products or to obtain and use information that we regard as proprietary.

Patents

As of December 31, 2019, we had 47 issued U.S. patents, six issued foreign patents, and 32 patent applications, including 19 U.S. applications, and two foreign applications. Our wearable therapeutic products have 14 issued U.S. utility patents and nine issued U.S. design patents plus 18 utility and design patent applications. The foreign patents for wearable therapeutics were assigned to GSK under the terms of our collaboration agreement. For our DPNCheck diagnostic device, eight utility patents (three U.S. and five foreign) were issued that cover the core technology and there are three (one U.S. and two foreign) additional utility patent applications. A utility patent granted in EU covering key aspects of DPNCheck device operations is currently being validated in nine EU countries.

With regard to our legacy neurodiagnostic products, our issued design patents began to expire in 2015, and our issued utility patents began to expire in 2017. We have additional patents and patent applications directed to other novel inventions that extend patent terms into 2022 to 2031.

The medical device industry is characterized by the existence of a large number of patents and frequent litigation based on allegations of patent infringement. Patent litigation can involve complex factual and legal questions, and its outcome is uncertain. Any claim relating to infringement of patents that is successfully asserted against us may require us to pay substantial damages. Even if we were to prevail, any litigation could be costly and time-consuming and would divert the attention of our management and key personnel from our business operations. Our success will also depend in part on our not infringing patents issued to others, including our competitors and potential competitors. If our products are found to infringe the patents of others, our development, manufacture, and sale of these potential products could be severely restricted or prohibited. In addition, our competitors may independently develop similar technologies. Because of the importance of our patent portfolio to our business, we may lose market share to our competitors if we fail to protect our intellectual property rights.

A patent infringement suit brought against us may force us or any strategic partners or licensees to stop or delay developing, manufacturing, or selling potential products that are claimed to infringe a third-party's intellectual property, unless that party grants us rights to use its intellectual property. In such cases, we may be required to obtain licenses to patents or proprietary rights of others in order to continue to commercialize our products. However, we may not be able to obtain any licenses required under any patents or proprietary rights of third parties on acceptable terms, or at all. Even if we were able to obtain rights to the third-party's intellectual property, these rights may be non-exclusive, thereby giving our competitors access to the same intellectual property. Ultimately, we may be unable to commercialize some of our potential products or may have to cease some of our business operations as a result of patent infringement claims, which could severely harm our business.

Trademarks

We hold domestic registrations for the trademarks NEUROMETRIX, Quell, stylized Q, Quell Health Cloud, OptiTherapy, DPNCheck, SENSUS, and NC-stat. We use a trademark for ADVANCE and Wearable Pain Relief Technology. We hold certain foreign registrations for the marks NEUROMETRIX, Quell, OptiTherapy, NC-stat, and SENSUS.

Third-Party Reimbursement

Procedures performed with our neurodiagnostic medical devices including ADVANCE and DPNCheck may be paid for by third-party payers, including government health programs, such as Medicare, and private insurance and managed care organizations. The 2020 Physicians Fee Schedule published by the Centers for Medicare & Medicaid Services (CMS) includes CPT 95905 for nerve conduction studies performed with pre-configured electrode arrays such as those used with the DPNCheck device and the ADVANCE System.

We believe that physicians are generally receiving reimbursement under CPT 95905 from Medicare for nerve conduction studies performed for carpal tunnel syndrome using pre-configured electrode arrays that meet the medical necessity requirements in their local Medicare region but that commercial insurers are generally not providing reimbursement. Reimbursement by third-party payers is an important element of success for medical device companies. We do not foresee a significant near-term improvement in reimbursement for procedures performed with ADVANCE and DPNCheck.

In the United States, some insured individuals are receiving their medical care through managed care programs which monitor and often require pre-approval of the services that a member will receive. Some managed care programs are paying their providers on a per capita basis a predetermined annual payment per member which puts the providers at financial risk for the services provided to their members. This is generally the case under Medicare Advantage where contracting insurers receive a monthly capitated fee from CMS to provide all necessary medical care to participating members. These capitated fees are adjusted under CMS's risk-adjustment model which uses health status indicators, or risk scores, to ensure the adequacy of payment. Members with higher risk codes generally require more healthcare resources than those with lower risk codes. In turn, the insurer fully absorbs the risk of patient health care costs. Insurers may share a portion of the risk with provider organizations such as independent practice associations (IPAs) with whom they contract to provide medical services to their members. Proper assessment of each member's health status and accurate coding helps to assure that insurers receive capitation fees consistent with the cost of treating these members. Nerve conduction testing can provide valuable, early identification of neuropathy leading to clinical interventions that can reduce health care costs. Also, these tests provide valuable input regarding each member's health risk status which can result in more appropriate capitated payments from CMS. We believe that the clinical and economic proposition for DPNCheck is attractive to Medicare Advantage insurers and risk bearing provider organizations. We are focusing our United States sales effort for DPNCheck on the Medicare Advantage managed care market segment.

We believe that our legacy SENSUS pain management therapeutic system is considered a durable medical equipment (DME) benefit and is reimbursed for chronic pain by Medicare and many commercial insurers under the Healthcare Common Procedure Coding System (HCPCS) code EO730 for the device and under HCPCS code A4595 for the consumable electrodes. These pre-existing codes apply to DME benefits employing transcutaneous electrical nerve stimulation equipment. We expect that Quell will generally not be reimbursed by third party payers in the near future.

We believe that the overall escalating cost of medical products and services has led to, and will continue to lead to, increased pressures on the healthcare industry to reduce the costs of products and services.

Our success in selling DPNCheck and ADVANCE will depend upon, among other things, our customers receiving, and our potential customers' expectation that they will receive sufficient reimbursement or patient capitated premium adjustments from third-party payers for procedures or therapies using these products. See "Risk Factors," "*If health care providers are unable to obtain sufficient reimbursement or other financial incentives from third-party health care payers related to the use of our products other than Quell, their adoption and our future product sales will be materially adversely affected.*"

FDA and Other Governmental Regulation

U.S. Food and Drug Administration (FDA) Regulation

Our products are medical devices that are subject to extensive regulation by the U.S. FDA under the Federal Food, Drug, and Cosmetic Act, or FDCA, and the regulations promulgated thereunder, as well as by other regulatory bodies in the United States and abroad. The FDA classifies medical devices into one of three classes based on the risks associated with the medical device and the controls deemed necessary to reasonably ensure the device's safety and effectiveness. Those three classes are:

- Class I, the lowest risk products, which require compliance with medical device general controls, including labeling, establishment registration, device product listing, adverse event reporting and, for some products, adherence to good manufacturing practices through the FDA's quality system regulations;

- Class II, comprising moderate-risk devices, which also require compliance with general controls and in some cases, so-called special controls that may include performance standards, particular labeling requirements, or post-market surveillance obligations; typically a Class II device also requires pre-market review and clearance by FDA of a pre-market notification (also referred to as a "510(k) application") as well as adherence to the quality system regulations/good manufacturing practices for devices; and
- Class III, high-risk devices that are often implantable or life-sustaining, which also require compliance with the medical device general controls and quality system regulations, but which generally must be approved by FDA before entering the market, through a more lengthy pre-market approval (PMA) application. Approved PMAs can include post-approval conditions and post-market surveillance requirements, analogous to some of the special controls that may be imposed on Class II devices.

Before being introduced into the U.S. market, our products must obtain marketing clearance or approval from FDA through the 510(k) pre-market notification process, the *de novo* classification process (summarized below under *De Novo Classification Process*), or the PMA process, unless they are determined to be Class I devices or to otherwise qualify for an exemption from one of these available forms of pre-market review and authorization by the FDA. To date, our products have all been classified as Class II, moderate-risk medical devices and have been subject to the 510(k) review and clearance process. See "Risk Factors," "*We are subject to extensive regulation by the FDA which could restrict the sales and marketing of the Quell and DPNCheck devices and the ADVANCE System, as well as other products for which we may seek FDA clearance or approval, and could cause us to incur significant costs.*"

510(k) Pre-Market Notification Process

Class II devices typically require pre-market review and clearance by the FDA, which is accomplished through the submission of a 510(k) pre-market notification before the device may be marketed. To obtain 510(k) clearance, we must demonstrate that a new device is substantially equivalent to another device with 510(k) clearance or grandfathered status, or to a device that was reclassified from Class III to Class II or Class I - this device to which the new device is compared is called the "predicate device." In some cases, we may be required to perform clinical trials to support a claim of substantial equivalence. If clinical trials are required, we may be required to submit an application for an investigational device exemption, or IDE, which must be cleared by the FDA prior to the start of a clinical investigation, unless the device and clinical investigation are considered non-significant risk by the FDA or are exempt from the IDE requirements. Whether or not an IDE is required for a clinical study involving a medical device, an appropriate Institutional Review Board (IRB) must review and approve the study protocol before it is initiated. It generally takes three months from the date of the pre-market notification submission to obtain a final 510(k) clearance decision from the FDA, but it can be significantly longer.

After a medical device receives a 510(k) clearance letter, which authorizes commercial marketing of the new device for one or more specific indications for use, any modification that could significantly affect its safety or effectiveness, or that would constitute a major change in its intended use, requires the submission of a new 510(k) notification or could require *de novo* classification or a PMA. The FDA allows each company to make this determination, but the FDA can review the decision as part of routine compliance audits of the company. If the FDA disagrees with a company's decision not to seek prior FDA authorization, the FDA may require the company to seek additional 510(k) clearance or pre-market approval. The FDA also can require the company to cease marketing and/or recall the medical device in question until its regulatory status is resolved.

De Novo Classification Process

If the FDA determines that a new, previously unclassified medical device or its intended use is not substantially equivalent to a predicate device, the device is automatically placed into Class III, requiring the submission of a PMA. Devices that cannot be cleared through the 510(k) process due to lack of a predicate device but would be considered low or moderate risk (in other words, they do not rise to the level of requiring the approval of a PMA because any risks associated with the device could be mitigated through general controls and/or special controls) may be eligible for the 510(k) De Novo classification process. If a product is classified as Class II through the *De Novo* classification process, then that device may serve as a predicate device for subsequent 510(k) pre-market notifications.

On September 9, 2019, FDA issued a Guidance document that formally codifies requirements for the medical device De Novo process and the procedures and criteria for product developers to file a De Novo classification request. Although this Guidance does not impact our marketed products, FDA's activities to create predictability, consistency, and transparency for innovative medical device developers may benefit the medical technology industry as a whole.

PMA Application Process

If a medical device does not qualify for the 510(k) pre-market notification process and is not eligible for classification as a low or moderate-risk device through the *De Novo* process, the device is deemed to be Class III and a company must submit a PMA application to seek authorization for its commercial sale. A PMA requires more extensive pre-filing testing than is required in the 510(k) application and is more costly, lengthy and uncertain. The PMA review and approval process can take one to three years or longer, from the time the PMA application is filed with the FDA. Under a PMA, the company must demonstrate to the FDA that the new medical device is safe and effective for its intended purpose. A PMA typically includes extensive pre-clinical and clinical trial data, and information about the device, its design, manufacture, labeling and components. Before approving a PMA, the FDA generally also performs an on-site inspection of manufacturing facilities for the product to ensure compliance with the FDA's quality system regulation, or QSR.

If FDA approves the PMA, the approved indications may be more limited than those originally sought. In addition, FDA's approval order may include post-approval conditions that the FDA believes necessary to ensure the safety and effectiveness of the device, including, among other things, restrictions on labeling, promotion, sale and distribution and post-market study requirements. Failure to comply with the post-approval conditions can result in adverse enforcement or administrative actions, including the withdrawal of the approval. Approval of a new PMA application or a PMA supplement may be required before making certain types of modifications to the device, including to its labeling, intended use or indication, or manufacturing process, especially when such modifications have the potential to affect safety and effectiveness.

Post-Marketing Compliance Obligations

Regardless of which pre-market pathway a medical device uses to reach the U.S. market, after a device is placed on the market, numerous regulatory requirements continue to apply. These include:

- the FDA's QSR, which requires manufacturers, including third-party manufacturers, to follow stringent design, testing, control, documentation and other good manufacturing practice and quality assurance procedures during all aspects of the manufacturing process (unless a device category is exempt from this requirement by the FDA, such as in the case of many Class I devices);
- labeling regulations and FDA prohibitions against the promotion of products for uncleared or unapproved uses (known as off-label uses), as well as requirements to provide adequate information on both risks and benefits;
- medical device reporting regulations, which require that manufacturers report to FDA any event that the company learns of in which a device may have caused or contributed to a death or serious injury or malfunctioned in a way that would likely cause or contribute to a death or serious injury if the malfunction were to recur;
- correction and removal reporting regulations, which require that manufacturers report to the FDA field corrections and device recalls or removals if undertaken to reduce a risk to health posed by the device or to remedy a violation of the FDCA caused by the device that may present a risk to health;
- post-market surveillance regulations, which apply to Class II or III devices if the FDA has issued a post-market surveillance order and the failure of the device would be reasonably likely to have serious adverse health consequences, the device is expected to have significant use in the pediatric population, the device is intended to be implanted in the human body for more than one year, or the device is intended to be used to support or sustain life and to be used outside a user facility;
- regular and for-cause inspections by FDA to review a manufacturer's facility and its compliance with applicable FDA requirements; and
- the FDA's recall authority, whereby it can ask, or order, device manufacturers to recall from the market a product that is in violation of applicable laws and regulations.

Regulatory Approvals and Clearances

The ADVANCE System received 510(k) clearance as a Class II medical device in April 2008 for its intended use by physicians to perform nerve conduction studies and needle electromyography procedures.

The NC-stat System is also a Class II medical device and has been the subject of several 510(k) clearances, the most recent in July 2006 (K060584). The NC-stat System is cleared for use to stimulate and measure neuromuscular signals that are useful in diagnosing and evaluating systemic and entrapment neuropathies. We believe our NC-stat DPNCheck, or DPNCheck, device is a technical modification to the 510(k) cleared NC-stat device and has the same intended use, and therefore does not raise safety or effectiveness questions. Under the FDA's published guidance on 510(k) requirements for modified devices, we do not believe that a 510(k) submission is required for DPNCheck.

As transcutaneous electrical nerve stimulators, the SENSUS and Quell pain therapy devices are Class II medical devices that received 510(k) clearance from the FDA in August 2012 and July 2014, respectively. In November 2012, the FDA provided 510(k) clearance for the disposable electrode used in conjunction with the SENSUS device, and in July 2013, the FDA provided 510(k) clearance for the use of SENSUS during sleep. The intended use of the SENSUS pain management therapeutic system is the symptomatic relief and management of chronic pain. While the SENSUS device is still marketed we have transitioned many SENSUS customers to the newer models of our transcutaneous electrical nerve stimulator, called Quell. In July 2014, our Quell device received 510(k) clearance for over-the-counter use and in November 2014, our Quell disposable electrode received 510(k) clearance for over-the-counter use. In January 2016, a number of new features were added to Quell and received 510(k) clearance, most notably use with an optional mobile app that contains several convenience features. The intended use of the Quell pain management therapeutic system is the symptomatic relief of chronic pain. The Quell device may also be used during nighttime sleep.

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Federal Trade Commission Regulatory Oversight

We are subject to Federal Trade Commission (FTC) regulatory oversight. Under the Federal Trade Commission Act (FTC Act), the FTC is empowered, among other things, to (a) prevent unfair methods of competition and unfair or deceptive acts or practices in or affecting commerce; (b) seek monetary redress and other relief for conduct injurious to consumers; and (c) gather and compile information and conduct investigations relating to the organization, business, practices, and management of entities engaged in commerce. The FTC has very broad enforcement authority, and failure to abide by the substantive requirements of the FTC Act and other consumer protection laws can result in administrative or judicial penalties, including civil penalties, or injunctions affecting the manner in which we would be able to market Quell in the future.

As previously disclosed, in 2017 we received a Civil Investigative Demand (CID) from the FTC. The CID requested information in connection with an FTC review for compliance of our representations about Quell with Sections 5 and 12 of the FTC Act. During 2017, 2018 and 2019, we responded to requests for information by FTC. We met with FTC on multiple occasions in 2019 to discuss our responses. Currently, we are actively engaged with FTC to achieve resolution of this matter. This would include a consent order that, among other provisions, would prohibit us from making certain claims in our advertising about Quell, and a monetary judgment that would be payable to the FTC. Final resolution of this matter is uncertain, and terms related to potential resolution cannot be reasonably estimated at this time.

Manufacturing Facilities

Our facility, and the facilities utilized by Sunburst, our contract sub-assembly manufacturer, have been inspected by FDA in the past, and observations were noted. There were no findings that involved a significant violation of regulatory requirements. The responses to these observations have been accepted by the FDA and we believe that we and our contract manufacturers are in substantial compliance with the QSR. We expect that our facility and our subcontract facilities will be inspected again as required by the FDA. If the FDA finds significant violations, we could be subject to fines, recalls, requirements to halt manufacturing, or other administrative or judicial sanctions.

Medical Device Single Audit Program (MDSAP)

The International Medical Device Regulators Forum (IMDRF) recognizes that a global approach to auditing and monitoring the manufacturing of medical devices could improve their safety and oversight on an international scale. At its inaugural meeting in Singapore in 2012, the IMDRF identified a work group to develop specific documents for advancing a Medical Device Single Audit Program (MDSAP).

The Medical Device Single Audit Program allows an MDSAP recognized Auditing Organization to conduct a single regulatory audit of a medical device manufacturer that satisfies the relevant requirements of the regulatory authorities participating in the program.

International partners that are participating in the MDSAP include:

- MDSAP Members
    - Therapeutic Goods Administration of Australia
    - Brazil’s Agência Nacional de Vigilância Sanitária
    - Health Canada
    - Japan’s Ministry of Health, Labour and Welfare, and the Japanese Pharmaceuticals and Medical Devices Agency

    - U.S. Food and Drug Administration
- MDSAP Official Observers:
    - The World Health Organization (WHO) Prequalification of In Vitro Diagnostics (IVDs) Programme
    - European Union (EU)
- MDSAP Affiliate Members: (New)
    - Republic of Korea's Ministry of Food and Drug Safety

Based on its evaluation of the MDSAP Final Pilot Report, the MDSAP Regulatory Authority Council (the international MDSAP governing body) determined that the MDSAP Pilot had satisfactorily demonstrated the viability of the Medical Device Single Audit Program.

In April 2019, NeuroMetrix underwent a successful MDSAP audit from our registrar TÜV SÜD. While issuance of the final certificate is still pending, there were no observations noted during the MDSAP audit. The FDA accepts MDSAP audit reports as a substitute for routine Agency inspections.

Legacy Products

We were founded in 1996 as a science-based health care company focused on the development of innovative products for the detection, diagnosis, and monitoring of peripheral nerve and spinal cord disorders, such as those associated with carpal tunnel syndrome, lumbosacral disc disease and spinal stenosis, and diabetes.

Our NC-stat System for the performance of nerve conduction studies at the point-of-care was commercially launched in 1999. In 2008, we brought to market the more sophisticated ADVANCE System for nerve conduction testing and performance of invasive needle electromyography. These systems were general purpose with broad application in evaluating and diagnosing nerve disorders. Numerous studies demonstrating the clinical accuracy and utility of these devices have been conducted and published in high quality peer-reviewed journals.

Significant changes to health reimbursement a decade ago adversely affected these products resulting in our decision to discontinue investment in the products and to manage them for cash flow. They are classified as Legacy Products, as is our prescription wearable technology for chronic pain called SENSUS since the 2015 launch of Quell. We reported revenue for our Legacy Products of $1.2 million and $1.4 million in 2019 and 2018, respectively.

Employees

As of December 31, 2019, we had 23 full time employees. Of these employees, six were in research and development, five in sales and marketing, seven in production/distribution, and five in general and administrative services. One employee holds both M.D. and Ph.D. degrees and one employee holds an M.D. degree. Our employees are not represented by a labor union and are not subject to a collective bargaining agreement. We have never experienced a work stoppage. We believe that we have good relations with our employees.

Available Information

Access to our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to these reports filed with or furnished to the Securities and Exchange Commission, or SEC, may be obtained through the Investor Relations section of our website at *www.neurometrix.com/investor* as soon as reasonably practical after we electronically file or furnish these reports. We do not charge for access to and viewing of these reports. Information on our Investor Relations page and on our website is not part of this Annual Report on Form 10-K or any of our other securities filings unless specifically incorporated herein by reference. In addition, the SEC maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Also, our filings with the SEC may be accessed through the SEC's website at *www.sec.gov.* All statements made in any of our securities filings, including all forward-looking statements or information, are made as of the date of the document in which the statement is included, and we do not assume or undertake any obligation to update any of those statements or documents unless we are required to do so by law

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Corporate Information

NeuroMetrix was founded in June 1996 by our President and Chief Executive Officer, Shai N. Gozani, M.D., Ph.D. We originally were incorporated in Massachusetts in 1996, and we reincorporated in Delaware in 2001. Our offices and production facilities are located at 4-B Gill Street, Woburn, Massachusetts 01801. Our website is *www.neurometrix.com.*

ITEM 1A. Risk Factors

You should carefully consider the following risks and all other information contained in this Annual Report on Form 10-K and our other public filings before making any investment decisions with respect to our securities. If any of the following risks occurs, our business, prospects, reputation, results of operations, or financial condition could be harmed. In that case, the trading price of our securities could decline, and our stockholders could lose all or part of their investment. This Annual Report also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of specific factors, including the risks described below and elsewhere in this Annual Report on Form 10-K.

We have incurred significant operating losses since inception and cannot assure you that we will achieve profitability.

We have incurred recurring losses from operations and negative cash flows from operating activities. At December 31, 2019, we had an accumulated deficit of $194.8 million. The extent of our future operating income or losses is highly uncertain, and we cannot assure you that we will be able to achieve or maintain profitability.

Our future capital needs are uncertain and our independent auditor has expressed substantial doubt about our ability to continue as a going concern. Our ability to continue as a going concern is dependent on our ability to raise additional capital. Our operations could be curtailed if we are unable to obtain the required additional funding when needed. The terms of any financings may not be advantageous to us.

We held cash and cash equivalents of $3.1 million as of December 31, 2019. We believe that these resources, and the cash to be generated from future product sales will be sufficient to meet our projected operating requirements into Q2 2020. Accordingly, we will need to raise additional funds to support our future operating and capital needs in Q2 2020 and beyond.

Our financial statements have been prepared assuming that we will continue as a going concern which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. We expect to incur further losses as we grow sales of DPNCheck and continue to commercialize Quell. We will be dependent on funding our operations through additional public or private financing, asset divestitures, collaborative arrangements with strategic partners, or through additional credit lines or other debt financing sources. These circumstances raise substantial doubt about our ability to continue as a going concern for the one-year period from the date of issuance of these financial statements. As a result of this uncertainty and the substantial doubt about our ability to continue as a going concern as of December 31, 2019, the report of our independent registered public accounting firm in this Annual Report on Form 10-K for the years ended December 31, 2019 and 2018 includes a going concern explanatory paragraph. Our financial statements do not include any adjustment relating to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might be necessary should we be unable to continue as a going concern.

We continue to face significant challenges and uncertainties and, as a result, our available capital resources may be consumed more rapidly than currently expected due to (a) decreases in sales of our products and the uncertainty of future revenues from new products; (b) changes we may make to the business that affect ongoing operating expenses; (c) changes we may make in our business strategy; (d) regulatory developments and inquiries affecting our existing products; (e) changes in our research and development spending plans; and (f) other items affecting our forecasted level of expenditures and use of cash resources. We may attempt to obtain additional funding through public or private financing, collaborative arrangements with strategic partners, asset divestitures, or through additional credit lines or other debt financing sources to increase the funds available to fund operations. However, we may not be able to secure such financing in a timely manner or on favorable terms, if at all. Furthermore, if we issue equity or debt securities to raise additional funds, our existing stockholders may experience dilution, and the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. If we raise additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies, or to grant licenses on terms that are not favorable to us. Without additional funds, we may be forced to delay, scale back or eliminate some of our sales and marketing efforts, research and development activities, or other operations and potentially delay product development in an effort to provide sufficient funds to continue our operations. If any of these events occurs, our ability to achieve our development and commercialization goals would be adversely affected.

We are focused on growing sales of DPNCheck, our test for diabetic peripheral neuropathy, and continuing to commercialize Quell, our wearable device for chronic pain. We cannot assure you that we will be successful with these products or future product candidates or product enhancements in our development pipeline.

We are focused on growing sales of DPNCheck primarily in the United States, Asia and Mexico, and sales of Quell within the United States. DPNCheck was launched in 2011 and is a quantitative nerve conduction test for systemic neuropathies such as DPN. Quell has been on the market since June 2015 and is an over-the-counter wearable device for chronic pain. Our future prospects are closely tied to our success with DPNCheck and Quell, which, in turn, depend upon market acceptance and growth in future revenues and margins. We cannot assure you that our commercialization strategy will be successful. If our strategy is not successful, it could materially affect our revenues and results of operations.

Our future success could be adversely affected by a number of factors, including:

- inability to increase adoption of DPNCheck within the Medicare Advantage market and Outside the United States (OUS) markets;
- regulatory inquiries or issues affecting our products;
- unfavorable changes to current Medicare, Medicare Advantage and commercial payer payment policies;
- changes to payor policies under the Patient Protection and Affordable Care Act;
- inability to efficiently create market demand for Quell at profitable pricing and efficient digital marketing;
- manufacturing issues with Quell or our other products;
- unfavorable experiences by patients and physicians using DPNCheck, Quell and our other products; and,
- physicians’ or patients' reluctance to alter their existing practices and adopt the use of our devices.

If we are unable to expand exposure and market demand for DPNCheck and Quell, our ability to increase our revenues will be limited and our business prospects will be adversely affected.

Our current and future revenue is dependent upon commercial acceptance of our products in the marketplace. The failure of such acceptance will materially and adversely affect our operations.

We will continue to incur operating losses until such time as sales of DPNCheck, Quell and other products or product candidates reach a mature level and we are able to generate sufficient revenue from their sale to meet our operating expenses. There can be no assurance that customers will adopt our technology and products, or that prospective customers will agree to pay for our products. In the event that we are not able to significantly increase the number of customers that purchase our products, or if we are unable to charge the necessary prices, our financial condition and results of operations will be materially and adversely affected.

Delays or changes in GSK commercialization plans involving the Quell technology could materially and adversely affect our operations.

We have earned approximately $20.5 million in development milestones under terms of our January 2018 GSK collaboration agreement for the Quell technology, as amended in December 2018. There remains approximately $4.5 million in commercialization milestones, which would be earned when and if GSK achieves certain market goals. Changes or delays in GSK’s commercialization plans could have an adverse effect on our ability to realize the milestone payments and would have a material and adverse effect on our operations.

If health care providers are unable to obtain sufficient reimbursement or other financial incentives from third-party health care payers related to the use of our products other than Quell, their adoption and our future product sales will be materially adversely affected.

Widespread adoption of our diagnostic products by the medical community is unlikely to occur without a financial incentive from third-party payers for the use of these products. If health care providers are unable to obtain adequate reimbursement for procedures performed using these products, and if managed care organizations do not receive improved capitated payments due to more accurate patient risk assessment using our products, we may be unable to sell our products at levels that are sufficient to allow us to achieve and maintain profitability, and our business would suffer significantly. Additionally, even if these products and procedures are adequately reimbursed by third-party payers today, adverse changes in payers future policies toward payment would harm our ability to market and sell our products. Third-party payers include governmental programs such as Medicare and Medicaid, private health insurers, workers' compensation programs and other organizations.

Future regulatory action by CMS or other governmental agencies or negative clinical results may diminish reimbursement payments to physicians for performing procedures using our products. Medicaid reimbursement differs from state to state, and some state Medicaid programs may not cover the procedures performed with our products or pay physicians an adequate amount for performing those procedures, if at all. Additionally, some private payers do not follow the Medicare guidelines and may reimburse for only a portion of these procedures or not at all. We are unable to predict what changes will be made in the reimbursement methods used by private or governmental third-party payers. Importantly, we cannot predict the effects that implementation of the Patient Protection and Affordable Care Act will have on CMS, commercial insurers, health care providers, and ultimately on our business.

We are subject to extensive regulation by the FDA which could restrict the sales and marketing of the Quell and DPNCheck devices and the ADVANCE System, as well as other products for which we may seek FDA clearance or approval, and could cause us to incur significant costs.

We sell medical devices that are subject to extensive regulation in the United States by the FDA with regard to manufacturing, labeling, sale, promotion, distribution, shipping and ongoing monitoring and follow-up. Before a new medical device, or a new use of or claim for an existing product, can be marketed in the United States, it must first be cleared or approved by the FDA. Medical devices may be marketed only for the indications for which they are approved or cleared. The regulatory review process can be expensive and lengthy. The FDA's process for granting 510(k) clearance typically takes approximately three to six months, but it can be significantly longer. The process for obtaining a pre-market approval, or PMA, is much more costly and onerous. By law, the time period designated for the FDA's review of a PMA is 180 days; however, this time is often extended and it is not uncommon for the PMA review process to take three years or longer from the time the application is filed with the FDA.

The FDA may remove our devices from the market or enjoin them from commercial distribution if safety or effectiveness problems develop. Further, we may not be able to obtain additional 510(k) clearances or pre-market approvals for new products or for modifications to, or additional indications for, our existing products in a timely fashion, or at all. Delays in obtaining future clearances or approvals would adversely affect our ability to introduce new or enhanced products in a timely manner, which in turn would harm our revenue and future profitability. We have made modifications to our devices in the past and may make additional modifications in the future that we believe do not or will not require additional clearances or approvals. If the FDA disagrees, and requires new clearances or approvals for the modifications, we may be required to recall and to stop marketing the modified devices. If any of these events occurs or if the FDA takes other enforcement actions, we may not be able to provide our customers with the products they require on a timely basis, our reputation could be harmed, and we could lose customers and suffer reduced revenues and increased costs.

We also are subject to numerous post-marketing regulatory requirements, including the FDA's quality system regulations, which relate to the design, manufacture, packaging, labeling, storage, installation and servicing of our products, labeling regulations, medical device reporting regulations and correction and removal reporting regulations. Our failure or the failure by any manufacturer of our products to comply with applicable regulatory requirements could result in enforcement action by the FDA. FDA enforcement actions relating to post-marketing regulatory requirements or other issues may include any of the following:

- warning letters, untitled letters, fines, injunctions, product seizures, consent decrees and civil penalties;
- requiring repair, replacement, refunds, customer notifications or recall of our products;

- imposing operating restrictions, suspension or shutdown of production;
- refusing our requests for 510(k) clearance or PMA approval of new products, new intended uses, or modifications to existing products;
- requesting voluntary rescission of 510(k) clearances or withdrawing PMA approvals that have already been granted; and
- criminal prosecution.

If any of these events were to occur, they could harm our reputation, our ability to generate revenues and our profitability.

Also, from time to time, legislation is introduced into Congress that could significantly change the statutory provisions governing the approval, manufacturing and marketing of medical devices. FDA regulations and guidance are often revised or reinterpreted by the agency in ways that may significantly affect our business and our products. It is impossible to predict whether legislative changes will be enacted, or FDA regulations, guidance or interpretations changed, and what the impact of such changes, if any, may be. The FDA has publicly stated that it is reevaluating its longstanding 510(k) review program. It is not clear when, or if, the program will be modified and what effect the modified review process will have on our ability to bring our product candidates to market.

We depend on several single source manufacturers to produce components of our products. Any material adverse changes in our relationships with these manufacturers could prevent us from delivering products to our customers in a timely manner and may adversely impact our future revenues or costs.

We rely on third-party manufacturers to manufacture components of our Quell and DPNCheck, and to fully manufacture devices for the ADVANCE system. In the event that our manufacturers cease to manufacture sufficient quantities of our products or components in a timely manner and on terms acceptable to us, we would be forced to locate alternate manufacturers. Additionally, if our manufacturers experience a failure in their production process, are unable to obtain sufficient quantities of the components necessary to manufacture our products, experience extraordinary price increases on parts essential to our products or otherwise fail to meet our quality requirements, we may be forced to delay the manufacture and sale of our products or locate an alternative manufacturer. We may be unable to locate suitable alternative manufacturers for our products or components for which the manufacturing process is relatively specialized, on terms acceptable to us, or at all. We have a manufacturing and supply agreement with Johnson Medtech, LLC. for the manufacture of the ADVANCE electrodes for nerve conduction testing. Katecho, Inc. manufactures biosensors for use with our DPNCheck devices and manufactures electrodes for Quell, and Sunburst EMS, Inc. manufactures electronic boards and other components of our Quell and DPNCheck products which we assemble at our Massachusetts facility to produce completed devices. Moreover, due to the limited amount of Quell sales to date we do not have long-standing relationships with our manufacturers, other than Katecho, Inc., and may not be able to convince suppliers to continue to make components available to us unless there is demand for such components from their other customers. As a result, there is a risk that certain components could be discontinued and no longer available to us.

We have experienced transient inventory shortages on our products and essential parts, including Quell. If any materially adverse changes in our relationships with these manufacturers or parts suppliers occur, our ability to supply our customers will be severely limited until we are able to engage an alternate manufacturer or parts supplier or, if applicable, resolve any quality issues with our existing manufacturer. This situation could prevent us from delivering products to our customers in a timely manner, lead to decreased sales or increased costs, or harm our reputation with our customers.

If our manufacturers are unable to supply us with an adequate supply of product components, we could lose customers, our potential future growth could be limited and our business could be harmed.

In order for us to successfully expand our business, our contract manufacturers must be able to provide us with substantial quantities of components of our products in compliance with regulatory requirements, in accordance with agreed upon specifications, at acceptable cost and on a timely basis. Our potential future growth could strain the ability of our manufacturers to deliver products and obtain materials and components in sufficient quantities. Manufacturers often experience difficulties in scaling up production, including problems with production yields and quality control and assurance. If we are unable to obtain sufficient quantities of high quality products to meet customer demand on a timely basis, we could lose customers, our growth may be limited and our business could be harmed.

If we or our manufacturers fail to comply with the FDA's quality system regulation, the manufacturing and distribution of our products could be interrupted, and our product sales and operating results could suffer.

We and our contract manufacturers are required to comply with the FDA's quality system regulation, or QSR, which is a complex regulation that governs the procedures and documentation of the design, testing, production, control, quality assurance, labeling, packaging, sterilization, storage and shipping of our devices. The FDA enforces the QSR through periodic inspections. We cannot assure you that our facilities or the facilities of the manufacturers of our products would pass any future inspection. If our facilities or any of the facilities of the manufacturers of our products fail an inspection, the manufacturing or distribution of our products could be interrupted and our operations disrupted. Failure to take adequate and timely corrective action in response to an adverse inspection could result in a suspension or shutdown of our packaging and labeling operations and the operations of the manufacturers of our products or a recall of our products, or other administrative or judicial sanctions. If any of these events occurs, we may not be able to provide our customers with the quantity of products they require on a timely basis, our reputation could be harmed, and we could lose customers and suffer reduced revenues and increased costs.

We are subject to Federal Trade Commission regulatory oversight. Exercise of this regulatory oversight could lead to an outcome which would constrain our marketing of Quell, cause us to incur significant costs and penalties, and adversely affect our financial results.

Under the Federal Trade Commission Act (FTC Act), the FTC is empowered, among other things, to (a) prevent unfair methods of competition and unfair or deceptive acts or practices in or affecting commerce; (b) seek monetary redress and other relief for conduct injurious to consumers; and (c) gather and compile information and conduct investigations relating to the organization, business, practices, and management of entities engaged in commerce. The FTC has very broad enforcement authority, and failure to abide by the substantive requirements of the FTC Act and other consumer protection laws can result in administrative or judicial penalties, including civil penalties, or injunctions affecting the manner in which we would be able to market Quell in the future.

As previously disclosed, in 2017 we received a Civil Investigative Demand (CID) from the FTC. The CID requested information in connection with an FTC review for compliance of our representations about Quell with Sections 5 and 12 of the FTC Act. During 2017, 2018 and 2019, we responded to requests for information by FTC. We met with FTC on multiple occasions in 2019 to discuss our responses. Currently, we are actively engaged with FTC to achieve resolution of this matter. This would include a consent order that, among other provisions, would prohibit us from making certain claims in our advertising about Quell, and a monetary judgment that would be payable to the FTC. Final resolution of this matter is uncertain, and terms related to potential resolution cannot be reasonably estimated at this time.

Our products may be subject to recalls, even after receiving FDA clearance or approval, which would harm our reputation, business and financial results.

We are subject to the medical device reporting regulations, which require us to report to the FDA if our products may have caused or contributed to a death or serious injury, or have malfunctioned in a way that would likely cause or contribute to a death or serious injury if the malfunction were to occur. We are also subject to the correction and removal reporting regulations, which require us to report to the FDA any field corrections and device recalls or removals that we undertake to reduce a risk to health posed by the device or to remedy a violation of the Federal Food, Drug and Cosmetic Act, or FDCA, caused by the device which may present a risk to health. In addition, the FDA and similar governmental agencies in other countries have the authority to require the recall of our products if there is a reasonable probability that the products would cause serious adverse health consequences or death. A government-mandated or voluntary recall by us could occur as a result of manufacturing defects, labeling deficiencies, packaging defects or other failures to comply with applicable regulations. Any recall would divert management attention and financial resources and harm our reputation with customers and could have a material adverse effect on our financial condition and results of operations.

The success of our business depends upon our ability to advance our pipeline products to commercialization.

We commenced commercialization of Quell in June 2015 and we initiated a DPNCheck product upgrade during 2019. We have additional product candidates and enhancements of our existing products in our R&D pipeline. We expect that advancing our pipeline products will require significant time and resources. We may not be successful in our commercialization efforts for any of the product candidates or product enhancements currently in our pipeline and we may not be successful in developing, acquiring, or in-licensing additional product candidates, to the extent we decide to do so. If we are not successful advancing new products through our development pipeline, the regulatory process and commercial launch, our business, financial condition, and results of operations will be adversely affected.

Our ability to achieve profitability depends in part on increasing our gross margins on product sales which we may not be able to achieve.

A number of factors may adversely impact our gross margins on product sales and services, including:

- lower than expected manufacturing yields of high cost components leading to increased manufacturing costs;
- shortages of electric components resulting in higher prices or an inability to supply key parts;
- low production volume which will result in high levels of overhead cost per unit of production;
- the timing of revenue recognition and revenue deferrals;
- increased material or labor costs;
- increased service or warranty costs or the failure to reduce service or warranty costs;
- increased price competition;
- variation in the margins across products in a particular period; and
- how well we execute on our strategic and operating plans.

If we are unable to increase our gross margins on product sales, our results of operations could be adversely impacted, we may not achieve profitability and our stock price could decline.

The patent rights we rely upon to protect the intellectual property underlying our products may not be adequate, which could enable third parties to use our technology and would harm our ability to compete in the market.

Our success will depend in part on our ability to develop or acquire commercially valuable patent rights and to protect these rights adequately. The risks and uncertainties that we face with respect to our patents and other related rights include the following:

- the pending patent applications we have filed or to which we have exclusive rights may not result in issued patents or may take longer than we expect to result in issued patents;
- the claims of any patents that are issued may not provide meaningful protection;
- we may not be able to develop additional proprietary technologies that are patentable;
- other parties may challenge patents, patent claims or patent applications licensed or issued to us; and
- other companies may design around technologies we have patented, licensed or developed.

Our issued and filed patents for our wearable therapeutic products are recent. With regard to our legacy neurodiagnostic products, our issued design patents began to expire in 2015, and our issued utility patents began to expire in 2017. In particular, seven of our issued U.S. utility patents covering various aspects of the legacy neurodiagnostic business expired on the same day in 2017. Although the patent protection for material aspects of these products covered by the claims of the patents were lost at that time, we have additional patents and patent applications directed to other novel inventions that have patent terms extending beyond 2019.

In addition, the laws of other countries may not protect our patent rights to the same extent as the laws of the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Many companies have encountered significant difficulties in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, including certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to medical devices, which could make it difficult for us to stop the infringement of our patent rights or the marketing of competing products in violation of our intellectual property and proprietary rights generally. For this or other reasons, we may not pursue or obtain patent protection in all major markets or may not obtain protection that enables us to prevent the entry of third parties onto the market.

Additionally, proceedings to enforce our intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Further, many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected.

In addition, GSK has certain rights to control the filing of patents with respect to Quell in certain foreign countries. Our patent rights underlying our products may not be adequate, and our competitors or customers may design around our proprietary technologies or independently develop similar or alternative technologies or products that are equal or superior to our technology and products without infringing on any of our patent rights. In addition, the patents licensed or issued to us may not provide a competitive advantage. If any of these events were to occur, our ability to compete in the market would be harmed.

Other rights and measures we have taken to protect our intellectual property may not be adequate, which would harm our ability to compete in the market.

In addition to patents, we rely on a combination of trade secrets, copyright and trademark laws, confidentiality, nondisclosure and assignment of invention agreements and other contractual provisions and technical measures to protect our intellectual property rights. We rely on trade secrets to protect the technology and algorithms we use in our customer data processing and warehousing information system. While we currently require employees, consultants and other third parties to enter into confidentiality, non-disclosure or assignment of invention agreements or a combination thereof where appropriate, any of the following could still occur:

- the agreements may be breached or not enforced in a particular jurisdiction;
- we may have inadequate remedies for any breach;
- trade secrets and other proprietary information could be disclosed to our competitors; or
- others may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets or disclose such technologies.

If, for any of the above reasons, our intellectual property is disclosed or misappropriated, it would harm our ability to protect our rights and our competitive position.

We may need to initiate lawsuits to protect or enforce our patents and other intellectual property rights, which could be expensive and, if we lose, could cause us to lose some of our intellectual property rights, which would harm our ability to compete in the market.

We rely on patents to protect a portion of our intellectual property and our competitive position. Patent law relating to the scope of claims in the technology fields in which we operate is still evolving and, consequently, patent positions in the medical device industry are generally uncertain. In order to protect or enforce our patent rights, we may initiate patent litigation against third parties, such as infringement suits or interference proceedings. Litigation may be necessary to:

- assert claims of infringement;
- enforce our patents;
- protect our trade secrets or know-how; or
- determine the enforceability, scope and validity of the proprietary rights of others.

Any lawsuits that we initiate could be expensive, take significant time and divert management's attention from other business concerns. Litigation also puts our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing. Additionally, we may provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially valuable. The occurrence of any of these events could harm our business, our ability to compete in the market or our reputation.

Claims that our products infringe on the proprietary rights of others could adversely affect our ability to sell our products and increase our costs.

Substantial litigation over intellectual property rights exists in the medical device industry. We expect that our products could be increasingly subject to third-party infringement claims as the number of competitors grows and the functionality of products and technology in different industry segments overlap. Third parties may currently have, or may eventually be issued, patents on which our products or technologies may infringe. Any of these third parties might make a claim of infringement against us. Any litigation regardless of its impact would likely result in the expenditure of significant financial resources and the diversion of management's time and resources. In addition, litigation in which we are accused of infringement may cause negative publicity, adversely impact prospective customers, cause product shipment delays or require us to develop non-infringing technology, make substantial payments to third parties, or enter into royalty or license agreements, which may not be available on acceptable terms, or at all. If a successful claim of infringement were made against us and we could not develop non-infringing technology or license the infringed or similar technology on a timely and cost-effective basis, our revenues may decrease substantially and we could be exposed to significant liability.

We are subject to federal and state laws prohibiting "kickbacks" and false or fraudulent claims, which, if violated, could subject us to substantial penalties. Additionally, any challenge to or investigation into our practices under these laws could cause adverse publicity and be costly to respond to, and thus could harm our business.

A federal law commonly known as the federal anti-kickback law, and several similar state laws, prohibit the payment of any remuneration that is intended to induce physicians or others either to refer patients or to acquire or arrange for or recommend the acquisition of health care products or services. These laws constrain a medical device company's sales, marketing and other promotional activities by limiting the kinds of business relationships and financial arrangements, including sales programs we may have with hospitals, physicians or other potential purchasers of medical devices. Other federal and state laws generally prohibit individuals or entities from knowingly presenting, or causing to be presented, claims for payment to Medicare, Medicaid or other third-party payers that are false or fraudulent, or for items or services that were not provided as claimed. From time to time, we may provide coding and billing information as product support to purchasers of our products. Anti-kickback and false claims laws prescribe civil and criminal penalties for noncompliance, which can be quite substantial including exclusion from participation in federal health care programs. A number of states have enacted laws that require pharmaceutical and medical device companies to monitor and report payments, gifts and other remuneration made to physicians and other health care professionals and health care organizations. Some state statutes, such as the one in Massachusetts, impose an outright ban on gifts to physicians. These laws are often referred to as "gift ban" or "aggregate spend" laws and carry substantial fines if they are violated. Similar legislation, known as the Physician Payments Sunshine Act, was enacted by Congress during 2014. In the event that we are found to have violated these laws or determine to settle a claim that we have done so, our business may be materially adversely affected as a result of any payments required to be made, restrictions on our future operations or actions required to be taken, damage to our business reputation or adverse publicity in connection with such a finding or settlement or other adverse effects relating thereto. Additionally, even an unsuccessful challenge or investigation into our practices could cause adverse publicity, and be costly to respond to, and thus could harm our business and results of operations.

If we are found to have violated laws protecting the confidentiality of patient health information, we could be subject to civil or criminal penalties, which could increase our liabilities, damage our reputation and harm our business.

There are a number of federal and state laws protecting the confidentiality of individually identifiable patient health information, including patient records, and restricting the use and disclosure of that protected information. In particular, the U.S. Department of Health and Human Services promulgated patient privacy rules under the Health Insurance Portability and Accountability Act of 1996, or HIPAA. These privacy rules protect medical records and other personal health information by limiting their use and disclosure, giving individuals the right to access, amend and seek accounting of their own health information and limiting most use and disclosures of health information to the minimum amount reasonably necessary to accomplish the intended purpose. We do not believe that we are subject to the HIPAA rules. However, if we are found to be in violation of the privacy rules under HIPAA, we could be subject to civil or criminal penalties, which could increase our liabilities and harm our reputation or our business.

The use of our products could result in product liability claims that could be expensive, damage our reputation and harm our business.

Our business exposes us to an inherent risk of potential product liability claims related to the manufacturing, marketing and sale of medical devices. The medical device industry historically has been litigious, and we face financial exposure to product liability claims if the use of our products were to cause or contribute to injury or death. Our products may be susceptible to claims of injury because their use involves the electric stimulation of a patient's nerves. Although we maintain product liability insurance for our products and other commercial insurance, the coverage limits of these policies may not be adequate to cover future claims. We may be unable to maintain sufficient product liability or other commercial insurance on acceptable terms or at reasonable costs, and this insurance may not provide us with adequate coverage against potential liabilities. A successful claim brought against us in excess of, or outside of, our insurance coverage could have a material adverse effect on our financial condition and results of operations. A product liability claim, regardless of its merit or eventual outcome, could result in substantial costs to us, a substantial diversion of management attention and adverse publicity. A product liability claim could also harm our reputation and result in a decline in revenues and an increase in expenses.

Our products are complex in design, and defects may not be discovered prior to shipment to customers, which could result in warranty obligations or product liability or other claims, reducing our revenues and increasing our costs and liabilities.

We depend upon third parties for the manufacture of our products or components. Our products, particularly our electrodes, require a significant degree of technical expertise to produce. If these manufacturers fail to produce our products to specification, or if the manufacturers use defective materials or workmanship in the manufacturing process, the reliability and performance of our products will be compromised.

If our products contain defects that cannot be repaired quickly, easily and inexpensively, we may experience:

- loss of customer orders and delay in order fulfillment;
- damage to our brand reputation;
- increased cost of our warranty program due to product repair or replacement;
- inability to attract new customers;
- diversion of resources from our manufacturing and research and development departments into our service department; and
- legal action.

The occurrence of any one or more of the foregoing could harm our reputation and materially reduce our revenues and increase our costs and liabilities.

If we lose any of our officers or key employees, our management and technical expertise could be weakened significantly.

Our success largely depends on the skills, experience, and efforts of our executive officers, including Shai N. Gozani, M.D., Ph.D., our founder, Chairman, President and Chief Executive Officer, Thomas T. Higgins, our Senior Vice President and Chief Financial Officer; and Francis X. McGillin, our Senior Vice President and Chief Commercial Officer. We do not maintain key person life insurance policies covering any of our employees. The loss of any of our executive officers could weaken our management and technical expertise significantly and harm our business.

If we are unable to recruit, hire and retain skilled and experienced personnel, our ability to manage and expand our business will be harmed, which would impair our future revenues and profitability.

We are a small company with 23 employees as of December 31, 2019, and our ability to retain our skilled labor force and our success in attracting and hiring new skilled employees will be a critical factor in determining our future performance. We may not be able to meet our future hiring needs or retain existing personnel, particularly given the challenges faced by our business. We will face challenges and risks in hiring, training, managing and retaining engineering and sales and marketing employees. Failure to attract and retain personnel, particularly technical and sales and marketing personnel would materially harm our ability to compete effectively and grow our business.

Failure to develop or enter into relationships to sell products other than our existing products or enhance our existing products could have an adverse effect on our business prospects.

Our future business and financial success will depend, in part, on our ability to effectively market our products, such as DPNCheck and Quell, and to enhance these products in response to customer demand. Developing new products and upgrades to existing and future products imposes burdens on our research and development department and our management. This process is costly, and we cannot assure you that we will be able to successfully develop new products or enhance our current products. We also may not be able to enter into relationships with other companies to sell additional products. In addition, as we develop the market for our products, future competitors may develop desirable product features earlier than we do which could make our competitors' products less expensive or more effective than our products and could render our products obsolete or unmarketable. If our product development efforts are unsuccessful, we will have incurred significant costs without recognizing the expected benefits and our business prospects may suffer.

If we are unable to develop new products or enhance existing products, we may be unable to attract or retain customers.

Our success depends on the successful development, regulatory clearance or approval (if required), introduction and commercialization of new generations of products, treatment systems, and enhancements to and/or simplification of existing products. DPNCheck and Quell must keep pace with, among other things, the products of our competitors. We are making significant investments in long-term growth initiatives. Such initiatives require significant capital commitments, involvement of senior management and other investments on our part, which we may be unable to recover. Our timeline for the development of new products or enhancements may not be achieved and price and profitability targets may not prove feasible. Commercialization of new products may prove challenging, and we may be required to invest more time and money than expected to successfully introduce them. Once introduced, new products may adversely impact orders and sales of our existing products, or make them less desirable or even obsolete. Compliance with regulations, competitive alternatives, and shifting market preferences may also impact the successful implementation of new products or enhancements.

Our ability to successfully develop and introduce new products and product enhancements, and the revenues and costs associated with these efforts, may be affected by our ability to:

- properly identify customer needs;
- prove feasibility of new products in a timely manner;
- educate physicians about the use of new products and procedures;
- comply with internal quality assurance systems and processes timely and efficiently;
- comply with regulatory requirements relating to our products, and limit the timing and cost of obtaining required regulatory approvals or clearances;
- accurately predict and control costs associated with inventory overruns caused by phase-in of new products and phase-out of old products;
- price new products competitively;
- manufacture and deliver our products in sufficient volumes on time, and accurately predict and control costs associated with manufacture of the products; and
- meet our product development plan and launch timelines.

Even if customers accept new products or product enhancements, the revenues from these products may not be sufficient to offset the significant costs associated with making them available to customers. Failure to successfully develop, obtain regulatory approval or clearance for, manufacture or introduce new products or to complete these processes in a timely and efficient manner could result in delays that could affect our ability to attract and retain customers, or could cause customers to delay or cancel orders, causing our backlog, revenues and operating results to suffer.

We currently compete, and may in the future need to compete, against other medical device and consumer companies with greater resources, more established distribution channels and other competitive advantages, and the success of these competitors may harm our ability to generate revenues.

We currently do, and in the future may need to, compete directly and indirectly with a number of other companies that may have competitive advantages over us. Our diagnostic devices for nerve testing compete with companies that sell traditional nerve conduction study and electromyography equipment including Cadwell Laboratories, Inc. and Natus Medical Incorporated. These companies enjoy significant competitive advantages, including:

- greater resources for product development, sales and marketing;
- more established distribution networks;
- greater name recognition;
- more established relationships with health care professionals, customers and third-party payers; and
- additional lines of products and the ability to offer rebates or bundle products to offer discounts or incentives.

As we develop the market for wearable technology for chronic pain, we will be faced with competition from other companies that decide and are able to enter the market as well as competition from other forms of treatment for chronic pain. Some or all of our future competitors in the diagnostic nerve testing market and the consumer market for pain relief may enjoy competitive advantages such as those described above. If we are unable to compete effectively against existing and future competitors, our sales will decline and our business will be harmed.

Security breaches and other disruptions could compromise our information and expose us to liability, which could cause our business and reputation to suffer.

In the ordinary course of our business, we collect and store sensitive data in our data centers, on our networks, including intellectual property, our proprietary business information, and that of our customers, suppliers and business partners, and personally identifiable information of our employees. The secure processing, maintenance and transmission of this information is critical to our operations. Despite our security measures, our information technology and infrastructure may be vulnerable to attacks by hackers or breached due to employee error, malfeasance or other disruptions. Any such breach could compromise our networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Any such access, disclosure or other loss of information could result in legal claims or proceedings, disrupt our operations, damage our reputation, and cause a loss of confidence in our products and services, which could have a material adverse effect on our business, financial condition, results of operations or cash flows.

If future clinical studies or other articles are published, or physician associations or other organizations announce positions that are unfavorable to our products, our sales efforts and revenues may be negatively affected.

Future clinical studies or other articles regarding our existing products or any competing products may be published that either support a claim, or are perceived to support a claim, that a competitor's product is more accurate or effective than our products or that our products are not as accurate or effective as we claim or previous clinical studies have concluded. Additionally, physician associations or other organizations that may be viewed as authoritative or have an economic interest in nerve conduction studies and in related electrodiagnostic procedures or other procedures that may be performed using our products or in neurostimulation therapies using our devices could endorse products or methods that compete with our products or otherwise announce positions that are unfavorable to our products. Any of these events may negatively affect our sales efforts and result in decreased revenues.

As we expand into foreign markets with respect to products other than Quell, we will be affected by new business risks that may adversely impact our financial condition or results of operations.

Foreign markets represented approximately 13% and 12% of our revenues in 2019 and 2018, respectively. We are working to expand market penetration, particularly in Asia. Any such expansion will subject us to the possibility of new business risks, including:

- failure to fulfill foreign regulatory requirements, if applicable, to market our products;
- availability of, and changes in, reimbursement within prevailing foreign health care payment systems;
- adapting to the differing business practices and laws in foreign countries;
- difficulties in managing foreign relationships and operations, including any relationships that we establish with foreign distributors or sales or marketing agents;
- limited protection for intellectual property rights in some countries;
- difficulty in collecting accounts receivable and longer collection periods;
- costs of enforcing contractual obligations in foreign jurisdictions;
- recessions in economies outside of the United States;
- political instability and unexpected changes in diplomatic and trade relationships;
- currency exchange rate fluctuations; and
- potentially adverse tax consequences.

If we are successful in introducing our products other than Quell into foreign markets, we will be affected by these additional business risks, which may adversely impact our financial condition or results of operations. In addition, expansion into foreign markets imposes additional burdens on our executive and administrative personnel, research and sales departments, and general managerial resources. Our efforts to introduce our products other than Quell into foreign markets may not be successful, in which case we may have expended significant resources without realizing the expected benefit.

Our loan and security agreement with a bank, which we refer to as our credit facility, contains financial and operating restrictions that may limit our access to credit. If we fail to comply with covenants in the credit facility, we may be required to repay any indebtedness thereunder, which may have an adverse effect on our liquidity.

Although we have not borrowed any funds under the credit facility, provisions in the credit facility impose restrictions on our ability to, among other things:

- incur additional indebtedness;
- create liens;
- replace certain of our executive officers;
- enter into transactions with affiliates;
- transfer assets;
- pay dividends or make distributions on, or repurchase, our capital stock; and
- merge or consolidate.

In addition, we are required to meet certain financial covenants customary with this type of credit facility, including maintaining a minimum specified tangible net worth. The credit facility also contains other customary covenants, which we may not be able to comply with in the future. Our failure to comply with these covenants may result in the declaration of an event of default and could cause us to be unable to borrow under the credit facility. In addition to preventing additional borrowings under the credit facility, an event of default, if not cured or waived, may result in the acceleration of the maturity of indebtedness outstanding under the credit facility at the time of the default, which would require us to pay all amounts outstanding. If an event of default occurs, we may not be able to cure it within any applicable cure period, if at all. If the maturity of our indebtedness is accelerated, we may not have sufficient funds available for repayment or we may not have the ability to borrow or obtain sufficient funds to replace the accelerated indebtedness on terms acceptable to us, or at all. We have not borrowed any funds under this agreement; however, as of January 23, 2020, $226,731 of the amounts available under the agreement are restricted to support letters of credit issued in favor of our landlords.

If we sell additional shares, our stock price may decline as a result of the dilution which will occur to existing stockholders.

Until we are profitable, we will need significant additional funds to develop our business and sustain our operations. We sold shares of convertible preferred stock and warrants on several occasions, and any additional sales of shares of our common stock or other securities exercisable into our common stock are likely to have a dilutive effect on some or all of our then existing stockholders. Resales of newly issued shares in the open market could also have the effect of lowering our stock price, thereby increasing the number of shares we may need to issue in the future to raise the same dollar amount and consequently further diluting our outstanding shares.

The perceived risk associated with the possible sale of a large number of shares could cause some of our stockholders to sell their stock, thus causing the price of our stock to decline. In addition, actual or anticipated downward pressure on our stock price due to actual or anticipated issuances or sales of stock could cause some institutions or individuals to engage in short sales of our common stock, which may itself cause the price of our stock to decline.

If our stock price declines, we may be unable to raise additional capital. A sustained inability to raise capital could force us to go out of business. Significant declines in the price of our common stock could also impair our ability to attract and retain qualified employees, reduce the liquidity of our common stock and result in the delisting of our common stock from The Nasdaq Stock Market LLC, or Nasdaq.

The trading price of our common stock has been volatile and is likely to be volatile in the future.

The trading price of our common stock has been highly volatile. For the two-year period ended December 31, 2019, our stock price has fluctuated from a low of $2.52 to a high of $29.60, as adjusted for stock splits during that time. The market price for our common stock will be affected by a number of factors, including:

- the outcome of the FTC Civil Investigative Demand initiated in 2017;
- the outcome of potential asset divestitures;
- the achievement of GSK commercialization milestones;
- the denial or delay of regulatory clearances or approvals for our products under development or receipt of regulatory approval of competing products;
- our ability to accomplish clinical, regulatory and other product development and commercialization milestones and to do so in accordance with our timing estimates;
- changes in policies affecting third-party coverage and reimbursement in the United States and other countries;
- changes in government regulations and standards affecting the medical device industry and our products;
- ability of our products to achieve market success;
- the performance of third-party contract manufacturers and component suppliers;
- actual or anticipated variations in our results of operations or those of our competitors;
- announcements of new products, technological innovations or product advancements by us or our competitors;
- developments with respect to patents and other intellectual property rights;
- sales of common stock or other securities by us or our stockholders in the future;
- additions or departures of key scientific or management personnel;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- trading volume of our common stock;
- regulatory inquiries or developments affecting our products;
- changes in earnings estimates or recommendations by securities analysts, failure to obtain or maintain analyst coverage of our common stock or our failure to achieve analyst earnings estimates;
- public statements by analysts or clinicians regarding their perceptions of our clinical results or the effectiveness of our products;
- decreases in market valuations of medical device companies; and
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors.

The stock prices of many companies in the medical device industry have experienced wide fluctuations that have often been unrelated to the operating performance of these companies. Periods of volatility in the market price of a company's securities can result in securities class action litigation against a company. If class action litigation is initiated against us, we may incur substantial costs and our management's attention may be diverted from our operations, which could significantly harm our business.

We have, in the past, failed to satisfy certain continued listing requirements on Nasdaq and could fail to satisfy those requirements again in the future which could affect the market price of our common stock and liquidity and reduce our ability to raise capital.

Currently, our common stock trades on the Nasdaq Capital Market. During 2019 we received notification from Nasdaq informing us of certain listing deficiencies related to the minimum bid price listing requirements. Although we have since cured the deficiency, it is possible that we could fall out of compliance again in the future. If we fail to maintain compliance with any Nasdaq listing requirements, we could be delisted and our stock would be considered a penny stock under regulations of the Securities and Exchange Commission, or SEC, and would therefore be subject to rules that impose additional sales practice requirements on broker-dealers who sell our securities. The additional burdens imposed upon broker-dealers by these requirements could discourage broker-dealers from effecting transactions in our common stock, which could severely limit the market liquidity of our common stock and your ability to sell our securities in the secondary market.

Anti-takeover provisions in our organizational documents and Delaware law, and the shareholder rights plan that we adopted in 2007, may discourage or prevent a change of control, even if an acquisition would be beneficial to our stockholders, which could affect our stock price adversely and prevent attempts by our stockholders to replace or remove our current management.

Our certificate of incorporation and bylaws contain provisions that could delay or prevent a change of control of our Company or changes in our Board of Directors that our stockholders might consider favorable. Some of these provisions:

- authorize the issuance of preferred stock which can be created and issued by the Board of Directors without prior stockholder approval, with rights senior to those of our common stock;
- provide for a classified Board of Directors, with each director serving a staggered three-year term;
- prohibit our stockholders from filling board vacancies, calling special stockholder meetings, or taking action by written consent;
- provide for the removal of a director only with cause and by the affirmative vote of the holders of 75% or more of the shares then entitled to vote at an election of our directors; and
- require advance written notice of stockholder proposals and director nominations.

We have also adopted a shareholder rights plan that could make it more difficult for a third party to acquire, or could discourage a third party from acquiring, us or a large block of our common stock. A third party that acquires 15% or more of our common stock could suffer substantial dilution of its ownership interest under the terms of the shareholder rights plan through the issuance of common stock to all stockholders other than the acquiring person.

In addition, we are subject to the provisions of Section 203 of the Delaware General Corporation Law, which may prohibit certain business combinations with stockholders owning 15% or more of our outstanding voting stock. These and other provisions in our certificate of incorporation, bylaws and Delaware law could make it more difficult for stockholders or potential acquirers to obtain control of our Board of Directors or initiate actions that are opposed by our then-current Board of Directors, including a merger, tender offer, or proxy contest involving our Company. Any delay or prevention of a change of control transaction or changes in our Board of Directors could cause the market price of our common stock to decline.

We do not intend to pay cash dividends.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings for use in the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. In addition, the terms of our credit facility preclude us from paying any dividends. As a result, capital appreciation, if any, of our common stock will be our stockholders' sole source of potential gain for the foreseeable future.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our headquarters, engineering activities, and manufacturing and fulfillment activities are located in an approximately 10,000 square foot leased facility in Woburn, Massachusetts. We believe this facility will be adequate for our needs during the foreseeable future.

ITEM 3. LEGAL PROCEEDINGS

While we are not currently a party to any material legal proceedings, we could become subject to legal proceedings in the ordinary course of business. We do not expect any such potential items to have a significant impact on our financial position.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

Our common stock is traded on the Nasdaq Capital Market under the symbol "NURO".

Stockholders

On January 24, 2020, there were approximately 28 stockholders of record of our common stock. This number does not include stockholders for whom shares were held in a "nominee" or "street" name. On January 24, 2020, the last reported sale price per share of our common stock on the Nasdaq Capital Market was $4.75.

EQUITY COMPENSATION PLAN INFORMATION

The following table sets forth information as of December 31, 2019 regarding the number of securities to be issued upon exercise, and the weighted average exercise price of outstanding options, warrants, and rights under our equity compensation plans and the number of securities available for future issuance under our equity compensation plans.

Equity Compensation Plan Information as of December 31, 2019

	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column a)	
	(a)	(b)	(c)	
Equity compensation plans approved by security holders(1)	164,980	$ 7.16	261,356	(2)
Equity compensation plans not approved by security holders(3)	—	—	1,250	
Totals	164,980	$ 7.16	262,606	

(1) Includes information related to our Amended and Restated 1996 Stock Option/Restricted Stock Plan, Amended and Restated 1998 Equity Incentive Plan, Tenth Amended and Restated 2004 Stock Option and Incentive Plan, and Fourth Amended and Restated 2010 Employee Stock Purchase Plan.

(2) As of December 31, 2019, there were 250,410 shares available for future grant under the Eleventh Amended and Restated 2004 Stock Option and Incentive Plan and 10,946 shares available under the Fourth Amended and Restated 2010 Employee Stock Purchase Plan.

(3) Includes information related to our Amended and Restated 2009 Non-Qualified Inducement Stock Plan, which is designed to provide equity grants to new employees. Pursuant to this plan, we were authorized to issue Non-Qualified Stock Options, Restricted Stock Awards and Unrestricted Stock Awards.

ITEM 6. SELECTED FINANCIAL DATA

The information required by this item may be found on pages F-1 through F-24 of this Annual Report on Form 10-K.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion of our financial condition and results of operations in conjunction with our selected financial data, our financial statements, and the accompanying notes to those financial statements included elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve risks and uncertainties. For a description of factors that may cause our actual results to differ materially from those anticipated in these forward-looking statements, please refer to the section titled "Risk Factors", contained in Item 1A of this Annual Report on Form 10-K.

Overview

NeuroMetrix develops and commercializes health care products that utilize non-invasive neurostimulation and digital medicine. Our core expertise in biomedical engineering has been refined over two decades of designing, building and marketing medical devices that stimulate nerves and analyze nerve response for diagnostic and therapeutic purposes. We created the market for point-of-care nerve testing and were first to market with sophisticated wearable technology for symptomatic relief of chronic pain. Our business is fully integrated with in-house capabilities spanning research and development, manufacturing, regulatory affairs and compliance, sales and marketing, product fulfillment and customer support. We derive revenues from the sale of medical devices and after-market consumable products and accessories. Our products are sold in the United States and select overseas markets. They are cleared by the U.S. Food and Drug Administration (FDA) and regulators in foreign jurisdictions where appropriate. We have two principal product lines:

- Point-of-care neuropathy diagnostic tests
- Wearable neurostimulation devices

Diabetes is a worldwide epidemic with an estimated affected population of over 400 million people. Within the United States there are over 30 million people with diabetes and another 80 million with pre-diabetes. The annual direct cost of treating diabetes in the United States exceeds $100 billion. Although there are dangerous acute manifestations of diabetes, the primary burden of the disease is in its long-term complications, which include cardiovascular disease, nerve disease and resulting conditions such as foot ulcers which may require amputation, eye disease leading to blindness, and kidney failure. The most common long-term complication of diabetes, affecting over 50% of the diabetic population is nerve disease or neuropathy. Diabetic peripheral neuropathy (DPN) is the primary trigger for diabetic foot ulcers, which may progress to the point of requiring amputation. People with diabetes have a 15-25% lifetime risk of foot ulcers and approximately 15% of foot ulcers lead to amputation. Foot ulcers are the most expensive complication of diabetes with a typical cost of $5,000 to $50,000 per episode. In addition, between 16% and 26% of people with diabetes suffer from chronic pain in the feet and lower legs.

Early detection of DPN is important because there are no treatment options once the nerves have degenerated. Today's diagnostic methods for DPN range from a simple monofilament test for lack of sensory perception in the feet to a nerve conduction study performed by a specialist. Our DPNCheck technology provides a rapid, low cost, quantitative test for peripheral nerve disease, including DPN. It addresses an important medical need and is particularly effective in screening large populations. DPNCheck has been validated in numerous clinical studies.

Chronic pain is a significant public health problem. It is defined by the National Institutes of Health (NIH) as pain lasting more than 12 weeks. This contrasts with acute pain which is a normal bodily response to injury or trauma. Chronic pain conditions include low back pain, arthritis, fibromyalgia, neuropathic pain, cancer pain and many others. Chronic pain may be triggered by an injury or there may be an ongoing cause such as disease or illness. There may also be no clear cause. Pain signals continue to be transmitted in the nervous system over extended periods of time often leading to other health problems. These can include fatigue, sleep disturbance, decreased appetite, and mood changes which cause difficulty in carrying out important activities and contributing to disability and despair. In general, chronic pain cannot be cured. Treatment of chronic pain is focused on reducing pain and improving function. The goal is effective pain management.

Chronic pain affects over 100 million adults in the United States and more than 1.5 billion people worldwide. The estimated incremental impact of chronic pain on health care costs in the United States is over $250 billion per year and lost productivity is estimated to exceed $300 billion per year. The most common approach to chronic pain management is pain medication. This includes over-the-counter (OTC) internal and external analgesics as well as prescription pain medications, both non-opioid or opioid. The approach to treatment is individualized, drug combinations may be employed, and the results are often inadequate. Side effects, including the potential for addiction, are substantial. Increasingly, restrictions are being imposed

on access to prescription opioids. Reflecting the complexity of chronic pain and the difficulty in treating it, we believe that inadequate relief leads 25% to 50% of pain sufferers to seek alternatives to prescription pain medications. These alternatives include nutraceuticals, acupuncture, chiropractic care, non-prescription analgesics, electrical stimulators, braces, sleeves, pads and other items. In total these pain relief products and services account for approximately $20 billion in annual out-of-pocket spending in the United States.

Nerve stimulation is a long-established category of treatment for chronic pain. This treatment approach is available through implantable spinal cord stimulation requiring surgery with its attendant risks. Non-invasive approaches involving transcutaneous electrical nerve stimulation (TENS) have achieved limited efficacy in practice due to device limitations, ineffective dosing and low patient adherence. Our app-enabled Quell wearable technology for chronic pain is designed to address many of the limitations of traditional TENS.

Results of Operations

Comparison of Years Ended December 31, 2019 and December 31, 2018

Revenues

	Years Ended December 31,			
	2019	2018	Change	% Change
	(in thousands)			
Revenues	$ 9,272.5	$ 16,090.1	$ (6,817.6)	(42.4)%

Revenues include sales from Quell, DPNCheck and our legacy neurodiagnostic products. During 2019 total revenues decreased by $6.8 million, or 42.4%, from 2018. Quell revenues of $3.8 million in 2019 declined from $10.5 million, or 63.8%, below the comparable 2018 period reflecting reduced advertising and an emphasis on the profitability of Quell sales. DPNCheck revenues of $4.2 million were consistent with the comparable 2018 period. Our legacy products contributed $1.2 million and $1.4 million of revenue in 2019 and 2018, respectively.

Cost of Revenues and Gross Profit

	Years Ended December 31,			
	2019	2018	Change	% Change
	(in thousands)			
Cost of revenues	$ 7,026.9	$ 8,707.1	$ (1,680.2)	(19.3)%
Gross profit	$ 2,245.6	$ 7,383.1	$ (5,137.5)	(69.6)%

Our gross profit margin was 24.2% in 2019 versus 45.9% in the prior year. The decrease in gross margin in 2019 results from a charge of $2.6 million to write down Quell inventory to net realizable value. Excluding this charge gross profit margin was 54.0% for 2019 due to the increased weight of our higher margin DPNCheck business within total revenue, manufacturing efficiencies and lower Quell cost of goods.

Operating Expenses

	Years Ended December 31,			
	2019	2018	Change	% Change
	(in thousands)			
Operating expenses:				
Research and development	$ 3,102.0	$ 5,134.6	$ (2,032.6)	(39.6)%
Sales and marketing	4,755.2	9,698.8	(4,943.6)	(51.0)%
General and administrative	5,923.2	4,841.2	1,082.0	22.3 %
Total operating expenses	$ 13,780.4	$ 19,674.6	$ (5,894.2)	(30.0)%

Research and Development

Research and development expenses for 2019 decreased by 39.6% from 2018 due to GSK co-funding $1.5 million of Quell product development costs. In addition, personnel costs decreased by $0.3 million due to business restructuring.

Sales and Marketing

Sales and marketing expense for 2019 decreased by 51% from 2018 primarily attributable to reduced Quell advertising spending of $4.1 million. In addition, personnel costs decreased by $0.7 million due to business restructuring.

General and Administrative

General and administrative expense for 2019 increased by 22.3% from 2018 due to higher professional service costs of $0.9 million in 2019. In addition, insurance costs increased $0.2 million offset by a decrease of personnel costs by $0.2 million due to business restructuring.

Collaboration income

	Years Ended December 31,			
	2019	2018	Change	% Change
	(in thousands)			
Collaboration income	$ 7,716.7	$ 12,255.7	$ (4,539.0)	(37.0)%

In early 2018 we entered into the Asset Purchase Agreement, the Development and Services Agreement, as amended in December 2018, and related documents with GSK, which we refer to as the “GSK collaboration,” pursuant to which we sold to GSK the rights to Quell in markets outside the United States in exchange for $25 million in milestone payments and an agreement to co-fund the Quell development program starting in 2019. We recorded $7.7 million and $12.3 million in collaboration income from GSK upon achievement of product development milestones in 2019 and 2018, respectively.

Other Income

	Years Ended December 31,			
	2019	2018	Change	% Change
	(in thousands)			
Other income	$ 45.0	$ 59.5	$ (14.5)	(24.4)%

Other income includes interest income on our cash and cash equivalent accounts. Interest income decreased by $14,500 in 2019 compared to 2018.

Net income (loss) per common share applicable to common stockholders, basic and diluted

Net loss per common share applicable to common stockholders was $(3.90), basic and diluted for 2019. Net income per common share applicable to common stockholders was $0.03 and $0.02, basic and diluted for 2018, respectively. Weighted average shares outstanding used in computing per share amounts are included in Note 2 to the Financial Statements.

Liquidity and Capital Resources

Our principal source of liquidity is cash of $3.1 million at December 31, 2019. Funding for our operations largely depends on revenues from the sales of our commercial products for chronic pain and neuropathy. A low level of market interest in DPNCheck or Quell, a decline in our consumables sales, or unanticipated increases in our operating costs would have an adverse effect on our liquidity and cash.

	December 31, 2019	December 31, 2018	Change	% Change
	(in thousands)			
Cash and cash equivalents	$ 3,126.2	$ 6,780.4	$ (3,654.2)	(53.9)%

During 2019 our cash and cash equivalents decreased by $3.7 million from 2018 mainly due to $3.6 million cash used by operating activities, which included the net proceeds of $7.7 million provided by the GSK collaboration.

We are party to a Loan and Security Agreement, or the credit facility, with a bank. As of December 31, 2019, the credit facility permitted us to borrow up to $2.5 million on a revolving basis. The credit facility was subsequently amended, most recently on January 23, 2020, and extended until April 30, 2020. The facility was lowered to $250,000 and secured by a cash pledge in the same amount. Amounts borrowed under the credit facility will bear interest equal to the prime rate plus 0.5%. Any borrowings under the credit facility will be collateralized by our cash, accounts receivable, inventory, and equipment. The credit facility also includes traditional lending and reporting covenants. We were in compliance with these covenants as of December 31, 2019.

In managing working capital, we focus on two important financial measurements as presented below:

	Years Ended December 31,	
	2019	2018
Days sales outstanding (days)	26.8	39.0
Inventory turnover rate (times per year)	3.5	3.5

Days sales outstanding (DSO) reflect customer payment terms which vary from payment on order to 60 days from invoice date. The decrease in DSO is due to a shift in our sales channel to payment-on-order Quell e-commerce sales. The inventory turnover rate of 3.5 in 2019 was consistent with 2018.

The following sets forth information relating to sources and uses of our cash:

	Years Ended December 31,	
	2019	2018
	(in thousands)	
Net cash used in operating activities (excluding cash provided by collaboration income)	(11,338.0)	(11,350.5)
Net cash provided by collaboration income	7,716.7	14,212.2
Net cash provided by (used in) operating activities	(3,621.3)	2,861.7
Net cash used in investing activities	(48.1)	(143.6)
Net cash provided by financing activities	15.1	18.6

During 2019 our operating activities used approximately $11.3 million for the year ended December 31, 2019 offset by $7.7 million of collaboration income.

During the year ended December 31, 2019, our investing activities reflected approximately $48,000 spent for the acquisition of fixed assets, primarily related to production system upgrades. Investment activities reflected approximately $19,000 due to net proceeds from issuance of stock for the year ended December 31, 2019.

During 2018 our operating activities used approximately $11.4 million for the year ended December 31, 2018 offset by $14.2 million of collaboration income. During 2018 our investing activities reflected approximately $144,000 spent for the acquisition of fixed assets, primarily related to production system upgrades. Investment activities reflected approximately $19,000 due to net proceeds from issuance of stock for the year ended December 31, 2018.

The Company has suffered recurring losses from operations and negative cash flows from operating activities. These factors raise substantial doubt about the Company's ability to continue as a going concern for the one-year period from the date of issuance of these financial statements. The financial statements do not include any adjustments that might result from the outcome of this uncertainty. We held cash and cash equivalents of $3.1 million as of December 31, 2019. We believe that these resources, and the cash to be generated from future product sales will be sufficient to meet our projected operating requirements into the second quarter of 2020. Accordingly, we will need to raise additional funds to support our operating and capital needs in the second quarter of 2020 and beyond. We continue to face significant challenges and uncertainties and, as a result, our available capital resources may be consumed more rapidly than currently expected due to (a) decreases in sales of our products; (b) changes we may make to the business that affect ongoing operating expenses; (c) changes we may make in our business strategy; (d) regulatory developments affecting our existing products; (e) changes we may make in our research and development spending plans; and (f) other items affecting our forecasted level of expenditures and use of cash resources. We may attempt to obtain additional funding through public or private financing, collaborative arrangements with strategic partners, divestiture of assets, or through additional credit lines or other debt financing sources. However, we may not be able to secure such financing in a timely manner or on favorable terms, if at all. We filed a shelf registration statement on Form S-3 with the SEC on January 24, 2019 covering shares of our common stock and other securities for sale, giving us the opportunity to raise funding when needed or otherwise considered appropriate at prices and on terms to be determined at the time of any such offerings. However, pursuant to the instructions to Form S-3, we only have the ability to sell shares under the shelf registration statement, during any 12-month period, in an amount less than or equal to one-third of the aggregate market value of our common stock held by non-affiliates. If we raise additional funds by issuing equity or debt securities, either through the sale of securities pursuant to a registration statement or by other means, our existing stockholders may experience dilution, and the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. If we raise additional funds through collaboration, asset divestitures, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies, or to grant licenses on terms that are not favorable to us. Without additional funds, we may be forced to delay, scale back or eliminate some of our sales and marketing efforts, research and development activities, or other operations and potentially delay product development in an effort to provide sufficient funds to continue our operations. If any of these events occurs, our ability to achieve our development and commercialization goals would be adversely affected.

At December 31, 2019, the Company had federal and state net operating loss carryforwards (NOL) of approximately $147.3 million and $50.9 million, respectively, as well as federal and state tax credits of approximately $1.7 million and $0.9 million, respectively, which may be available to reduce future taxable income and related taxes. This amount includes tax benefits of $2.5 million and $75,000 attributable to NOL and tax credit carryforwards, respectively, that result from the exercise of employee stock options. The Company experienced an ownership change in 2019, which significantly reduced the tax benefits associated with these carryforwards under Internal Revenue Code Sections 382 and 383. The federal NOL's, the state NOL's, and the federal and state R&D credits each begin to expire in 2020. A full valuation allowance has been provided against our NOL carryforwards and research and development credit carryforwards. If an NOL or tax credit adjustment is required, it would be offset by a similar adjustment to the valuation allowance. Thus, NOL or tax credit adjustments would have no impact to the balance sheet or statement of operations.

Off-Balance Sheet Arrangements, Contractual Obligations, and Contingent Liabilities and Commitments

As of December 31, 2019, we did not have any off-balance sheet financing arrangements.

Critical Accounting Policies and Estimates

Our financial statements are based on the selection and application of generally accepted accounting principles, which require us to make estimates and assumptions about future events that affect the amounts reported in our financial statements and the accompanying notes. Future events and their effects cannot be determined with certainty. Therefore, the determination of estimates requires the exercise of judgment. Actual results could differ significantly from those estimates, and any such differences may be material to our financial statements. We believe that the policies set forth below may involve a higher degree of judgment and complexity in their application than our other accounting policies and represent the critical accounting policies used in the preparation of our financial statements. If different assumptions or conditions were to prevail, the results could be materially different from our reported results. Our significant accounting policies are presented within Note 2 to our Financial Statements.

Revenue Recognition and Accounts Receivable

Revenues include product sales, net of estimated returns. Revenue is measured as the amount of consideration the Company expects to receive in exchange for product transferred. Revenue is recognized when contractual performance obligations have been satisfied and control of the product has been transferred to the customer. In most cases, the Company has a single performance obligation for product delivery. Product returns are estimated based on historical data and evaluation of current information.

Revenue recognition involves judgments, including assessments of expected returns and expected customer relationship periods. We analyze various factors, including a review of specific transactions, historical product returns, average customer relationship periods, customer usage, customer balances, and market and economic conditions. Changes in judgments or estimates on these factors could materially impact the timing and amount of revenues and costs recognized. Should market or economic conditions deteriorate, our actual return or bad debt experience could exceed its estimate. Certain product sales are made with a 30-day or 60-day right of return.

Trade accounts receivable are recorded at the invoiced amount and do not bear interest.

Accounts receivable are recorded net of the allowance for doubtful accounts receivable. The allowance for doubtful accounts is our best estimate of the amount of probable credit losses in our existing accounts receivable. We review our allowance for doubtful accounts and determine the allowance based on an analysis of customer past payment history, product usage activity, and recent communications between us and the customer. Individual customer balances which are past due and over 90 days outstanding are reviewed individually for collectability. Account balances are written-off against the allowance when we feel it is probable the receivable will not be recovered. We do not have any off-balance sheet credit exposure related to our customers.

Inventories

Inventories, consisting primarily of finished goods and purchased components, are stated at the lower of cost or net realizable value. Cost is determined using the first-in, first-out method. We write down inventory to its net realizable value for excess or obsolete inventory. The realizable value of inventories is based upon the types and levels of inventories held, forecasted demand, pricing, competition, and changes in technology. Our consumable electrodes and biosensors have an eighteen to twenty-four month shelf life. Should current market and economic conditions deteriorate, our actual recoveries could be less than our estimates.

Income Taxes

The Company records income taxes using the asset and liability method. Deferred income tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective income tax bases, and operating loss and tax credit carryforwards. The Company's financial statements contain certain deferred tax assets, which have arisen primarily as a result of operating losses, as well as other temporary differences between financial and tax accounting. In accordance with the provisions of the Income Taxes topic of the Codification, the Company is required to establish a valuation allowance if the likelihood of realization of the deferred tax assets is reduced based on an evaluation of objective verifiable evidence. Significant management judgment is required in determining the Company's provision for income taxes, the Company's deferred tax assets and liabilities and any valuation allowance recorded against those net deferred tax assets. The Company evaluates the weight of all available evidence to determine whether it is more likely than not that some portion or all of the net deferred income tax assets will not be realized.

Utilization of the NOL and research and development credit carryforwards may be subject to a substantial annual limitation due to ownership change limitations that have occurred previously or that could occur in the future, as provided by Section 382 of the Internal Revenue Code of 1986, as well as similar state provisions. Ownership changes may limit the amount of NOL and tax credit carryforwards that can be utilized to offset future taxable income and tax, respectively. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain shareholders or public groups in the stock of a corporation by more than 50 percentage points over a three-year period. If the Company has experienced a change of control, utilization of its NOL or tax credits carryforwards would be subject to an annual limitation under Section 382. Any limitation may result in expiration of a portion of the NOL or research and development credit carryforwards before utilization. Subsequent ownership changes could further impact the limitation in future years. Further, until a study is completed and any limitation known, no amounts are being presented as an uncertain tax position. A full valuation allowance has been provided against the Company's NOL carryforwards and research and development credit carryforwards and, if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the balance sheet or statement of operations if an adjustment were required.

Management performed a two-step evaluation of all tax positions, ensuring that these tax return positions meet the "more likely than not" recognition threshold and can be measured with sufficient precision to determine the benefit recognized in the financial statements. These evaluations provide management with a comprehensive model for how a company should recognize, measure, present, and disclose in its financial statements certain tax positions that the Company has taken or expects to take on income tax returns.

Research and Development

Costs incurred in research and development are expensed as incurred. Included in research and development costs are wages, benefits, product design consulting, and other operating costs such as facilities, supplies, and overhead directly related to the Company's research and development efforts.

Collaboration income

Collaboration income is recognized within Other Income when contractual performance obligations, outside the ordinary activities of the Company, have been satisfied and control has been transferred to a collaboration partner. Collaboration income for each performance obligation is based on relative fair value of the overall transaction price. A deferred collaboration income liability is recorded when payments are received prior to satisfaction of performance obligations.

Product Warranty Costs

The Company accrues estimated product warranty costs at the time of sale which are included in cost of sales in the statements of operations. The amount of the accrued warranty liability is based on historical information such as past experience, product failure rates, number of units repaired, and estimated cost of material and labor. The liabilities for product warranty costs of $75,300 and $129,837 at December 31, 2019 and 2018, respectively, are included in accrued expenses and compensation in the accompanying balance sheets.

Fixed Assets and Long-Lived Assets

Fixed assets are recorded at cost and depreciated using the straight-line method over the estimated useful life of each asset. Expenditures for repairs and maintenance are charged to expense as incurred. On disposal, the related assets and accumulated depreciation are eliminated from the accounts and any resulting gain or loss is included in the Company's statement of operations. Leasehold improvements are amortized over the shorter of the estimated useful life of the improvement or the remaining term of the lease.

The Company periodically evaluates the recoverability of its fixed assets and other long-lived assets whenever events or changes in circumstances indicate that an event of impairment may have occurred. This periodic review may result in an adjustment of estimated depreciable lives or asset impairment. When indicators of impairment are present, the carrying values of the asset are evaluated in relation to the assets operating performance and future undiscounted cash flows of the underlying assets. If the future undiscounted cash flows are less than their book value, an impairment may exist. The impairment is measured as the difference between the book value and the fair value of the underlying asset. Fair values are based on estimates of the market prices and assumptions concerning the amount and timing of estimated future cash flows and assumed discount rates, reflecting varying degrees of perceived risk.

Accounting for Stock-Based Compensation

Stock-based compensation cost is generally recognized ratably over the requisite service period. The Company uses the Black-Scholes option pricing model for determining the fair value of its stock options and amortizes its stock-based compensation expense using the straight-line method. The Black-Scholes model requires certain assumptions that involve judgment. Such assumptions are the expected share price volatility, expected life of options, expected annual dividend yield, and risk-free interest rate (See Note 3 - Stock-Based Compensation).

Advertising and Promotional Costs

Advertising and promotional costs are expensed as incurred. Advertising and promotion expense were $1,652,171 and $5,766,982, in 2019 and 2018, respectively.

Recently Issued or Adopted Accounting Pronouncements

In February 2016, the FASB issued Accounting Standards Update No. 2016-02, *Leases (Topic 842)* ("ASU 2016-02"). ASU 2016-02 requires that lessees recognize virtually all of their leases on the balance sheet, by recording a right-of-use asset and lease liability. The provisions of this guidance are effective for annual periods beginning after December 15, 2018, and for interim periods therein. We adopted ASU 2016-02, using the modified retrospective method, upon its effective date of January 1, 2019. The impact of adoption was an increase to long-term assets and total liabilities of approximately $2.0 million as of January 1, 2019.

In May 2014, the FASB and the International Accounting Standards Board ("IASB") jointly issued Accounting Standards Update ("ASU") No. 2014-09, *Revenue from Contracts with Customers* ("ASU 2014-09"), a comprehensive new revenue recognition standard that superseded nearly all existing revenue recognition guidance. We adopted this standard effective January 1, 2018, applying the modified retrospective method. Upon adoption, we discontinued revenue deferral under the sell-through model and commenced recording revenue upon delivery to distributors, net of estimated returns. The impact of adoption was a credit to accumulated deficit of $0.3 million as of January 1, 2018.

ITEM 8. Financial Statements and Supplementary Data

The information required by this item may be found on pages F-1 through F-24 of this Annual Report on Form 10-K.

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

Not Applicable.

ITEM 9A. Controls and Procedures

(a) Evaluation of disclosure controls and procedures.

Our principal executive officer and principal financial officer, after evaluating the effectiveness of our disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) as of the end of the period covered by this Form 10-K, have concluded that, based on such evaluation, our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms, and is accumulated and communicated to our management, including our principal executive and principal financial officers, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

(b) Management's Report on Internal Control Over Financial Reporting.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. Under the supervision and with the participation of our management, including our Chief Executive Officer and our Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2019 based on the criteria in *Internal Control — Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on our evaluation under the framework in *Internal Control — Integrated Framework* (2013) issued by the COSO, our management concluded that our internal control over financial reporting was effective as of December 31, 2019.

This Annual Report on Form 10-K does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our independent registered public accounting firm pursuant to rules of the SEC that permit us to provide only management's report in this Annual Report on Form 10-K.

(c) Changes in internal control over financial reporting.

There have been no changes to our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the year ended December 31, 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. Other Information

As previously disclosed, in 2017 we received a Civil Investigative Demand (CID) from the FTC. The CID requested information in connection with an FTC review for compliance of our representations about Quell with Sections 5 and 12 of the FTC Act. During 2017, 2018 and 2019, we responded to requests for information by FTC. We met with FTC on multiple occasions in 2019 to discuss our responses. Currently, we are actively engaged with FTC to achieve resolution of this matter. This would include a consent order that, among other provisions, would prohibit us from making certain claims in our advertising about Quell, and a monetary judgment that would be payable to the FTC. Final resolution of this matter is uncertain, and terms related to potential resolution cannot be reasonably estimated at this time.

On January 24, 2020, we entered into Amendment No. 12 to our Shareholder Rights Agreement ("Amendment No. 12") with American Stock Transfer & Trust Company, LLC dated as of March 7, 2007, as amended. Amendment No. 12 extends the term of the Shareholder Rights Agreement by an additional year. The foregoing description of Amendment No. 12 is subject to, and is qualified in its entirety by reference to, the full text of Amendment No. 12, a copy of which is set forth as Exhibit 4.2.12 to this Annual Report on Form 10-K and is incorporated herein by reference.

On January 20, 2020, our Board of Directors approved the Amended and Restated Management Retention and Incentive Plan attached hereto as Exhibit 10.17 and incorporated herein by reference.

PART III

ITEM 10. Directors, Executive Officers and Corporate Governance

The response to this item is incorporated by reference from the discussion responsive thereto under the captions “Management and Corporate Governance” and “Corporate Code of Conduct and Ethics” in our proxy statement for the 2020 annual meeting of stockholders.

ITEM 11. Executive Compensation

The response to this item is incorporated by reference from the discussion responsive thereto under the caption “Executive Officer and Director Compensation” in our proxy statement for the 2020 annual meeting of stockholders.

ITEM 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The response to this item is incorporated by reference from the discussion responsive thereto under the captions “Security Ownership of Certain Beneficial Owners and Management” and “Equity Compensation Plan Information” in our proxy statement for the 2020 annual meeting of stockholders.

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

The response to this item is incorporated by reference from the discussion responsive thereto under the captions “Certain Relationships and Related Person Transactions” and “Management and Corporate Governance” in our proxy statement for the 2020 annual meeting of stockholders.

ITEM 14. Principal Accounting Fees and Services

The response to this item is incorporated by reference from the discussion responsive thereto under the caption “Ratification of Appointment of Independent Registered Public Accounting Firm” in our proxy statement for the 2020 annual meeting of stockholders.

PART IV

ITEM 15. Exhibits and Financial Statement Schedule

(a) 1. *Financial Statements*

The financial statements are listed in the accompanying index to financial statements on page F-1.

2. *Financial Statement Schedule*

The financial statement schedule is listed in the accompanying index to financial statements on page F-1. Other financial statement schedules required under this Item and Item 8 are omitted because they are not applicable or the required information is shown in the financial statements or the footnotes thereto.

3. *Exhibit Index*

The following is a list of exhibits filed as part of this Annual Report on Form 10-K:

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
3.1.1	Third Amended and Restated Certificate of Incorporation of NeuroMetrix, Inc. dated July 27, 2004		S-8 (Exhibit 4.1)	8/9/2004	333-118059
3.1.2	Certificate of Designations for Series A Junior Cumulative Preferred Stock, par value $0.001 per share, dated March 7, 2007		8-A12(b) (Exhibit 3.1)	3/8/2007	001-33351
3.1.3	Certificate of Amendment to Restated Certificate of Incorporation of NeuroMetrix, Inc. dated September 1, 2011		8-K (Exhibit 3.1)	9/1/2011	001-33351
3.1.4	Certificate of Amendment to Restated Certificate of Incorporation of NeuroMetrix, Inc. dated February 15, 2013		8-K (Exhibit 3.1)	2/15/2013	001-33351
3/1/2005	Certificate of Amendment to Restated Certificate of Incorporation of NeuroMetrix, Inc. dated December 1, 2015		8-K (Exhibit 3.1)	12/1/2015	001-33351
3.1.6	Certificate of Amendment ti Restated Certificate of Incorporation of NeuroMetrix, Inc. dated May 11, 2017		8-K (Exhibit 3.1)	5/12/2017	001-33351
3.1.7	Certificate of Amendment to Restated Certificate of Incorporation of NeuroMetrix, Inc. dated November 18, 2019		8-K (Exhibit 3.1)	11/18/2019	001-33351
3.1.8	Certificate of Designation of Preferences, Rights and Limitations of Series A-1 Convertible Preferred Stock, par value $0.001 per share, dated June 5, 2013		8-K (Exhibit 3.1)	6/6/2013	001-33351
3.1.9	Certificate of Designation of Preferences, Rights and Limitations of Series A-2 Convertible Preferred Stock, par value $0.001 per share, dated June 5, 2013		8-K (Exhibit 3.2)	6/6/2013	001-33351
3.1.10	Certificate of Designation of Preferences, Rights and Limitations of Series A-3 Convertible Preferred Stock, par value $0.001 per share, dated June 24, 2014		8-K (Exhibit 3.1)	6/25/2014	001-33351

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
3.1.11	Certificate of Designation of Preferences, Rights and Limitations of Series A-4 Convertible Preferred Stock, par value $0.001 per share, dated June 24, 2014		8-K (Exhibit 3.2)	6/25/2014	001-33351
3.1.12	Certificate of Designation of Preferences, Rights and Limitations of Series B Convertible Preferred Stock, par value $0.001 per share, dated May 26, 2015		8-K (Exhibit 3.1)	5/29/2015	001-33351
3.1.13	Certificate of Designation of Preferences, Rights and Limitations of Series C Convertible Preferred Stock, par value $0.001 per share, dated December 30, 2015		8-K (Exhibit 3.1)	12/30/2015	001-33351
3.1.14	Certificate of Designation of Preferences, Rights and Limitations of Series D Convertible Preferred Stock, par value $0.001 per share, dated June 3, 2016		8-K (Exhibit 3.1)	6/3/2016	001-33351
3.1.15	Certificate of Designation of Preferences, Rights and Limitations of Series E Convertible Preferred Stock, par value $0.001 per share, dated December 28, 2016		8-K (Exhibit 3.1)	12/29/2016	001-33351
3.1.16	Certificate of Designation of Preferences, Rights and Limitations of Series F Convertible Preferred Stock, par value $0.001 per share, dated July 10, 2017		8-K (Exhibit 3.1)	7/11/2017	001-33351
3.2.1	Second Amended and Restated Bylaws of NeuroMetrix, Inc.		S-8 (Exhibit 4.2)	8/9/2004	333-118059
3.2.2	Amendment No. 1 to Second Amended and Restated Bylaws of NeuroMetrix, Inc.		8-K (Exhibit 3.1)	9/17/2007	001-33351
4.1	Description of Securities of the Registrant	X			
4.2	Specimen Certificate for Shares of Common Stock		S-1/A (Exhibit 4.1)	7/19/2004	333-115440
4.3.1	Shareholder Rights Agreement, dated as of March 7, 2007, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-A12(b) (Exhibit 4.1)	3/8/2007	001-33351
4.3.2	Amendment to Shareholder Rights Agreement, dated September 8, 2009, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.1)	9/14/2009	001-33351
4.3.3	Amendment No. 2 to Shareholder Rights Agreement, dated June 5, 2013, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.2)	6/6/2013	001-33351
4.3.4	Amendment No. 3 to Shareholder Rights Agreement, dated June 25, 2014, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.2)	6/25/2014	001-33351

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
4.3.5	Amendment No. 4 to Shareholder Rights Agreement, dated May 28, 2015, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		10-Q (Exhibit 4.1)	7/23/2015	001-33351
4.3.6	Amendment No. 5 to Shareholder Rights Agreement, dated December 29, 2015, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.3)	12/30/2015	001-33351
4.3.7	Amendment No. 6 to Shareholder Rights Agreement, dated June 3, 2016, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.2)	6/3/2016	001-33351
4.3.8	Amendment No. 7 to Shareholder Rights Agreement, dated December 28, 2016, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.2)	12/29/2016	001-33351
4.3.9	Amendment No. 8 to Shareholder Rights Agreement, dated February 8, 2017, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		10-K (Exhibit 4.2.9)	2/8/2017	001-33351
4.3.10	Amendment No. 9 to Shareholder Rights Agreement, dated July 10, 2017, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		8-K (Exhibit 4.2)	7/11/2017	001-33351
4.3.11	Amendment No. 10 to Shareholder Rights Agreement, dated February 5, 2018, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		10-K (Exhibit 4.2.11)	2/8/2018	001-33351
4.3.12	Amendment No. 11 to Shareholder Rights Agreement, dated January 21, 2019, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent		10-K (Exhibit 4.2.11)	1/24/2019	001-33351
4.3.13	Amendment No. 12 to Shareholder Rights Agreement, dated January 27, 2020, between NeuroMetrix, Inc. and American Stock Transfer & Trust Company, as Rights Agent	X			
4.4.1	Form of Unit Warrant to purchase Common Stock (February 2012)		S-1/A (Exhibit 4.5)	1/31/2012	333-178165
4.4.2	Form of Placement Agent Warrant (February 2012)		S-1/A (Exhibit 4.6)	1/31/2012	333-178165
4.5	Form of Common Stock Purchase Warrant (June 2013)		8-K/A (Exhibit 4.1)	6/7/2013	001-33351
4.6	Form of Common Stock Purchase Warrant (June 2014)		8-K (Exhibit 4.1)	6/25/2014	001-33351
4.7.1	Form of Warrant (2015) issued as part of a Unit on May 29, 2015		S-1/A (Exhibit 4.3)	5/4/2015	333-188133
4.7.2	Form of Underwriter's Warrant (2015) issued on May 29, 2015		S-1/A (Exhibit 4.5)	4/13/2015	333-188133
4.8	Form of Series A Common Stock Purchase Warrant (December 2015)		8-K (Exhibit 4.1)	12/30/2015	001-33351

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
4.9	Form of Series B Common Stock Purchase Warrant (December 2015)		8-K (Exhibit 4.2)	12/30/2015	001-33351
4.10	Form of Common Stock Purchase Warrant (June 2016)		8-K (Exhibit 4.1)	6/3/2016	001-33351
4.11	Form of Common Stock Purchase Warrant (December 2016)		8-K (Exhibit 4.1)	12/29/2016	001-33351
Lease Agreements					
10.1.1	Lease Agreement, dated August 27, 2014, between Cummings Properties, LLC and NeuroMetrix, Inc.		10-Q (Exhibit 10.1)	10/28/2014	011-33351
10.1.2	Lease Agreement, dated September 10, 2014, between, Boston Properties, Inc. and NeuroMetrix, Inc.		10-Q (Exhibit 10.2)	10/28/2014	011-33351
10.1.3	Lease Extension #1, dated June 14, 2018, between Cummings Properties, LLC and NeuroMetrix, Inc.	**X**			
Credit Facilities, Loan and Equity Agreements					
10.2.1	Loan and Security Agreement between NeuroMetrix, Inc. and Comerica Bank, dated March 5, 2010		10-Q (Exhibit 10.1)	5/14/2010	001-33351
10.2.2	First Modification to Loan and Security Agreement between NeuroMetrix, Inc. and Comerica Bank, dated March 1, 2011		8-K (Exhibit 10.1)	3/3/2011	001-33351
10.2.3	Fifth Modification to Loan and Security Agreement between NeuroMetrix, Inc. and Comerica Bank, dated January 31, 2014		10-Q (Exhibit 10.1)	4/24/2014	001-33351
10.2.4	Sixth Modification to Loan and Security Agreement with Comerica Bank, dated January 23, 2015		10-Q (Exhibit 10.1)	4/24/2015	001-33351
10.2.5	Seventh Modification to Loan and Security Agreement with Comerica Bank, dated January 14, 2016		10-K (Exhibit 10.2.5)	2/12/2016	001-33351
10.2.6	Eighth Modification to Loan and Security Agreement with Comerica Bank, dated December 27, 2016		10-K (Exhibit 10.2.6)	2/9/2017	001-33351
10.2.7	Ninth Modification to Loan and Security Agreement with Comerica Bank, dated January 17, 2018		10-K (Exhibit 10.2.7)	2/8/2018	001-33351
10.2.8	Tenth Modification to Loan and Security Agreement with Comerica Bank, dated January 14, 2019		10-K (Exhibit 10.2.8)	1/24/2019	001-33351
10.2.9	Eleventh Modification to Loan and Security Agreement with Comerica Bank, dated March 25, 2019	X			
10.2.10	Twelfth Modification to Loan and Security Agreement with Comerica Bank, dated June 21, 2019	X			
10.2.11	Thirteenth Modification to Loan and Security Agreement with Comerica Bank, dated September 30, 2019	X			

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
10.2.12	Fourteenth Modification to Loan and Security Agreement with Comerica Bank, dated November 25, 2019	X			
10.2.13	Fifteenth Modification to Loan and Security Agreement with Comerica Bank, dated January 23, 2020	X			
10.3	Repurchase and Forfeiture Agreement by and between NeuroMetrix, Inc. and the parties named therein		10-Q (Exhibit 10.1)	7/23/2015	001-33351
10.4.1	Securities Purchase Agreement by and between NeuroMetrix, Inc. and the purchasers named therein, dated December 29, 2015		8-K (Exhibit 10.1)	12/30/2015	001-33351
10.4.2	Registration Rights Agreement by and between NeuroMetrix, Inc. and the purchasers named therein, dated December 29, 2015		8-K (Exhibit 10.2)	12/30/2015	001-33351
10.5.1	Securities Purchase Agreement by and between NeuroMetrix, Inc. and the purchasers named therein, dated June 2, 2016		8-K (Exhibit 10.1)	6/3/2016	001-33351
10.5.2	Registration Rights Agreement by and between NeuroMetrix, Inc. and the purchasers named therein, dated June 2, 2016		8-K (Exhibit 10.2)	6/3/2016	001-33351
10.6.1	Securities Purchase Agreement by and between NeuroMetrix, Inc. and the purchasers named therein, dated December 28, 2016		8-K (Exhibit 10.1)	12/29/2016	001-33351
10.6.2	Registration Rights Agreement by and between NeuroMetrix, Inc. and the purchasers named therein, dated December 28, 2016		8-K (Exhibit 10.2)	12/29/2016	001-33351
Equity Compensation Plans					
10.7+	Amended and Restated 1996 Stock Option/Restricted Stock Plan		S-1/A (Exhibit 10.2)	6/22/2004	333-115440
10.8.1+	Amended and Restated 1998 Equity Incentive Plan		S-1/A (Exhibit 10.3)	6/22/2004	333-115440
10.8.2+	Second Amendment to Amended and Restated 1998 Equity Incentive Plan		S-1 (Exhibit 10.18)	6/22/2004	333-115440
10.9.1+	Eleventh Amended and Restated 2004 Stock Option and Incentive Plan		14A (Appendix C)	1/18/2019	001-33351
10.9.2+	Form of Restricted Stock Agreement		10-Q (Exhibit 10.4)	5/14/2010	001-33351
10.9.3+	Form of Incentive Stock Option Agreement		10-Q (Exhibit 10.1)	11/15/2004	000-50856
10.9.4+	Form of Non-Qualified Stock Option Agreement For Company Employees		10-Q (Exhibit 10.2)	11/15/2004	000-50856
10.9.5+	Form of Non-Qualified Stock Option Agreement For Non-Employee Directors		10-Q (Exhibit 10.3)	11/15/2004	000-50856
10.10+	2009 Non-Qualified Inducement Stock Plan		S-8 (Exhibit 99.1)	6/3/2009	333-159712

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
10.11.1+	Fourth Amended and Restated 2010 Employee Stock Purchase Plan		14A (Appendix B)	3/9/2018	001-33351
Agreements with Executive Officers and Directors					
10.12+	Form of Indemnification Agreement between NeuroMetrix, Inc. and each of its directors		S-1/A (Exhibit 10.8)	6/22/2004	333-115440
10.13.1+	Employment Agreement, dated June 21, 2004, by and between NeuroMetrix, Inc. and Shai N. Gozani, M.D., Ph.D.		S-1/A (Exhibit 10.9)	6/22/2004	333-115440
10.13.2+	First Amendment to Employment Agreement dated December 31, 2008, by and between NeuroMetrix, Inc. and Shai N. Gozani, M.D., Ph.D.		10-K (Exhibit 10.11)	3/20/2009	001-33351
10.13.3+	Indemnification Agreement dated June 21, 2004, by and between Shai N. Gozani, M.D., Ph.D., and NeuroMetrix, Inc.		S-1/A (Exhibit 10.20)	6/22/2004	333-115440
10.13.4+	Employment Agreement dates December 31, 2019, by and between NeuroMetrix, Inc. and Shai N. Gozani, M.D., Ph.D., and NeuroMetrix	X			
10.14.1+	Indemnification Agreement, dated September 10, 2009, by and between NeuroMetrix, Inc. and Thomas T. Higgins		8-K (Exhibit 10.2)	9/15/2009	001-33351
10.14.2+	Employment Agreement, dated October 27, 2014 by and between NeuroMetrix, Inc. and Thomas T. Higgins		10-Q (Exhibit 10.4)	10/28/2014	001-33351
10.14.3+	Employment Agreement, dates December 31, 2019 by and between NeuroMetrix, Inc. and Thomas T. Higgins	X			
10.15.1+	Letter Agreement, dated August 14, 2014, between NeuroMetrix, Inc. and Francis X. McGillin		10-Q (Exhibit 10.5)	10/28/2014	001-33351
10.16+	Amended and Restated Management Retention and Incentive Plan, as modified, dated February 3, 2017		10-K (Exhibit 10.17)	2/9/2017	001-33351

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
Agreements with Respect to Collaborations, Licenses, Research and Development					
10.16.2+	Amended and Restated Management Retention and Incentive Plan, as modified, dated January 20, 2020	X			
10.17†	Manufacturing and Supply Agreement, dated as of August 2, 2006, by and between Parlex Polymer Flexible Circuits, Inc. and NeuroMetrix, Inc.		8-K (Exhibit 99.1)	8/2/2006	000-50856
10.18†	Asset Purchase Agreement, dated as of January 12, 2018, by and between Novartis Consumer Health S.A. and NeuroMetrix, Inc.		10-K (Exhibit 10.19)	2/8/2018	001-33351
10.19†	Development and Services Agreement, dated as of January 12, 2018, by and between Novartis Consumer Health S.A. and NeuroMetrix, Inc.		10-K (Exhibit 10.20)	2/8/2018	001-33351
10.20†	Contribution Agreement, dated as of December 22, 2017, by and between Quell Intellectual Property Corp., LLC and NeuroMetrix, Inc.		10-K (Exhibit 10.21)	2/8/2018	001-33351
10.21†	Amended and Restated Limited Liability Company Agreement of Quell Intellectual Property Corp., LLC, dated as of January 12, 2018, by and between Novartis Consumer Health S.A. and NeuroMetrix, Inc.		10-K (Exhibit 10.22)	2/8/2018	001-33351
10.22	NeuroMetrix License Agreement, dated as of December 21, 2017, by and between Quell Intellectual Property Corp., LLC and NeuroMetrix, Inc.		10-K (Exhibit 10.23)	2/8/2018	001-33351
10.23	GSK License Agreement, dated as of December 21, 2017, by and between Quell Intellectual Property Corp., LLC and NeuroMetrix, Inc.		10-K (Exhibit 10.24)	2/8/2018	001-33351
10.24	Assignment Agreement, dated as of January 12, 2018, by and between Novartis Consumer Health S.A. and NeuroMetrix, Inc.		10-K (Exhibit 10.25)	2/8/2018	001-33351
10.25*	Amendment No.1 to Development and Services Agreement, dated as of December 6, 2018, by and between GSK Consumer Health S.A. and NeuroMetrix, Inc.		10-K (Exhibit 10.26)	1/24/2019	001-33351
23.1	Consent of Moody, Famiglietti & Andronico, LLP, an independent registered public accounting firm.	X			
31.1	Certification of Principal Executive Officer under Section 302 of the Sarbanes-Oxley Act of 2002.	X			
31.2	Certification of Principal Accounting and Financial Officer under Section 302 of the Sarbanes-Oxley Act of 2002.	X			

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/ Registration Number
32	Certification of the Principal Executive Officer and the Principal Accounting and Financial Officer under Section 906 of the Sarbanes-Oxley Act of 2002.	X			
101	The following materials from NeuroMetrix, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2019, formatted in XBRL (Extensible Business Reporting Language): (i) Balance Sheets as of December 31, 2019 and 2018, (ii) Statements of Operations for the years ended December 31, 2019 and 2018, (iii) Statements of Changes in Stockholders' Equity for the years ended December 31, 2018 and 2017, (iv) Statements of Cash Flows for the years ended December 31, 2018 and 2017, and (v) Notes to Financial Statements.	X			

+ Indicates management contract or any compensatory plan, contract or arrangement.

† Confidential treatment has been granted with respect to certain portions of this Exhibit, which portions have been omitted and filed separately with the Securities and Exchange Commission as part of an application for confidential treatment pursuant to the Securities Exchange Act of 1934, as amended.

* Confidential treatment has been requested with respect to certain portions of this Exhibit, which portions have been omitted and filed separately with the Securities and Exchange Commission as part of an application for confidential treatment pursuant to the Securities Exchange Act of 1934, as amended.

SIGNATURES

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

NEUROMETRIX, INC.

By: /s/ SHAI N. GOZANI, M.D., PH.D.

Shai N. Gozani, M.D., Ph.D.
Chairman, President and Chief Executive Officer

Date: January 27, 2020

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant on January 27, 2020 in the capacities indicated below.

Name	Title
/s/ SHAI N. GOZANI, M.D., PH.D. Shai N. Gozani, M.D., Ph.D.	Chairman, President and Chief Executive Officer (Principal Executive Officer)
/s/ THOMAS T. HIGGINS Thomas T. Higgins	Senior Vice President, Chief Financial Officer and Treasurer (Principal Financial Officer and Principal Accounting Officer)
/s/ DAVID E. GOODMAN, M.D. David E. Goodman, M.D.	Director
/s/ NANCY E. KATZ Nancy E. Katz	Director
/s/ TIMOTHY R. SURGENOR Timothy R. Surgenor	Director
/s/ DAVID VAN AVERMAETE David Van Avermaete	Director

INDEX TO FINANCIAL STATEMENTS

NeuroMetrix, Inc.

Years ended December 31, 2019 and 2018

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of NeuroMetrix, Inc.

Opinion on the Financial Statements

We have audited the accompanying balance sheets of NeuroMetrix, Inc. (the Company) as of December 31, 2019 and 2018, and the related statements of operations, changes in stockholders' equity, and cash flows for each of the years then ended, and the related notes and schedule (collectively referred to as the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Going Concern Uncertainty

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the financial statements, the Company has suffered recurring losses from operations, negative cash flows from operating activities and has an accumulated deficit that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

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

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

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

We have served as the Company's auditor since 2017.

/s/ Moody, Famiglietti, & Andronico, LLP

Moody, Famiglietti, & Andronico, LLP
Tewksbury, Massachusetts
January 27, 2020

NeuroMetrix, Inc.

Balance Sheets

	December 31,	
	2019	**2018**
Assets		
Current assets:		
Cash and cash equivalents	$ 3,126,206	$ 6,780,429
Accounts receivable, net of allowances of $70,000 and $25,000 at December 31, 2019 and 2018, respectively	298,967	1,082,957
Inventories	1,163,714	2,861,864
Collaboration receivable	189,008	—
Prepaid expenses and other current assets	652,919	860,915
Total current assets	5,430,814	11,586,165
Fixed assets, net	273,448	407,339
Right to use asset	1,159,774	1,968,062
Other long-term assets	29,650	30,314
Total assets	$ 6,893,686	$ 13,991,880
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 725,658	$ 1,298,084
Accrued expenses and compensation	1,443,574	1,659,173
Accrued product returns	689,000	1,101,658
Lease obligation, current	588,546	577,460
Deferred collaboration income	—	1,956,522
Total current liabilities	3,446,778	6,592,897
Lease obligation, net of current portion	916,674	1,301,172
Total liabilities	4,363,452	7,894,069
Commitments and contingencies (Note 8)		
Stockholders' equity		
Preferred stock	—	—
Convertible preferred stock	1	18
Common stock, $0.0001 par value; 25,000,000 and 100,000,000 authorized at December 31, 2019 and 2018; 1,400,674 and 738,029 shares issued and outstanding at December 31, 2019 and 2018, respectively	140	74
Additional paid-in capital	197,319,698	197,114,310
Accumulated deficit	(194,789,605)	(191,016,591)
Total stockholders' equity	2,530,234	6,097,811
Total liabilities and stockholders' equity	$ 6,893,686	$ 13,991,880

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

NeuroMetrix, Inc.

Statements of Operations

	Years Ended December 31,	
	2019	**2018**
Revenues	$ 9,272,522	$ 16,090,138
Cost of revenues	7,026,899	8,707,082
Gross profit	2,245,623	7,383,056
Operating expenses:		
Research and development	3,101,976	5,134,592
Sales and marketing	4,755,168	9,698,753
General and administrative	5,923,190	4,841,278
Total operating expenses	13,780,334	19,674,623
Loss from operations	(11,534,711)	(12,291,567)
Other income:		
Collaboration income	7,716,667	12,255,704
Other income	45,030	59,468
Total other income	7,761,697	12,315,172
Net income (loss) applicable to common stockholders:	(3,773,014)	23,605
Net income (loss) per common share applicable to common stockholders:		
Basic	$ (3.90)	$ 0.03
Diluted	$ (3.90)	$ 0.02

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

NeuroMetrix, Inc.

Statements of Changes in Stockholders' Equity

	Series B – F Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated Deficit	Total
	Number of Shares	Amount	Number of Shares	Amount			
Balance at December 31, 2017	29,479.98	$ 30	270,590	$ 27	$ 196,355,386	$ (191,338,054)	$ 5,017,389
Stock-based compensation expense	—	$ —	—	$ —	$ 446,077	$ —	$ 446,077
Issuance of common stock upon conversion of preferred stock	(11,966.35)	$ (12)	443,680	$ 44	$ (32)	$ —	$ —
Common stock issued to settle employee incentive compensation obligations	—	$ —	21479	$ 2	$ 294,262	$ —	$ 294,264
Issuance of common stock under employee stock purchase plan	—	$ —	2,280	$ 1	$ 18,617	$ —	$ 18,618
Adoption of ASC606		$ —	—	$ —		$ 297,858	$ 297,858
Net income	—	$ —	—	$ —	$ —	$ 23,605	$ 23,605
Balance at December 31, 2018	17,513.63	$ 18	738,029	$ 74	$ 197,114,310	$ (191,016,591)	$ 6,097,811
Stock-based compensation expense	—	$ —	—	$ —	$ 190,331	$ —	$ 190,331
Issuance of common stock upon conversion of preferred stock	(17,313.63)	$ (17)	658,314	$ 65	$ (48)	$ —	$ —
Issuance of common stock under employee stock purchase plan	—	$ —	4,331	$ 1	$ 15,105	$ —	$ 15,106
Net loss	—	$ —	—	$ —	$ —	$ (3,773,014)	$ (3,773,014)
Balance at December 31, 2019	200.00	$ 1	1,400,674	$ 140	$ 197,319,698	$ (194,789,605)	$ 2,530,234

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

NeuroMetrix, Inc.

Statements of Cash Flows

	Years Ended December 31,	
	2019	**2018**
Cash flows for operating activities:		
Net income (loss)	$ (3,773,014)	$ 23,605
Adjustments to reconcile net income (loss) to net cash (used in) provided by operating activities:		
Depreciation and amortization	124,012	169,712
Stock-based compensation	190,331	446,077
Allowance for doubtful accounts	49,361	—
Impairment charge against right of use asset	400,000	—
Inventory provision	2,595,884	—
Changes in operating assets and liabilities:		
Accounts receivable	734,629	1,319,871
Inventories	(897,734)	(719,303)
Collaboration receivable	(189,008)	—
Prepaid expenses and other current and long-term assets	243,536	358,661
Accounts payable	(572,426)	572,153
Accrued expenses and compensation	(157,644)	(408,687)
Accrued product returns	(412,658)	(856,898)
Deferred collaboration income	(1,956,522)	1,956,522
Net cash (used in) provided by operating activities	(3,621,253)	2,861,713
Cash flows for investing activities:		
Purchases of fixed assets	(48,076)	(143,583)
Net cash used in investing activities	(48,076)	(143,583)
Cash flows from financing activities:		
Net proceeds from issuance of stock	15,106	18,618
Net cash provided by financing activities	15,106	18,618
Net (decrease) increase in cash and cash equivalents	(3,654,223)	2,736,748
Cash and cash equivalents, beginning of year	6,780,429	4,043,681
Cash and cash equivalents, end of year	$ 3,126,206	$ 6,780,429
Supplemental disclosure of cash flow information:		
Common stock issued to settle employee incentive compensation obligations	$ —	$ 294,264

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

1. Description of Business and Basis of Presentation

NeuroMetrix, Inc (the Company) develops and commercializes health care products that utilize non-invasive neurostimulation and digital medicine. Revenues are derived from the sale of medical devices and after-market consumable products and accessories. The Company's products are sold in the United States and select overseas markets. They are cleared by the U.S. Food and Drug Administration (FDA) and regulators in foreign jurisdictions where appropriate. The Company has two primary products. DPNCheck® is a point-of-care test for diabetic peripheral neuropathy which is the most common long-term complication of Type 2 diabetes. Quell is an app-enabled, over-the-counter wearable device for chronic pain.

In January 2018, the Company entered a collaboration with GlaxoSmithKline ("GSK") under terms of which GSK acquired the rights to Quell outside the United States and committed to a joint development program. The initial term of the GSK collaboration runs through 2020. Through December 31, 2019, GSK made development milestone payments of approximately $20.5 million to the Company in addition to co-funding the 2019 development program. Commercialization milestones totaling approximately $4.5 million are payable under the GSK collaboration when and if product launch occurs in pre-defined countries.

The accompanying financial statements have been prepared on a basis which assumes that the Company will continue as a going concern and which contemplates the realization of assets and satisfaction of liabilities and commitments in the normal course of business. The Company has suffered recurring losses from operations and negative cash flows from operating activities. At December 31, 2019, the Company had an accumulated deficit of $194.8 million. These factors raise substantial doubt about the Company's ability to continue as a going concern for the one-year period from the date of issuance of these financial statements. The financial statements do not include any adjustments that might result from the outcome of this uncertainty. At December 31, 2019, the Company held cash and cash equivalents of $3.1 million. The Company believes that these resources and the cash to be generated from future product sales will be sufficient to meet its projected operating requirements into the second quarter of 2020. Accordingly, the Company will need to raise additional funds to support its operating and capital needs in the second quarter of 2020 and beyond. The Company continues to face significant challenges and uncertainties and, as a result, the Company's available capital resources may be consumed more rapidly than currently expected due to (a) decreases in sales of the Company's products and the uncertainty of future revenues from new products; (b) changes the Company may make to the business that affect ongoing operating expenses; (c) changes the Company may make in its business strategy; (d) regulatory developments affecting the Company's existing products; (e) changes the Company may make in its research and development spending plans; and (f) other items affecting the Company's forecasted level of expenditures and use of cash resources. The Company may attempt to obtain additional funding from a public or private financing, collaborative arrangements with strategic partners, divestiture of assets or through additional credit lines or other debt financing sources to increase the funds available to fund operations. However, the Company may not be able to secure such financing in a timely manner or on favorable terms, if at all. Furthermore, if the Company issues equity or debt securities to raise additional funds, its existing stockholders may experience dilution, and the new equity or debt securities may have rights, preferences and privileges senior to those of the Company's existing stockholders. If the Company raises additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to its potential products or to proprietary technologies, or grant licenses on terms that are not favorable to the Company. Without additional funds, the Company may be forced to delay, scale back or eliminate some of its sales and marketing efforts, research and development activities, or other operations and potentially delay product development in an effort to provide sufficient funds to continue its operations. If any of these events occurs, the Company's ability to achieve its development and commercialization goals would be adversely affected.

2. Summary of Significant Accounting Policies

Use of Estimates and Assumptions

The preparation of financial statements in conformity with United States generally accepted accounting principles requires management to make significant estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during reporting periods. Actual results could differ from those estimates.

2. Summary of Significant Accounting Policies - (continued)

The Company bases its estimates on historical experience and various other assumptions that it believes to be reasonable under the circumstances and regularly assesses these estimates, but actual results could differ materially from these estimates. Effects of changes in estimates are recorded in the period in which they occur.

Cash and Cash Equivalents

The Company considers all highly liquid investments with an original maturity of ninety days or less to be cash equivalents. Cash equivalents are recorded at cost which approximates fair value. The Company invests cash primarily in a money market account and other investments which management believes are subject to minimal credit and market risk.

Concentrations of Credit Risk

Financial instruments that potentially expose the Company to concentrations of credit risk consist primarily of cash and cash equivalents in bank deposit accounts and trade receivables. The Company invests its funds in highly rated institutions and limits its investment in any individual account so that they do not exceed FDIC limits. The Company has not experienced significant losses related to cash and cash equivalents and does not believe it is exposed to any significant credit risks relating to its cash and cash equivalents.

At December 31, 2019 and 2018, two customers accounted for 42% and 45% of accounts receivable, respectively. One customer accounted for 19% of revenues for the year ended December 31, 2019 and two customers accounted for 23% of revenues, for the year ended December 31, 2018.

The Company relies on in-house assembly and four third-party manufacturers to manufacture the major portion of its current products and product components. The disruption or termination of the supply of these products or a significant increase in the cost of these products from these sources could have an adverse effect on the Company’s business, financial position, and results of operations.

Inventories

Inventories, consisting primarily of finished goods and purchased components, are stated at the lower of cost or net realizable value. Cost is determined using the first-in, first-out method. The Company writes down inventory to its net realizable value for excess or obsolete inventory. The realizable value of inventories is based upon the types and levels of inventories held, forecasted demand, pricing, competition, and changes in technology. The Company's consumable electrodes and biosensors have an eighteen to twenty-four month shelf life. Should current market and economic conditions deteriorate, our actual recoveries could be less than our estimates.

Fair Value

The carrying amounts of the Company’s accounts receivable, accounts payable, and accrued expenses approximate their fair value at December 31, 2019 and 2018 due to the short-term nature of these assets and liabilities. The Company’s cash equivalents are carried at fair value determined according to the fair value hierarchy described in Note 9.

Revenue Recognition

Revenues include product sales, net of estimated returns. Revenue is measured as the amount of consideration the Company expects to receive in exchange for product transferred. Revenue is recognized when contractual performance obligations have been satisfied and control of the product has been transferred to the customer. In most cases, the Company has a single product delivery performance obligation. Accrued product returns are estimated based on historical data and evaluation of current information.

Accounting Standards Update (“ASU”) No. 2014-09, Revenue from Contracts with Customers (“ASU 2014-09”), is a comprehensive revenue recognition standard that superseded nearly all existing revenue recognition guidance. The Company adopted this standard effective January 1, 2018, applying the modified retrospective method. Upon adoption, the Company

2. Summary of Significant Accounting Policies - (continued)

discontinued revenue deferral under the sell-through model and commenced recording revenue upon delivery to distributors, net of estimated returns.

Accounts Receivable

Accounts receivable are recorded net of the allowance for doubtful accounts receivable. The allowance for doubtful accounts is the Company's best estimate of the amount of probable credit losses in its existing accounts receivable. The Company reviews the allowance for doubtful accounts and determines the allowance based on an analysis of customer past payment history, product usage activity, and recent communications with the customer. Individual customer balances which are past due and over 90 days outstanding are reviewed individually for collectability. Account balances are written-off against the allowance when the Company feels it is probable the receivable will not be recovered. The Company does not have any off-balance sheet credit exposure related to its customers. Allowance for doubtful accounts was $70,000 as of December 31, 2019 and 25,000 as of December 31, 2018.

Income Taxes

The Company records income taxes using the asset and liability method. Deferred income tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective income tax bases, and operating loss and tax credit carryforwards. The Company's financial statements contain certain deferred tax assets, which have arisen primarily as a result of operating losses, as well as other temporary differences between financial and tax accounting. In accordance with the provisions of the Income Taxes topic of the Codification, the Company is required to establish a valuation allowance if the likelihood of realization of the deferred tax assets is reduced based on an evaluation of objective verifiable evidence. Significant management judgment is required in determining the Company's provision for income taxes, the Company's deferred tax assets and liabilities and any valuation allowance recorded against those net deferred tax assets. The Company evaluates the weight of all available evidence to determine whether it is more likely than not that some portion or all of the net deferred income tax assets will not be realized.

Utilization of the NOL and research and development credit carryforwards may be subject to a substantial annual limitation due to ownership change limitations that have occurred previously or that could occur in the future, as provided by Section 382 of the Internal Revenue Code of 1986, as well as similar state provisions. Ownership changes may limit the amount of NOL and tax credit carryforwards that can be utilized to offset future taxable income and tax, respectively. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain shareholders or public groups in the stock of a corporation by more than 50 percentage points over a three-year period. If the Company has experienced a change of control, utilization of its NOL or tax credits carryforwards would be subject to an annual limitation under Section 382. Any limitation may result in expiration of a portion of the NOL or research and development credit carryforwards before utilization. Subsequent ownership changes could further impact the limitation in future years. Further, until a study is completed and any limitation known, no amounts are being presented as an uncertain tax position. A full valuation allowance has been provided against the Company's NOL carryforwards and research and development credit carryforwards and, if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the balance sheet or statement of operations if an adjustment were required.

Management performed a two-step evaluation of all tax positions, ensuring that these tax return positions meet the "more likely than not" recognition threshold and can be measured with sufficient precision to determine the benefit recognized in the financial statements. These evaluations provide management with a comprehensive model for how a company should recognize, measure, present, and disclose in its financial statements certain tax positions that the Company has taken or expects to take on income tax returns.

Research and Development

Costs incurred in research and development are expensed as incurred. Included in research and development costs are wages, benefits, product design consulting, and other operating costs such as facilities, supplies, and overhead directly related to the Company's research and development efforts.

2. Summary of Significant Accounting Policies - (continued)

Collaboration income

Collaboration income is recognized within Other Income when contractual performance obligations, outside the ordinary activities of the Company, have been satisfied and control has been transferred to a collaboration partner. Collaboration income for each performance obligation is based on relative fair value of the overall transaction price. A deferred collaboration income liability is recorded when payments are received prior to satisfaction of performance obligations.

Product Warranty Costs

The Company accrues estimated product warranty costs at the time of sale which are included in cost of sales in the statements of operations. The amount of the accrued warranty liability is based on historical information such as past experience, product failure rates, number of units repaired, and estimated cost of material and labor. The liabilities for product warranty costs of $75,300 and $129,837 at December 31, 2019 and 2018, respectively, are included in accrued expenses and compensation in the accompanying balance sheets.

Fixed Assets and Long-Lived Assets

Fixed assets are recorded at cost and depreciated using the straight-line method over the estimated useful life of each asset. Expenditures for repairs and maintenance are charged to expense as incurred. On disposal, the related assets and accumulated depreciation are eliminated from the accounts and any resulting gain or loss is included in the Company’s statement of operations. Leasehold improvements are amortized over the shorter of the estimated useful life of the improvement or the remaining term of the lease.

The Company periodically evaluates the recoverability of its fixed assets and other long-lived assets whenever events or changes in circumstances indicate that an event of impairment may have occurred. This periodic review may result in an adjustment of estimated depreciable lives or asset impairment. When indicators of impairment are present, the carrying values of the asset are evaluated in relation to the assets operating performance and future undiscounted cash flows of the underlying assets. If the future undiscounted cash flows are less than their book value, an impairment may exist. The impairment is measured as the difference between the book value and the fair value of the underlying asset. Fair values are based on estimates of the market prices and assumptions concerning the amount and timing of estimated future cash flows and assumed discount rates, reflecting varying degrees of perceived risk.

Accounting for Stock-Based Compensation

Stock-based compensation cost is generally recognized ratably over the requisite service period. The Company uses the Black-Scholes option pricing model for determining the fair value of its stock options and amortizes its stock-based compensation expense using the straight-line method. The Black-Scholes model requires certain assumptions that involve judgment. Such assumptions are the expected share price volatility, expected life of options, expected annual dividend yield, and risk-free interest rate (See Note 3 — Stock-Based Compensation).

2. Summary of Significant Accounting Policies - (continued)

Net Income (Loss) per Common Share

Basic and dilutive net income (loss) per common share were as follows:

	Years Ended December 31,	
	2019	2018
Net income (loss) applicable to common stockholders	$ (3,773,014)	$ 23,605
Weighted average number of common shares outstanding, basic	968,116	710,457
Dilutive convertible preferred stock	—	678,100
Weighted average number of common shares outstanding, dilutive	968,116	1,388,557
Net income (loss) per common share applicable to common stockholders, basic	$ (3.90)	$ 0.03
Net income (loss) per common share applicable to common stockholders, diluted	$ (3.90)	$ 0.02

The following potentially dilutive weighted average number of common stock equivalents were excluded from the calculation of diluted net income (loss) per common share because their effect was anti-dilutive for each of the periods presented:

	Years Ended December 31,	
	2019	2018
Options	38,936	44,199
Warrants	44,534	45,937
Convertible preferred stock	478,184	—
Total	561,654	90,136

Advertising and Promotional Costs

Advertising and promotional costs are expensed as incurred. Advertising and promotion expense were $1,652,171 and $5,766,982, in 2019 and 2018, respectively.

Accumulated Other Comprehensive Items

For 2019 and 2018, the Company had no components of other comprehensive income or loss other than net income (loss).

Segments

The Company operates in one segment for the sale of medical equipment and consumables. Substantially all of the Company’s assets, revenues, and expenses for 2019 and 2018 were located at or derived from operations in the United States. Revenues from sales outside the United States accounted for approximately 13% and 12% of total revenues in 2019 and 2018, respectively.

Risks and Uncertainties

The Company is subject to risks common to companies in the medical device industry, including, but not limited to, development by the Company or its competitors of new technological innovations, dependence on key personnel, customers’ reimbursement from third-party payers, protection of proprietary technology, and compliance with regulations of the FDA, FTC and other governmental agencies.

2. Summary of Significant Accounting Policies - (continued)

Recently Issued or Adopted Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update No. 2016-02, *Leases (Topic 842)* ("ASU 2016-02"). ASU 2016-02 requires that lessees recognize virtually all of their leases on the balance sheet, by recording a right-of-use asset and lease liability. The Company adopted ASU 2016-02, using the modified retrospective method, upon its effective date of January 1, 2019. The impact of adoption was an increase to long-term assets and total liabilities of approximately $1.9 million as of January 1, 2019.

The following table summarizes the effects of adopting ASU 2016-02 on the Company's balance sheet as of December 31, 2019:

	As reported	Adjustments	Amounts under prior GAAP
Assets			
Prepaid expenses and other current assets	$ 652,919	$ 20,910	$ 673,829
Total current assets	$ 5,430,814	$ 20,910	$ 5,451,724
Right of use asset	$ 1,159,774	$ (1,159,774)	$ —
Other long-term assets	$ 29,650	$ 33,645	$ 63,295
Total assets	$ 6,893,686	$ (1,105,219)	$ 5,788,467
Liabilities			
Lease obligation - current	$ 588,546	$ (188,545)	$ 400,001
Total current liabilities	$ 3,446,778	$ (188,545)	$ 3,258,233
Lease obligation - net of current portion	$ 916,674	$ (916,674)	$ —
Total liabilities	$ 4,363,452	$ (1,105,219)	$ 3,258,233

The following table summarizes the effects of adopting ASU 2016-02 on the Company's balance sheet as of December 31, 2018

	As reported	Adjustments	Amounts under prior GAAP
Assets			
Prepaid expenses and other current assets	$ 860,915	$ 44,852	$ 905,767
Total current assets	$ 11,586,165	$ 44,852	$ 11,631,017
Right of use asset	$ 1,968,062	$ (1,968,062)	$ —
Other long-term assets	$ 30,314	$ 44,578	$ 74,892
Total assets	$ 13,991,880	$ (1,878,632)	$ 12,113,248
Liabilities			
Lease obligation - current	$ 577,460	$ (577,460)	$ —
Total current liabilities	$ 6,592,897	$ (577,460)	$ 6,015,437
Lease obligation - net of current portion	$ 1,301,172	$ (1,301,172)	$ —
Total liabilities	$ 7,894,069	$ (1,878,632)	$ 6,015,437

2. Summary of Significant Accounting Policies - (continued)

Adoption of ASU 2016-02 had no impact on the Company's statements of operations, statements of changes in stockholders' equity and statements of cash flows.

In May 2014, the FASB and the International Accounting Standards Board ("IASB") jointly issued Accounting Standards Update ("ASU") No. 2014-09, *Revenue from Contracts with Customers* ("ASU 2014-09"), a comprehensive new revenue recognition standard that superseded nearly all existing revenue recognition guidance. We adopted this standard effective January 1, 2018, applying the modified retrospective method. Upon adoption, we discontinued revenue deferral under the sell-through model and commenced recording revenue upon delivery to distributors, net of estimated returns. The impact of adoption was a credit to accumulated deficit of $0.3 million as of January 1, 2018.

3. Stock-Based Compensation

The Company's 2004 Stock Option and Incentive Plan was amended and restated most recently in 2019. At a Special Meeting of Stockholders held on November 12, 2019, the stockholders of the Company approved the Company's Eleventh Amended and Restated 2004 Stock Option and Incentive Plan (the "2004 Stock Plan"), which, among other things, increased the number of shares of the Company's common stock authorized for issuance thereunder by 327,000 shares. The 2004 Stock Plan, among other things, provides for granting of incentive and nonqualified stock option and stock bonus awards to officers, employees and outside consultants. Outstanding options under the 2004 Stock Plan generally vest over four years and terminate 10 years after the grant date, or earlier if the option holder is no longer an executive officer, employee, consultant, advisor or director, as applicable, of the Company. As of December 31, 2019, 439,890 shares of common stock were authorized for issuance under the 2004 Stock Plan, of which 24,500 shares had been issued, 164,980 shares were subject to outstanding options at a weighted average exercise price of $7.16 per share and 250,410 shares were available for future grant.

The Company's 2009 Non-Qualified Inducement Stock Plan (the "2009 Inducement Plan") is intended to encourage and enable employees, including prospective employees, of the Company upon whose judgment, initiative, and efforts the Company largely depends for the successful conduct of its business to acquire a proprietary interest in the Company. The 2009 Inducement Plan, among other things, provides for the granting of awards, including non-qualified stock options, restricted stock, and unrestricted stock. As of December 31, 2019, 1,250 shares of common stock were authorized for issuance and were available for future grant under the 2009 Inducement Plan.

The exercise price of stock options awarded under the 2004 Stock Plan and the 2009 Inducement Plan may not be less than the fair value of the common stock on the date of the option grant. For holders of more than 10% of the Company's total combined voting power of all classes of stock, incentive stock options may not be granted at less than 110% of the fair value of the Company's common stock at the date of grant and for a term not to exceed five years.

The Company's 2010 Employee Stock Purchase Plan was amended and restated most recently in 2018. The 2010 ESPP authorizes an annual increase on the first day of each of the Company's fiscal years equal to the lesser of (i) 2,500 shares, (ii) 1 percent of the shares of common stock outstanding on the last day of the immediately preceding fiscal year, or (iii) such lesser number of shares as is determined by the Board. All of the Company's full-time employees and certain part-time employees are eligible to participate in the 2010 ESPP. For part-time employees to be eligible, they must have customary employment of more than five months in any calendar year and more than 20 hours per week. Employees who, after exercising their rights to purchase shares under the 2010 ESPP, would own shares representing 5% or more of the voting power of the Company's common stock, are ineligible to participate.

Under the 2010 ESPP, participating employees can authorize the Company to withhold up to 10% of their earnings during consecutive six-month payment periods for the purchase of the shares. At the conclusion of each period, participating employees can purchase shares at 85% of the lower of their fair value at the beginning or end of the period. The 2010 ESPP is regarded as a compensatory plan. For the years ended December 31, 2019 and 2018 the Company issued 4,331 and 2,280 shares of its common stock, respectively, under the 2010 ESPP. As of December 31, 2019, there were 10,946 remaining shares to be issued under the 2010 ESPP.

3. Stock-Based Compensation - (continued)

The Company uses the Black-Scholes option pricing model for determining the fair value of shares of common stock issued or to be issued under the 2010 ESPP. The following assumptions are used in determining fair value: The risk-free interest rate assumption is based on the United States Treasury's constant maturity rate for a six month term (corresponding to the expected option term) on the date the option was granted. The expected dividend yield is zero because the Company does not currently pay dividends nor expects to do so during the expected option term. An expected term of six months is used based on the duration of each plan offering period. The volatility assumption is based on a consideration of stock price volatility over the most recent period of time corresponding to the expected term and is also based on expected future stock price volatility.

The weighted average grant-date fair value of stock options used in the calculation of stock-based compensation expense in the accompanying statement of operations for the years ended December 31, 2019 and 2018 is calculated using the following assumptions:

	Years Ended December 31,	
	2019	2018
Risk-free interest rate	1.9%	2.2 - 3.0%
Expected dividend yield	—	—
Expected option term	10 years	3 - 5 years
Volatility	72.4%	70.0%

The risk-free interest rate assumption is based on the United States Treasury's constant maturity rate for a three or five year term (corresponding to the expected option term) on the date the option was granted. The expected dividend yield is zero as the Company does not currently pay dividends nor expects to do so during the expected option term. The expected option term of three to five years is estimated based on an analysis of actual option exercises. The volatility assumption is based on daily historical volatility during the time period that corresponds to the expected option term and expected future stock price volatility. The pre-vesting forfeiture rate is based on the historical and projected average turnover rate of employees.

A summary of option activity for the year ended December 31, 2019 is presented below:

	Number of Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Outstanding at December 31, 2018	49,410	$ 40.84		
Granted	150,000	4.58		
Exercised	—	—		
Forfeited	(34,420)	38.69		
Expired	(10)	19,713.00		
Outstanding at December 31, 2019	164,980	$ 7.16	9.3	$ —
Vested or expected to vest at December 31, 2019	164,980	$ 7.16	9.3	$ —
Exercisable at December 31, 2019	13,086	$ 34.54	2.0	$ —

Expected to vest options are determined by applying the pre-vesting forfeiture rate to the total outstanding options. Aggregate intrinsic value represents the total pre-tax intrinsic value (the aggregate difference between the closing stock price of the Company's common stock as of December 31, 2019, as applicable, and the exercise price for the in-the-money options) that would have been received by the option holders if all the in-the-money options had been exercised on December 31, 2019.

The weighted average per share grant-date fair values of options granted during 2019 and 2018 was $4.58 and $17.10, respectively.

The aggregate intrinsic value of options issued or exercised during 2019 and 2018 was $0.

3. Stock-Based Compensation - (continued)

Total unrecognized stock-based compensation costs related to non-vested stock options was $545,459, which related to 164,980 shares with a per share weighted fair value of $7.16 as of December 31, 2019. This unrecognized cost is expected to be recognized over a weighted average period of approximately 1.0 year.

Cash received from option exercises and purchases under the 2004 ESPP and the 2010 ESPP for 2019 and 2018, was $15,106 and $18,618, respectively. The Company issues new shares upon option exercises, purchases under the Company's ESPPs, and vesting of restricted stock.

The Company recorded stock-based compensation expense of $190,331 and $446,077 for 2019 and 2018, respectively.

4. Inventories

Inventories consist of the following:

	December 31,	
	2019	2018
Purchased components	$ 720,209	$ 1,767,674
Finished goods	443,505	1,094,190
	$ 1,163,714	$ 2,861,864

The Company recorded inventory and supplier excess commitment charges of $2,595,884 (see note 13 - Business Restructuring) and zero for the years ended December 31, 2019 and 2018, respectively, to reflect its estimated net realizable value.

5. Fixed Assets

Fixed assets consist of the following:

	Estimated Useful Life (Years)	December 31,	
		2019	2018
Computer and laboratory equipment	3	$ 905,966	$ 857,889
Furniture and equipment	3	241,413	241,413
Production equipment	7	216,000	327,000
Leasehold improvements	*	141,485	141,485
		1,504,864	1,567,787
Less – accumulated depreciation		(1,231,416)	(1,160,448)
		$ 273,448	$ 407,339

* Lesser of life of lease or estimated useful life.

Depreciation expense was $124,012 and $169,712 for 2019 and 2018, respectively.

6. Accrued Expenses and Compensation

Accrued expenses and compensation consist of the following for the years ended December 31, 2019 and 2018:

	December 31,	
	2019	2018
Technology fees	$ 450,000	$ 450,000
Supplier excess commitments	—	160,000
Professional services	454,000	391,000
Compensation	62,322	223,756
Advertising and promotion	68,000	171,000
Warranty	75,300	129,837
Other	333,952	133,580
	$ 1,443,574	$ 1,659,173

7. Income Taxes

Current income tax expense (benefit) attributable to continuing operations was zero for the years ended December 31, 2019 and 2018.

The Company's effective income tax rate differs from the statutory federal income tax rate as follows for the years ended December 31, 2019 and 2018.

	Years Ended December 31,	
	2019	2018
Federal tax provision (benefit) rate	(21.0)%	(21.0)%
State tax provision, net of federal provision	19.9	(19.6)
Permanent items	1.1	(315.0)
Federal research and development credits	—	659.2
382 Limitation - NOL and tax credits	861.5	—
Change in statutory tax rate	—	—
Valuation allowance	(861.5)	(303.6)
Effective income tax rate	—	—

The Company's deferred tax assets consist of the following:

	December 31,	
	2019	2018
Deferred tax assets:		
Net operating loss carryforwards	$ 1,592,993	$ 31,239,750
Research and development credit carryforwards	—	2,599,358
Accrued expenses	96,030	965,191
Inventory reserve	306,855	—
Stock-based compensation	222,420	227,843
Other	(9,455)	9,158
Total gross deferred tax assets	2,208,843	35,041,300
Valuation allowance	(2,208,843)	(35,041,300)
Net deferred tax assets	$ —	$ —

7. Income Taxes - (continued)

At December 31, 2019, the Company has federal and state net operating loss carryforwards ("NOL") of $147.3 million and $50.9 million, respectively, as well as federal and state tax credits of $1.7 million and $0.9 million, respectively, which may be available to reduce future taxable income and related taxes. This amount includes tax benefits of $2.5 million and $75,000 attributable to NOL and tax credit carryforwards, respectively, that result from the exercise of employee stock options. The Company experienced an ownership change in 2019, which significantly reduced the tax benefits associated with these carryforwards under Internal Revenue Code Sections 382 and 383. The federal NOLs, the state NOLs, and the federal and state research and development credits each begin to expire in 2020.

In accordance with the provisions of the Income Taxes topic of the Codification, the Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of net operating losses. Management has determined that it is more likely than not that the Company will not recognize the benefits of federal and state deferred tax assets and, as a result, a valuation allowance of $2.2 million and $35.0 million has been established at December 31, 2019 and 2018, respectively. The Company experienced a change in control during 2019. Accordingly, utilization of their respective consolidated and/ or separately computed NOL's and/ or tax credit carryforwards is subject to an annual limitation for federal tax purposes under Internal Revenue Code Sections 382 and 383. Due to this change in control, the Company estimates that approximately $143,300,000 of federal NOL's and/or tax credit carryforwards are effectively eliminated according to the Internal Revenue Code Sections 382 and 383 limitations. A large portion of state NOLs and/ or tax credit carry forwards are also eliminated. As a result of these eliminations, the Company's federal net operating loss and credit carryforwards are reduced to approximately $5,700,000 and $0 respectively, before valuation allowance. State credit carryforwards are reduced to zero. The Company files tax returns as prescribed by the tax laws of the jurisdictions in which it operates. In the normal course of business, the Company is subject to examination by federal and state jurisdictions, where applicable. There are currently no pending income tax examinations. The Company's tax years are still open under statute from December 31, 2016 to the present. Earlier years may be examined to the extent that tax credit or net operating loss carryforwards are used in future periods. The Company's policy is to record interest and penalties related to income taxes as part of its income tax provision.

8. Commitments and Contingencies

Operating Leases

The Company's lease on its Woburn, Massachusetts manufacturing facilities (the "Woburn Lease") extends through September 2025 at a monthly base rent of $13,846 and with a 5-year extension option. In September 2014, the Company entered into a 7-year operating lease agreement with one 5-year extension option for its corporate office and product development activities in Waltham, Massachusetts (the "Waltham Lease"). The term of the Waltham Lease commenced on February 20, 2015 and includes fixed payment obligations that escalate over the initial lease term. Average monthly base rent under the 7-year lease is approximately $41,074. During 2019 the Company consolidated its operations within the Woburn facility and is offering the Waltham facility for sublet. At December 31, 2019, the Company had an impairment charge of $400,000 that reduced the right of use asset for idle facility costs.

8. Commitments and Contingencies - (continued)

The following is a maturity analysis of the annual undiscounted cash flows of the operating lease liabilities as of December 31, 2019:

2020	$	641,193
2021		653,164
2022		247,347
2023		165,785
2024		165,785
2025		117,431
Total minimum lease payments	$	1,990,705
Weighted-average discount rate, 14.7%	$	485,485
Lease obligation, current portion		588,546
Lease obligation, net of current portion		916,674
	$	1,990,705

Total recorded rent expense was $664,098 and $627,732, for 2019 and 2018, respectively. The Company records rent expense on its facility leases on a straight-line basis over the lease term. Weighted average remaining operating lease term was 3.5 years as of December 31, 2019.

Other Contingencies

As previously disclosed, in 2017 we received a Civil Investigative Demand (CID) from the FTC. The CID requested information in connection with an FTC review for compliance of our representations about Quell with Sections 5 and 12 of the FTC Act. During 2017, 2018 and 2019, we responded to requests for information by FTC. We met with FTC on multiple occasions in 2019 to discuss our responses. Currently, we are actively engaged with FTC to achieve resolution of this matter. This would include a consent order that, among other provisions, would prohibit us from making certain claims in our advertising about Quell, and a monetary judgment that would be payable to the FTC. Final resolution of this matter is uncertain, and terms related to potential resolution cannot be reasonably estimated at this time.

9. Fair Value Measurements

The following tables present information about the Company's assets and liabilities that are measured at fair value on a recurring basis for the periods presented and indicates the fair value hierarchy of the valuation techniques it utilized to determine such fair value. In general, fair values determined by Level 1 inputs utilize quoted prices (unadjusted) in active markets for identical assets or liabilities. Fair values determined by Level 2 inputs utilize data points that are observable such as quoted prices, interest rates, and yield curves. Fair values determined by Level 3 inputs are unobservable data points for the asset or liability, and include situations where there is little, if any, market activity for the asset or liability.

		Fair Value Measurements at December 31, 2019 Using		
	December 31, 2019	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents	$ 698,807	$ 698,807	$ —	$ —
Total	$ 698,807	$ 698,807	$ —	$ —

9. Fair Value Measurements - (continued)

		Fair Value Measurements at December 31, 2018 Using		
	December 31, 2018	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents	$ 4,284,928	$ 4,284,928	$ —	$ —
Total	$ 4,284,928	$ 4,284,928	$ —	$ —

10. Retirement Plan

The Company has established a 401(k) defined contribution savings plan for its employees who meet certain service period and age requirements. Contributions are permitted up to the maximum allowed under the Internal Revenue Code of each covered employee's salary. The savings plan permits the Company to contribute at its discretion. In 2019 and 2018 the Company made no contributions to the plan.

11. Credit Facility

The Company is party to a Loan and Security Agreement, or the Credit Facility, with a bank. As of December 31, 2019, the Credit Facility permitted the Company to borrow up to $2.5 million on a revolving basis. The Credit Facility was subsequently amended, most recently on January 23, 2020 and extended until April 30, 2020. The facility was lowered to $250,000 and secured by a cash pledge in the same amount. Amounts borrowed under the Credit Facility will bear interest equal to the prime rate plus 0.5%. Any borrowings under the Credit Facility will be collateralized by the Company's cash, accounts receivable, inventory, and equipment. The Credit Facility also includes traditional lending and reporting covenants. These include certain financial covenants applicable to liquidity that are to be maintained by the Company. As of December 31, 2019, the Company was in compliance with these covenants and had not borrowed any funds under the Credit Facility. However, $226,731 of the amount under the Credit Facility is restricted to support letters of credit issued in favor of the landlords of the Company's facilities. Consequently, the amount available for borrowing under the Credit Facility as of December 31, 2019 was approximately $2.3 million.

12. Stockholder's Equity - (continued)

12. Stockholders' Equity

Preferred stock and convertible preferred stock consist of the following:

	December 31,	
	2019	2018
Preferred stock, $0.001 par value; 5,000,000 shares authorized at December 31, 2019 and 2018; no shares issued and outstanding at December 31, 2019 and 2018	$ —	$ —
Series B convertible preferred stock, $0.001 par value, 147,000 shares designated at December 31, 2019 and 2018, and 200 shares issued and outstanding at December 31, 2019 and 2018, respectively	1	1
Series D convertible preferred stock, $0.001 par value, 21,300 shares designated at December 31, 2019 and 2018, and zero and 14,052.93 shares issued and outstanding at December 31, 2019 and 2018, respectively	—	14
Series E convertible preferred stock, $0.001 par value, 7,000 designated at December 31, 2019 and 2018, and zero and 3,260.70 shares issued and outstanding at December 31, 2019 and 2018, respectively	—	3
Series F convertible preferred stock, $0.001 par value, 10,621 shares designated at December 31, 2019 and 2018, and no shares issued and outstanding at December 31, 2019 and 2018, respectively	—	—

Preferred stock activity

As of December 31, 2019, 200.00 shares of Series B Preferred Stock remained outstanding. In 2019, 14,052.93 shares of the Series D Preferred Stock were converted into a total of 534,333 shares of Common Stock. As of December 31, 2019, zero shares of Series D Preferred Stock remained outstanding. In 2019, 3,260.70 shares of the Series F Preferred Stock were converted into a total of 123,981 shares of Common Stock. As of December 31, 2019, zero shares of Series E Preferred Stock remained outstanding. As of December 31, 2019, zero shares of Series F Preferred Stock remained outstanding.

In 2018, 300.00 shares of the Series B Preferred Stock were converted into a total of 93 shares of Common Stock. As of December 31, 2018, 200.00 shares of Series B Preferred Stock remained outstanding. In 2018, 3,739.3 shares of the Series E Preferred Stock were converted into a total of 142,178 shares of Common Stock. As of December 31, 2018, 3,260.70 shares of Series E Preferred Stock remained outstanding. In 2018, 7,927.05 shares of the Series F Preferred Stock were converted into a total of 301,409 shares of Common Stock. As of December 31, 2018, zero shares of Series F Preferred Stock remained outstanding.

Other equity activity

In 2018, the Company issued shares of fully vested common stock in partial settlement of management incentive compensation. The 2018 issuance totaled 21,479 shares with a value of $294,264 reflecting the $13.70 closing price of the Company's common stock as reported on the Nasdaq Capital Market on April 12, 2018.

As of December 31, 2019, the Company had 25,000,000 shares of common stock authorized and 1,400,674 shares issued and outstanding. Each share of common stock entitles the holder to one vote on all matters submitted to a vote of the Company's stockholders. Common stockholders are not entitled to receive dividends unless declared by the Board of Directors.

12. Stockholder's Equity - (continued)

At December 31, 2019, the Company has reserved authorized shares of common stock for future issuance as follows:

Warrants	41,627
Outstanding stock options	164,980
Possible future issuance under inducement plan	1,250
Possible future issuance under stock option plans	250,410
Possible future issuance under employee stock purchase plan	10,946
Total	469,213

13. Business Restructuring

The second quarter 2019 business restructuring involved a charge against operations of $2,345,657. The restructuring included a reduction in force affecting eleven employees and severance costs of $224,773. It included a consolidation of the Company's corporate offices and engineering labs into its Woburn manufacturing facility and attendant relocation costs of $225,000. It also included inventory-related costs totaling $1,895,884 to write down excess parts to net realizable value. During the fourth quarter of 2019, the provision for idle Waltham facility held for sublet was increased to $400,000. As of December 31, 2019, the restructuring was completed. There Company had an impairment charge of $400,000 for idle Waltham facilities held for sublet. This impairment charge is recorded against the Company’s right to use asset.

The severance and relocation obligations relating to the business restructuring outstanding as of December 31, 2019 are presented below.

	December 31, 2019
Severance obligations:	
Provision	224,773
Amounts paid out	(224,773)
Total	—
Relocation costs:	
Provision	100,000
Amounts paid out	(100,000)
Total	—
Impairment charge for idle facility	400,000
Total	400,000
Balance - December 31, 2019	400,000

Within the Company's Statements of Operations for the year ended December 31, 2019, $1,895,884 of inventory-related write-downs were recorded within cost of revenues, and severance and relocations costs were recorded as follows: $311,514 within research and development, $221,387 within sales and marketing, and $191,872 within general and administrative.

14. Reverse Stock Split

On November 18, 2019, the Company effected a 1-for-10 reverse stock split of its Common Stock, or the Reverse Stock Split. The par value and other terms of the common stock were not effected by the Reverse Stock Split. The Company's shares outstanding immediately prior to the split totaled 9,781,755, which were subsequently adjusted to 978,158 shares outstanding. No fractional shares will be issued in connection with the reverse stock split. Stockholders who otherwise would be entitled to receive fractional shares will receive payment in cash in lieu of any such resulting fractional shares of common stock as the post-reverse split amounts of common stock will be rounded down to the nearest full share. Share, per share, and stock option amounts for all periods presented within the financial statements contained in the Annual Report on Form 10-K have been retroactively adjusted to reflect the Reverse Stock Split.

15. Management Retention and Incentive Plan

Under the Company's Management Retention and Incentive Plan (the "Plan"), a portion of the consideration payable upon a change in control transaction, as defined in the Plan and its amendments, would be paid in cash to certain executive officers and key employees and recorded as compensation expense within the Statement of Operations during the period in which the change of control transaction occurs.

Schedule II — Valuation and Qualifying Accounts

Description	Balance at Beginning of Period	Charged to costs and expenses	Charged to other accounts	Recoveries/ (Deductions)		Balance at End of Period
December 31, 2019						
Allowance for Doubtful Accounts	$ 25,000	49,361	—	(4,361)		$ 70,000
Deferred Tax Asset Valuation Allowance	35,041,300	1,535,093	—	(34,367,550)	(1)	2,208,843
Accrued Product Returns	1,101,658		—	(412,658)		689,000
Warranty Reserve	129,837	—	—	(54,537)		75,300
December 31, 2018						
Allowance for Doubtful Accounts	$ 25,000	8,374	—	(8,374)		$ 25,000
Deferred Tax Asset Valuation Allowance	35,331,314	269,241	—	(559,255)	(1)	35,041,300
Accrued Product Returns	1,486,406	—	—	(384,748)		1,101,658
Warranty Reserve	127,361	2,476	—	—		129,837

(1)Expiration of Federal and State Net Operating Loss Carryforwards and other reductions.

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

As of December 31, 2019, NeuroMetrix, Inc. had three classes of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"): (i) common stock, $0.0001 par value per share ("Common Stock"); (ii) rights to purchase shares of preferred stock, par value $0.001 per share ("Preferred Stock Purchase Rights"), and (iii) warrants to purchase Common Stock.

Unless the context otherwise requires, all references to "we", "us", the "Company", or "NeuroMetrix" in this Exhibit 4.1 refer to NeuroMetrix, Inc.

DESCRIPTION OF CAPITAL STOCK

The following description of our securities is intended as a summary only and is qualified in its entirety by reference to our amended and restated certificate of incorporation, amended and restated bylaws, and shareholder rights agreement, as amended, which are filed as exhibits to the annual report on Form 10-K of which this Exhibit 4.1 is a part. We refer in this section to our amended and restated certificate of incorporation as our certificate of incorporation, and we refer to our amended and restated bylaws as our bylaws.

Authorized Capitalization

Our authorized capital stock consists of 25,000,000 shares of Common Stock and 5,000,000 shares of preferred stock, $0.001 par value per share ("Preferred Stock") in one or more series. As of December 31, 2019, we had outstanding 1,400,674 shares of our Common Stock and 200 shares of our Series B Convertible Preferred Stock. At that date, we also had an aggregate of 164,980 shares of Common Stock reserved for issuance upon exercise of outstanding stock options granted under our stock incentive plans, and an aggregate of 41,627 shares of Common Stock reserved for issuance upon the exercise of outstanding warrants to purchase Common Stock.

Transfer Agent and Registrar. The transfer agent for our Common Stock and outstanding shares of Preferred Stock is American Stock Transfer & Trust Company.

Listing. Our Common Stock is traded on the Nasdaq Capital Market under the symbol "NURO" and our warrants to purchase shares of Common Stock are listed under the symbol "NUROW" on the Nasdaq Capital Market.

Common Stock

The holders of our Common Stock are generally entitled to one vote for each share held on all matters submitted to a vote of the stockholders and do not have any cumulative voting rights. Except as may be required by law and in connection with some significant actions, such as mergers, consolidations, or amendments to our certificate of incorporation that affect the rights of stockholders, holders of our Common Stock vote together as a single class. There is no cumulative voting in the election of our directors, which means that, subject to any rights to elect directors that are granted to the holders of any class or series of Preferred Stock, a plurality of the votes cast at a meeting of stockholders at which a quorum is present is sufficient to elect a director. Holders of our Common Stock are entitled to receive proportionally any dividends declared by our Board of Directors, subject to any preferential dividend rights of outstanding Preferred Stock.

Subject to the preferential rights of any other class or series of stock, all shares of our Common Stock have equal dividend, distribution, liquidation and other rights, and have no preference, appraisal or exchange rights, except for any appraisal rights provided by Delaware law. Furthermore, holders of our Common Stock have no conversion, sinking fund or redemption rights, or preemptive rights to subscribe for any of our securities. Our certificate of incorporation and bylaws do not restrict the ability of a holder of our Common Stock to transfer his or her shares of our Common Stock.

In the event of our liquidation or dissolution, holders of our Common Stock are entitled to share ratably in all assets remaining after payment of all debts and other liabilities, subject to the prior rights of any outstanding Preferred Stock. Holders of our Common Stock have no preemptive, subscription, sinking fund, redemption, exchange or conversion rights. The Common Stock, when issued, will be duly authorized, fully paid and nonassessable.

Preferred Stock

Pursuant to our certificate of incorporation, we are authorized to issue "blank check" Preferred Stock, which may be issued from time to time in one or more series upon authorization by our Board of Directors. Our Board of Directors, without further approval of the stockholders, is authorized to fix the designations, powers, including voting powers, preferences and the relative, participating, optional or other special rights of the shares of each series and any qualifications, limitations and restrictions thereof. The issuance of Preferred Stock, while providing flexibility in connection with possible acquisitions and other corporate purposes could, among other things, adversely affect the voting power or other rights of the holders of our Common Stock and, under certain circumstances, make it more difficult for a third party to gain control of us, discourage bids for our Common Stock at a premium or otherwise adversely affect the market price of the Common Stock.

The Preferred Stock will have the terms described below unless otherwise provided in the prospectus supplement relating to a particular series of the Preferred Stock. You should read the prospectus supplement relating to the particular series of the Preferred Stock being offered for the specific terms of that series, including:

- the designation and stated value per share of the Preferred Stock and the number of shares offered;
- the amount of liquidation preference per share, if any;
- the price at which the Preferred Stock will be issued;
- the dividend rate, or method of calculation of the dividend rate, if any, the dates on which dividends will be payable, whether dividends will be cumulative or noncumulative and, if cumulative, the dates from which dividends will commence to accumulate;

- any redemption or sinking fund provisions;
- if other than the currency of the United States, the currency or currencies, including composite currencies, in which the Preferred Stock is denominated and/or in which payments will or may be payable;
- any conversion provisions; and
- any other rights, preferences, privileges, limitations and restrictions on the Preferred Stock.

The Preferred Stock will, when issued, be duly authorized, fully paid and nonassessable. Unless otherwise specified in the applicable prospectus supplement, each series of the Preferred Stock will rank equally as to dividends and liquidation rights in all respects with each other series of Preferred Stock. The rights of holders of shares of each series of Preferred Stock will be subordinate to those of our general creditors.

Rank. Unless otherwise specified in the applicable prospectus supplement, the Preferred Stock, with respect to dividend rights and rights upon our liquidation, dissolution or winding up our affairs, ranks:

- senior to all classes or series of our Common Stock and to all equity securities ranking junior to such Preferred Stock with respect to dividend rights or rights upon our liquidation, dissolution or winding up our affairs;
- on a parity with all equity securities issued by us, the terms of which specifically provide that such equity securities rank on a parity with the Preferred Stock with respect to dividend rights or rights upon our liquidation, dissolution or winding up of our affairs; and
- junior to all equity securities issued by us, the terms of which specifically provide that such equity securities rank senior to the Preferred Stock with respect to dividend rights or rights upon our liquidation, dissolution or winding up of our affairs.

The term “equity securities” does not include convertible debt securities.

Dividends. Holders of the Preferred Stock of each series will be entitled to receive, when, as and if declared by our board of directors, cash dividends at such rates and on such dates descripted in the applicable prospectus supplement. Different series of Preferred Stock may be entitled to dividends at different rates or based on different methods of calculation. The dividend rate may be fixed or variable or both. Dividends will be payable to the holders of record as they appear on our stock books on record dates fixed by our board of directors, as specified in the applicable prospectus supplement.

Dividends on any series of the Preferred Stock may be cumulative or noncumulative, as described in the applicable prospectus supplement. If our board of directors does not declare a dividend payable on a dividend payment date on any series of noncumulative Preferred Stock, then the holders of that noncumulative Preferred Stock will have no right to receive a dividend for that dividend payment date, and we will have no obligation to pay the dividend accrued for that period, whether or not dividends on that series are declared payable on any future dividend payment dates. Dividends on any series of cumulative Preferred Stock will accrue from the date we initially issue shares of such series or such other date specified in the applicable prospectus supplement.

No full dividends may be declared or paid or funds set apart for the payment of any dividends on any parity securities unless dividends have been paid or set apart for payment on the Preferred Stock. If full dividends are not paid, the Preferred Stock will share dividends pro rata with the parity securities.

No dividends may be declared or paid or funds set apart for the payment of dividends on any junior securities unless full cumulative dividends for all dividend periods terminating on or prior to the date of the declaration or payment will have been paid or declared and a sum sufficient for the payment set apart for payment on the Preferred Stock.

Liquidation Preference. Upon any voluntary or involuntary liquidation, dissolution or winding up of our affairs, then, before we make any distribution or payment to the holders of any Common Stock or any other class or series of our capital stock ranking junior to the Preferred Stock in the distribution of assets upon any liquidation, dissolution or winding up of our affairs, the holders of each series of Preferred Stock shall be entitled to receive out of assets legally available for distribution to stockholders, liquidating distributions in the amount of the liquidation preference per share set forth in the applicable prospectus supplement, plus any accrued and unpaid dividends thereon. Such dividends will not include any accumulation in respect of unpaid noncumulative dividends for prior dividend periods. Unless otherwise specified in the applicable prospectus supplement, after payment of the full amount of their liquidating distributions, the holders of Preferred Stock will have no right or claim to any of our remaining assets. Upon any such voluntary or involuntary liquidation, dissolution or winding up, if our available assets are insufficient to pay the amount of the liquidating distributions on all outstanding Preferred Stock and the corresponding amounts payable on all other classes or series of our capital stock ranking on parity with the Preferred Stock and all other such classes or series of shares of capital stock ranking on parity with the Preferred Stock in the distribution of assets, then the holders of the Preferred Stock and all other such classes or series of capital stock will share ratably in any such distribution of assets in proportion to the full liquidating distributions to which they would otherwise be entitled.

Upon any liquidation, dissolution or winding up, and if we have made liquidating distributions in full to all holders of Preferred Stock, we will distribute our remaining assets among the holders of any other classes or series of capital stock ranking junior to the Preferred Stock according to their respective rights and preferences and, in each case, according to their respective number of shares. For such purposes, our consolidation or merger with or into any other corporation, trust or entity, or the sale, lease or conveyance of all or substantially all of our property or business will not be deemed to constitute a liquidation, dissolution or winding up of our affairs.

Redemption. If so provided in the applicable prospectus supplement, the Preferred Stock will be subject to mandatory redemption or redemption at our option, as a whole or in part, in each case upon the terms, at the times and at the redemption prices set forth in such prospectus supplement.

The prospectus supplement relating to a series of Preferred Stock that is subject to mandatory redemption will specify the number of shares of Preferred Stock that shall be redeemed by us in each year commencing after a date to be specified, at a redemption price per share to be specified, together with an amount equal to all accrued and unpaid dividends thereon to the date of redemption. Unless the shares have a cumulative dividend, such accrued dividends will not include any accumulation in respect of unpaid dividends for prior dividend periods. We may pay the redemption price in cash or other property, as specified in the applicable prospectus supplement. If the redemption price for Preferred Stock of any series is payable only from the net proceeds of the issuance of shares of our capital stock, the terms of such Preferred Stock may provide that, if no such shares of our capital stock shall have been issued or to the extent the net proceeds from any issuance are insufficient to pay in full the aggregate redemption price then due, such Preferred Stock shall

automatically and mandatorily be converted into the applicable shares of our capital stock pursuant to conversion provisions specified in the applicable prospectus supplement.

Notwithstanding the foregoing, we will not redeem any Preferred Stock of a series unless:

- if that series of Preferred Stock has a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full cumulative dividends on the Preferred Stock for the past and current dividend period; or

- if such series of Preferred Stock does not have a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full dividends for the current dividend period.

In addition, we will not acquire any Preferred Stock of a series unless:

- if that series of Preferred Stock has a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full cumulative dividends on all outstanding shares of such series of Preferred Stock for all past dividend periods and the then current dividend period; or

- if that series of Preferred Stock does not have a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full dividends on the Preferred Stock of such series for the then current dividend period.

However, at any time we may purchase or acquire Preferred Stock of that series (1) pursuant to a purchase or exchange offer made on the same terms to holders of all outstanding Preferred Stock of such series or (2) by conversion into or exchange for shares of our capital stock ranking junior to the Preferred Stock of such series as to dividends and upon liquidation.

If fewer than all of the outstanding shares of Preferred Stock of any series are to be redeemed, we will determine the number of shares that may be redeemed pro rata from the holders of record of such shares in proportion to the number of such shares held or for which redemption is requested by such holder or by any other equitable manner that we determine. Such determination will reflect adjustments to avoid redemption of fractional shares.

Unless otherwise specified in the applicable prospectus supplement, we will mail notice of redemption at least 30 days but not more than 60 days before the redemption date to each holder of record of Preferred Stock to be redeemed at the address shown on our stock transfer books. Each notice shall state:

- the redemption date;

- the number of shares and series of the Preferred Stock to be redeemed;

- the redemption price;

- the place or places where certificates for such Preferred Stock are to be surrendered for payment of the redemption price;

- that dividends on the shares to be redeemed will cease to accrue on such redemption date;

- the date upon which the holder’s conversion rights, if any, as to such shares shall terminate; and

- the specific number of shares to be redeemed from each such holder if fewer than all the shares of any series are to be redeemed.

If notice of redemption has been given and we have set aside the funds necessary for such redemption in trust for the benefit of the holders of any shares so called for redemption, then from and after the redemption date, dividends will cease to accrue on such shares, and all rights of the holders of such shares will terminate, except the right to receive the redemption price.

Voting Rights. Holders of Preferred Stock will not have any voting rights, except as described in the next paragraph, as otherwise from time to time required by law or as indicated in the applicable prospectus supplement.

Unless otherwise provided for any series of Preferred Stock, so long as any Preferred Stock of a series remains outstanding, we will not, without the affirmative vote or consent of the holders of at least two-thirds of the Preferred Stock of such series outstanding at the time, given in person or by proxy, either in writing or at a meeting with each of such series voting separately as a class:

- authorize, or create, or increase the authorized or issued amount of, any class or series of shares of capital stock ranking senior to such series of Preferred Stock with respect to payment of dividends or the distribution of assets upon liquidation, dissolution or winding up, or reclassify any of our authorized shares of capital stock into such shares, or create, authorize or issue any obligation or security convertible into or evidencing the right to purchase any such shares; or

- amend, alter or repeal the provisions of our restated certificate or the amendment to our certificate of incorporation designating the terms for such series of Preferred Stock, whether by merger, consolidation or otherwise, so as to materially and adversely affect any right, preference, privilege or voting power of such series of Preferred Stock or the holders thereof.

Notwithstanding the preceding bullet point, if the Preferred Stock remains outstanding with the terms thereof materially unchanged, the occurrence of any of the events described above shall not be deemed to materially and adversely affect the rights, preferences, privileges or voting power of holders of Preferred Stock, even if upon the occurrence of such an event we may not be the surviving entity. In addition, any increase in the amount of (1) authorized Preferred Stock or the creation or issuance of any other series of Preferred Stock, or (2) authorized shares of such series or any other series of Preferred Stock, in each case ranking on parity with or junior to the Preferred Stock of such series with respect to payment of dividends or the distribution of assets upon liquidation, dissolution or winding up, shall not be deemed to materially and adversely affect such rights, preferences, privileges or voting powers.

The foregoing voting provisions will not apply if, at or prior to the time when the act with respect to which such vote would otherwise be required will be effected, we have redeemed or called for redemption all outstanding shares of such series of Preferred Stock and, if called for redemption, have deposited sufficient funds in trust to effect such redemption.

Conversion Rights. The terms and conditions, if any, upon which any series of Preferred Stock is convertible into Common Stock will be set forth in the applicable prospectus supplement relating thereto. Such terms will include the number of shares of Common Stock into which the shares of Preferred Stock are convertible, the conversion price, rate or manner of calculation thereof, the conversion period, provisions as to whether conversion will be at our option or at the option of the holders of the Preferred Stock, the events requiring an adjustment of the conversion price and provisions affecting conversion in the event of the redemption.

Transfer Agent and Registrar. The transfer agent and registrar for the Preferred Stock will be set forth in the applicable prospectus supplement.

Series B Convertible Preferred Stock Outstanding

As of December 31, 2019, we had 200 shares of our Series B Convertible Preferred Stock with a stated value of $100 outstanding. The Series B Convertible Preferred Stock is convertible at the option of the holder into the number of shares of Common Stock determined by dividing the stated value by the adjusted conversion price of $333.30, which is subject to adjustment as provided in the Certificate of Designation for the Series B Preferred Stock, subject to a 9.99% ownership limitation. The Series B Convertible Preferred Stock has no dividend rights, liquidation preference or other preferences over Common Stock and has no voting rights except as provided in the Certificate of Designation, as filed with the Secretary of State of the State of Delaware, or as otherwise required by law. You should refer to the certificate of designation of preferences, rights and limitations of Series B Convertible Preferred Stock, which is included as exhibit to the annual report on Form 10-K.

Warrants Outstanding

As of December 31, 2019, we had warrants outstanding to purchase 41,627 shares of Common Stock at a weighted average exercise price of $400.00 per share. These warrants were issued in May 2015 and have a five-year term.

Shareholder Rights Plan

On March 7, 2007, we entered into a Rights Agreement with American Stock Transfer & Trust Company, as rights agent, and approved the declaration of a dividend distribution of one preferred share purchase right on each outstanding share of our Common Stock to shareholders of record as of the close of business on June 8, 2007. Each right entitles the registered holder to purchase from us [1.152] shares of our Series A Junior Convertible Preferred Stock at a price of [$75.00], subject to adjustment.

Initially, the rights are not exercisable and are attached to and trade with all shares of Common Stock outstanding as of, and issued subsequent to March 8, 2007. The rights will separate from the Common Stock and will become exercisable upon the earlier of (i) the close of business on the tenth calendar day following the first public announcement that a person or group of affiliated or associated persons, or an Acquiring Person, has acquired beneficial ownership of 15% or more of the outstanding shares of Common Stock, other than as a result of repurchases of stock by the Company or certain inadvertent actions by a shareholder or (ii) the close of business on the tenth business day (or such later day as our Board of Directors may determine) following the commencement of a tender offer or exchange offer that could result upon its consummation in a person or group becoming the beneficial owner of 15% or more of the outstanding shares of Common Stock.

The rights may be redeemed in whole, but not in part, at a price of $0.01 per right (payable in cash, Common Stock or other consideration deemed appropriate by our board) by the board only until the earlier of (i) the time at which any person becomes an Acquiring Person or (ii) the expiration date of the Rights Agreement. Immediately upon the action of the board ordering redemption of the rights, the rights will terminate and thereafter the only right of the holders of rights will be to receive the redemption price.

The rights will expire on March 8, 2021, unless previously redeemed or exchanged by the Company. The rights distribution was not taxable to stockholders.

The above summary of the Rights Agreement does not purport to be complete. You should refer to the Rights Agreement, as amended, which is included as an exhibit to the annual report on Form 10-K.

Certain Effects of Authorized but Unissued Stock

We have shares of Common Stock and Preferred Stock available for future issuance without stockholder approval. We may issue these additional shares for a variety of corporate purposes, including future public offerings to raise additional capital or facilitate corporate acquisitions or for payment as a dividend on our capital stock. The existence of unissued and unreserved Common Stock and Preferred Stock may enable our board of directors to issue shares to persons friendly to current management or to issue Preferred Stock with terms that could render more difficult or discourage a third-party attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise, thereby protecting the continuity of our management. In addition, if we issue Preferred Stock, the issuance could adversely affect the voting power of holders of Common Stock and the likelihood that such holders will receive dividend payments and payments upon liquidation.

Delaware Law and Certificate of Incorporation and Bylaws Provisions

Board of Directors. Our certificate of incorporation provides that:

- our Board of Directors is divided into three classes, as nearly equal in number as possible, to serve staggered terms so that approximately one-third of our board will be elected each year;
- subject to the rights of the holders of any class or series of Preferred Stock then outstanding, our directors may be removed (i) only with cause and (ii) only by the affirmative vote of the holders of at least seventy-five percent (75%) of the voting power of all of the then outstanding shares then entitled to vote at an election of directors voting together as a single class, unless otherwise specified by law; and
- any vacancy on our Board of Directors, however occurring, including a vacancy resulting from an enlargement of the board, may only be filled by vote of a majority of the directors then in office, even if less than a quorum, or by a sole remaining director, and not by the stockholders.

These provisions could discourage, delay or prevent a change in control of our company or an acquisition of our company at a price which many stockholders may find attractive. The existence of these provisions could limit the price that investors might be willing to pay in the future for shares of our

Common Stock. These provisions may also have the effect of discouraging a third party from initiating a proxy contest, making a tender offer or attempting to change the composition or policies of our Board of Directors.

Stockholder Action; Special Meeting of Stockholders. Our certificate of incorporation and bylaws also provide that:

- stockholder action may be taken only at a duly called and convened annual or special meeting of stockholders and then only if properly brought before the meeting;
- stockholder action may not be taken by written action in lieu of a meeting;
- special meetings of stockholders may be called only by our Board of Directors pursuant to a resolution approved by the affirmative vote of a majority of the directors then in office; and
- in order for any matter to be considered "properly brought" before a meeting, a stockholder must comply with requirements regarding specified information and advance notice to us.

These provisions could delay, until the next stockholders' meeting, actions which are favored by the holders of a majority of our outstanding voting securities. These provisions may also discourage another person or entity from making a tender offer for our Common Stock, because a person or entity, even if it acquired a majority of our outstanding voting securities, would be able to take action as a stockholder only at a duly called stockholders' meeting, and not by written consent.

Provisions of Delaware Law Governing Business Combinations. We are subject to the "business combination" provisions of Section 203 of the Delaware General Corporation Law. In general, such provisions prohibit a publicly held Delaware corporation from engaging in any "business combination" transactions with any "interested stockholder" for a period of three years after the date on which the person became an "interested stockholder," unless:

- prior to such date, the board of directors approved either the "business combination" or the transaction which resulted in the "interested stockholder" obtaining such status; or
- upon consummation of the transaction which resulted in the stockholder becoming an "interested stockholder," the "interested stockholder" owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the "interested stockholder") those shares owned by (a) persons who are directors and also officers and (b) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- at or subsequent to such time the "business combination" is approved by the board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock which is not owned by the "interested stockholder."

A "business combination" is defined to include mergers, asset sales and other transactions resulting in financial benefit to a stockholder. In general, an "interested stockholder" is a person who, together with affiliates and associates, owns 15% or more of a corporation's voting stock or within three years did own 15% or more of a corporation's voting stock. The statute could prohibit or delay mergers or other takeover or change in control attempts with respect to us and, accordingly, may discourage attempts to acquire us.

Indemnification. Our restated certificate provides that no director of our company shall be personally liable for any monetary damages for any breach of fiduciary duty as a director, except for liability (i) for any breach of the director's duty of loyalty to the company or its stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the General Corporation Law of the State of Delaware, or (iv) for any transaction from which the director derived an improper personal benefit. Our restated certificate also provides that if the General Corporation Law of the State of Delaware is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of our company shall be eliminated or limited to the fullest extent permitted by the General Corporation Law of the State of Delaware, as so amended. The restated certificate further provides that no amendment to or repeal of these provisions shall apply to or have any effect on the liability or alleged liability of any director for or with respect to any acts or omissions of such director occurring prior to such amendment or repeal. Our restated certificate further provides for the indemnification of our directors and officers to the fullest extent permitted by Section 145 of the Delaware General Corporation Law, including circumstances in which indemnification is otherwise discretionary.

AMENDMENT NO. 12 TO SHAREHOLDER RIGHTS AGREEMENT

This Amendment No. 12 to Shareholder Rights Agreement (the "***Amendment***"), dated as of January 27, 2020, by and between NeuroMetrix, Inc., a Delaware corporation (the "**Company**"), and American Stock Transfer & Trust Company, LLC (the "***Rights Agent***"), amends that certain Shareholder Rights Agreement, dated as of March 7, 2007, as previously amended, between the Company and the Rights Agent (as so amended, the "***Rights Agreement***").

WHEREAS, the Company and the Rights Agent are parties to the Rights Agreement; and

WHEREAS, the Company desires to extend the term of the Final Expiration Date (as defined in the Rights Agreement) by an additional year;

WHEREAS, pursuant to Section 27 of the Rights Agreement, the Company and the Rights Agent may from time to time supplement or amend the Rights Agreement subject to the terms of the Rights Agreement; and

WHEREAS, the Board of Directors of the Company has determined that an amendment to the Rights Agreement as set forth herein is necessary and desirable in connection with the foregoing and the Company and the Rights Agent desire to evidence such amendment in writing.

NOW, THEREFORE, in consideration of these premises and mutual agreements set forth herein, the parties agree as follows:

1. Amendment to Section 7. Section 7(a) of the Rights Agreement is amended by striking Section 7(a) thereof in its entirety and replacing it with the following:

"(a) Subject to Section 7(e) hereof, the registered holder of any Right Certificate may exercise the Rights evidenced thereby (except as otherwise provided herein) in whole or in part at any time after the Distribution Date upon surrender of the Right Certificate, with the form of election to purchase and the certificate on the reverse side thereof duly executed, to the Rights Agent at the office or offices of the Rights Agent designated for such purpose, together with payment of the aggregate Exercise Price for the total number of one ten-thousandths of a share of Preferred Stock (or other securities, cash or other assets, as the case may be) as to which such surrendered Rights

are then exercised, at or prior to the earlier of (i) the Close of Business on the fourteenth anniversary of the

Record Date (the "Final Expiration Date"), (ii) the time at which the Rights are redeemed as provided in Section 23 hereof (the "Redemption Date") or (iii) the time at which such Rights are exchanged as provided in Section 24 hereof (the "Exchange Date") (the earliest of (i), (ii) or (iii) being herein referred to as the "Expiration Date"). Except as set forth in Section 7(e) hereof and notwithstanding any other provision of this Agreement, any Person who prior to the Distribution Date becomes a record holder of shares of Common Stock of the Company may exercise all of the rights of a registered holder of a Right Certificate with respect to the Rights associated with such shares of Common Stock of the Company in accordance with the provisions of this Agreement, as of the date such Person becomes a record holder of shares of Common Stock of the Company."

2. Amendment to Section 26. Section 26 of the Rights Agreement is amended by deleting the notice and demand address for the Rights Agent set forth therein and inserting the following notice and demand addresses in its place:

"American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, NY
Attention: Corporate Trust Department
Telephone: (718) 921-8334

With a copy to:
American Stock Transfer & Trust Company, LLC
48 Wall Street, 22nd Floor
New York, NY 10005
Attention: Legal Department
Email: legalteamAST@astfinancial.com"

3. Ratification. The parties hereby ratify and confirm in all respects the Agreement, as amended by this Amendment.

4. Governing Law. This Amendment shall be deemed to be a contract made under the laws of the State of Delaware and for all purposes shall be governed by and construed in accordance with the laws of such State applicable to contracts to be made and performed entirely within such State.

5. Counterparts. This Amendment may be executed in any number of counterparts and each of such counterparts shall for all purposes be deemed to be an original, and all such counterparts shall together constitute but one and the same instrument.

6. Descriptive Headings. Descriptive headings of the several Sections of this Amendment are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.

[remainder left intentionally blank]

IN WITNESS WHEREOF, the parties have entered into this Amendment No. 12 to Shareholder Rights Agreement as of the date first stated above.

NEUROMETRIX, INC.

By:
Name: Thomas T. Higgin
Title: Senior Vice President, Chief Financial Officer, Treasurer and Principal Accounting Officer

AMERICAN STOCK TRANSFER & TRUST COMPANY, LLC

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By:
Name: Michael A Nespoli
Title: Executive Director

TWELFTH MODIFICATION TO LOAN AND SECURITY AGREEMENT

This Twelfth Modification to Loan and Security Agreement (this "Modification") dated June 21, 2019, is entered into by and between **Neurometrix, Inc.,** a Delaware corporation ("Borrower"), and **Comerica Bank** ("Bank").

RECITALS

Bank and Borrower previously entered into a Loan and Security Agreement dated March 5, 2010, as amended by the following:

the First Modification to Loan and Security Agreement dated March 1, 2011,
the Second Modification to Loan and Security Agreement dated February 15, 2012, the Third Modification to Loan and Security Agreement dated April 19, 2012,
the Fourth Modification to Loan and Security Agreement dated January 28, 2013, the Fifth Modification to Loan and Security Agreement dated January 31, 2014, the Sixth Modification to Loan and Security Agreement dated January 23, 2015,
the Seventh Modification to Loan and Security Agreement dated January 14, 2016,
the Eighth Modification to Loan and Security Agreement dated December 29, 2016, the Ninth Modification to Loan and Security Agreement dated January 17, 2018,
the Tenth Modification to Loan and Security Agreement dated January 14, 2019, and
the Eleventh Modification to Loan and Security Agreement dated March 25, 2019 (collectively **"Agreetnent").**

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as set forth below.

AGREEMENT

I. Incorporation by Reference. The Recitals and the documents referred to therein are incorporated herein by this reference. Except as otherwise noted, the terms not defined herein shall have the meanings set forth in the Agreement.

2. Modification to the Agreement. Subject to the satisfaction of the conditions precedent as set forth in Section 3 hereof, the Agreement is hereby modified as set forth below.

(a) The following defined term, which is set forth in Exhibit A of the Agreement, is given the following amended definition:

"'Revolving Maturity Date' means **September** 30, **2019."**

3. Legal Effect.

(a) Except as expressly set forth herein, the execution, delivery, and performance of this Modification shall not operate as a waiver of, or as an amendment of, any light, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all promissory notes, guaranties, security agreements, environmental agreements, and all other instruments, documents and agreements entered into in connection with the Agreement.

(b) Borrower represents and warrants that the representations and warranties contained in the Agreement are trne and correct as of the date of this Modification, and that no Event of Default has occurred and is continuing.

(c) The effectiveness of this Modification and each of the documents, instruments and agreements entered into in connection with this Modification is conditioned upon receipt by Bank of:

(i) this Modification and any other documents which Bank may require to carry out the terms hereof; and

(ii) payment of any Bank expenses incurred through the date of this Modification.

4. No Other Changes. Except as specifically provided in this Modification, it does not vary the terms and provisions of any of the Loan Documents. This Modification shall not impair the rights, remedies, and security given in and by the Loan Documents. The terms of this Modification shall control any conflict between its terms and those of the Agreement.

5. Integration. This is an integrated Modification and supersedes all prior negotiations and agreements regarding the subject matter hereof. All amendments hereto must be in writing and signed by the parties.

6. Release and Waiver. Borrower waives, discharges, and forever releases Bank, Bank's employees, officers, directors, attorneys, stockholders, and their successors and assigns, from and of any and all claims, causes of action, allegations or assertions that Borrower has or may have had at any time up through and including the date of this Amendment, against any or all of the foregoing, regardless of whether any such claims, causes of action, allegations or assertions are known to Borrower or whether **any such claims, causes of action, allegations or** assertions **arose as result of Bank's actions or omissions** in connection with the Loan Agreement, any other Loan Document, any amendments, extensions or modifications thereto, or Bank's administration of the Indebtedness or otherwise. It is further understood and agreed that any and all rights under the provisions of Section 1542 of the California Civil Code are expressly waived by Borrower. Section 1542 of the California Civil Code provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

7. Counterpaits. This Modification may be executed in one or more counterparts, each of which shall be deemed an original but all of which taken together shall constitute one and the same Agreement, and shall become effective when one or more counterparts have been signed by each of the parties hereto and delivered to the other party.

[end of Modification; signature page follows]

IN WITNESS WHEREOF, the patties have agreed to this Twelfth Modification to Loan and Security Agreement as of the date first set forth above.

BANK:

Comerica Bank

NeuroMetrix, Inc., a Delaware corporation

By: _____

Printed Name: _____

Its: _____

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By: ·/,...,--J._,.::,,,,□_,,,,,....-;, --

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Its: Vice President

BORROWER:

THIRTEENTH MODIFICATION TO LOAN AND SECURITY AGREEMENT

This Thirteenth Modification to Loan and Security Agreement (this "Modification") dated September 30, 21, 2019, is entered into by and between **Neurometrix,** Inc., a Delaware corporation ("Borrower"), and **Comerica Bank** ("Bank").

RECITALS

Bank and Borrower previously entered into a Loan and Security Agreement dated March 5, 2010, as amended by the following:

the First Modification to Loan and Security Agreement dated March I, 2011,
the Second Modification to Loan and Security Agreement dated February 15, 2012, the Third Modification to Loan and Security Agreement dated April 19, 2012,
the Fourth Modification to Loan and Security Agreement dated January 28, 2013, the Fifth Modification to Loan and Security Agreement dated January 31, 2014, the Sixth Modification to Loan and Security Agreement dated January 23, 2015,
the Seventh Modification to Loan and Security Agreement dated January 14, 20 I 6, the Eighth Modification to Loan and Security Agreement dated December 29, 2016, the Ninth Modification to Loan and Security Agreement dated January I 7, 2018,
the Tenth Modification to Loan and Security Agreement dated January 14, 2019,
the Eleventh Modification to Loan and Security Agreement dated March 25, 2019, and
the Twelfth Modification to Loan and Security Agreement dated June 2 I, 20 I 9 (collectively **"Agreement").**

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as set forth below.

AGREEMENT

I. Incorporation by Reference. The Recitals and the documents referred to therein are incorporated herein by this reference. Except as otherwise noted, the terms not defined herein shall have the meanings set forth in the Agreement.

2. Modification to the Agreement. Subject to the satisfaction of the conditions precedent as set forth in Section 3 hereof, the Agreement is hereby modified as set forth below.

(a) The following defined term, which is set forth in Exhibit A of the Agreement, is given the following amended definition:

" 'Revolving Maturity Date' means **November 30, 2019."**

3. Legal Effect.

(a) Except as expressly set forth herein, the execution, delivery, and performance of this Modification shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all promissory notes, guaranties, security agreements, environmental agreements, and all other instruments, documents and agreements entered into in connection with the Agreement.

(b) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct as of the date of this Modification, and that no Event of Defanlt has occurred and is continuing.

(c) The effectiveness of this Modification and each of the documents, instruments and agreements entered into in connection with this Modification is conditioned upon receipt by Bank of:

(i) this Modification and any other documents which Bank may require to carry out the terms hereof; and

(ii) payment of any Bank expenses incurred through the date of this Modification.

4. No Other Changes. Except as specifically provided in this Modification, it does not vary the terms and provisions of any of the Loan Documents. This Modification shall not impair the rights, remedies, and security given in and by the Loan Documents. The terms of this Modification shall control any conflict between its terms and those of the Agreement.

5. Integration. This is an integrated Modification and supersedes all prior negotiations and agreements regarding the subject matter hereof. All amendments hereto must be in writing and signed by the parties,

6. Release and Waiver. Borrower waives, discharges, and forever releases Bank, Bank's employees, officers, directors, attorneys, stockholders, and their successors and assigns, from and of any and all claims, causes of action, allegations or assertions that Borrower has or may have had at any time up through and including the date of this Amendment, against any or all of the foregoing, regardless of whether any such claims, causes of action, allegations or assertions are known to Borrower or whether any such claims, causes of action, allegations or assertions arose as result of Bank's actions or omissions in connection with the Loan Agreement, any other Loan Document, any amendments, extensions or modifications thereto, or Bank's administration of the Indebtedness or otherwise. It is further understood and agreed that any and all rights under the provisions of Section 1542 of the California Civil Code are expressly waived by Borrower. Section 1542 of the California Civil Code provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

7. Counterparts. This Modification may be executed in one or more counterparts, each of which shall be deemed an original but all of which taken together shall constitute one and the same Agreement, and shall become effective when one or more counterparts have been signed by each of the parties hereto and delivered to the other party.

[end of Modification; signature page follows]

IN WITNESS WHEREOF, the parties have agreed to this Thirteenth Modification to Loan and Security Agreement as of the date first set forth above.

BANK:

Comerica Bank

By:--;;-fz:zt;,.

Its: Vice President

NeuroMetrix, Inc., a Delaware corporation

By: _____

Printed Name: Thomas J. Adams

Its: CFO

BORROWER:

FOURTEENTH MODIFICATION TO LOAN AND SECURITY AGREEMENT AND WAIVER

This Fourteenth Modification to Loan and Security Agreement and Waiver (this "Modification") dated November 27, 2019, is entered into by and between **Neurometrix,** Inc., a Delaware corporation ("Borrower"), and **Comerica Bank** ("Bank").

RECITALS

Bank and Borrower previously entered into a Loan and Security Agreement dated March 5, 2010, as amended by the following:

the First Modification to Loan and Security Agreement dated March 1, 2011,
the Second Modification to Loan and Security Agreement dated February 15, 2012, the Third Modification to Loan and Security Agreement dated April 19, 2012,
the Fourth Modification to Loan and Security Agreement dated January 28, 2013,
the Fifth Modification to Loan and Security Agreement dated January 31, 2014, the Sixth Modification to Loan and Security Agreement dated January 23, 2015,
the Seventh Modification to Loan and Security Agreement dated January 14, 2016, the Eighth Modification to Loan and Security Agreement dated December 29, 2016, the Ninth Modification to Loan and Security Agreement dated January 17, 2018,
the Tenth Modification to Loan and Security Agreement dated January 14, 2019,
the Eleventh Modification to Loan and Security Agreement dated March 25, 2019, the Twelfth Modification to Loan and Security Agreement dated June 21, 2019, and
the Thirteenth Modification to Loan and Security Agreement dated September 30, 21, 2019 (collectively "Agreement").

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as set forth below.

AGREEMENT

I. Incorporation by Reference. The Recitals and the documents referred to therein are incorporated herein by this reference. Except as otherwise noted, the terms not defined herein shall have the meanings set forth in the Agreement.

2. Modification to the Agreement. Subject to the satisfaction of the conditions precedent as set forth in Section 3 hereof, the Agreement is hereby modified as set forth below.

(a) The following defined term, which is set forth in Exhibit A of the Agreement, is given the following amended definition:

" 'Revolving Maturity Date' means **January 14, 2020."**

3. Legal Effect.

(a) Except as expressly set forth herein, the execution, delivery, and performance of this Modification shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all promissory notes, guaranties, security agreements, enviromnental agreements, and all other instruments, documents and agreements entered into in connection with the Agreement.

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(b) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct as of the date of this Modification, and that no Event of Default has occurred and is continuing.

(c) The effectiveness of this Modification and each of the documents, instruments and agreements entered into in connection with this Modification is conditioned upon receipt by Bank of:

(i) this Modification and any other documents which Bank may require to carry out the terms hereof; and

(ii) payment of any Bank expenses incurred through the date of this Modification.

4. Waiver of Default. Borrower acknowledges that it is not in compliance with the Loan Agreement because it has failed to comply with Section 6.2(a)(vii) *(annual budgets)* for the 2019 fiscal year ("Identified Default"). Bank waives any default or Event of Default under the Loan Agreement arising out of the Identified Default, but does not waive compliance with that Section at or for any subsequent time or period. This provision is not a waiver of or consent to any other event, condition, transaction, act or omission whether related or unrelated to the Identified Default. This provision shall not be deemed to constitute or be construed as a course of dealing obligating Bank to provide any waiver, amendment, consent or other modification of the terms provided in the Loan Documents to Borrower at any time or to confer on Borrower any right to notice or cure periods with respect to any further Event of Default.

5. No Other Changes. Except as specifically provided in this Modification, it does not vary the terms and provisions of any of the Loan Documents. This Modification shall not impair the rights, remedies, and security given in and by the Loan Documents. The terms of this Modification shall control any conflict between its terms and those of the Agreement.

6. Integration. This is an integrated Modification and supersedes all prior negotiations and agreements regarding the subject matter bereof. All amendments hereto must be in writing and signed by the parties.

7. Release and Waiver. Borrower waives, discharges, and forever releases Bank, Bank's employees, officers, directors, attorneys, stockholders, and their successors and assigns, from and of any and all claims, causes of action, allegations or assertions that Borrower has or may have had at any time up through and including the date of this Amendment, against any or all of the foregoing, regardless of whether any such claims, causes of action, allegations or assertions are known to Borrower or whether any such claims, causes of action, allegations or assertions arose as result of Bank's actions or omissions in connection with the Loan Agreement, any other Loan Document, any amendments, extensions or modifications thereto, or Bank's administration of the Indebtedness or otherwise. It is further understood and agreed that any and all rights under the provisions of Section 1542 of the California Civil Code are expressly waived by Borrower. Section 1542 of the California Civil Code provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

8. Counterparts. This Modification may be executed in one or more counterparts, each of which shall be deemed an original but all of which taken together shall constitute one and the same Agreement,

Comerica Bank

NeuroMetrix, Inc., a Delaware corporation

By:_____
Printed Name: _____
Its: _____By: _ Bryan W. Kana
Its:

Vice President

Comerica Bank

By:;:: Its: Vice President

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NeuroMetrix, Inc., a Delaware corporation

By: _ Printed Name: _ Its: _

FIFTEENTH MODIFICATION TO LOAN AND SECURITY AGREEMENT

This Fifteenth Modification to Loan and Security Agreement (this "Modification") dated January 23, 2020, is entered into by and between **Neurometrix, Inc.,** a Delaware corporation ("Borrower"), and **Comerica Bank** ("Banlc").

RECITALS

Banlc and Borrower previously entered into a Loan and Security Agreement dated March 5, 2010, as amended by the following:

the First Modification to Loan and Security Agreement dated March 1, 2011,
the Second Modification to Loan and Security Agreement dated February 15, 2012, the Third Modification to Loan and Security Agreement dated April 19, 2012,
the Fourth Modification to Loan and Security Agreement dated January 28, 2013, the Fifth Modification to Loan and Security Agreement dated January 31, 2014, the Sixth Modification to Loan and Security Agreement dated January 23, 2015,
the Seventh Modification to Loan and Security Agreement dated January 14, 2016, the Eighth Modification to Loan and Security Agreement dated December 29, 2016, the Ninth Modification to Loan and Security Agreement dated January 17, 2018,
the Tenth Modification to Loan and Security Agreement dated January 14, 2019,
the Eleventh Modification to Loan and Security Agreement dated March 25, 2019, the Twelfth Modification to Loan and Security Agreement dated June 21, 2019,
the Thirteenth Modification to Loan and Security Agreement dated September 30, 21, 2019, and the Fourteenth Modification to Loan and Security Agreement dated November 27, 2019 (collectively "Agreement").

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as set forth below.

AGREEMENT

1. Incorporation by Reference. The Recitals and the documents referred to therein are incorporated herein by this reference. Except as otherwise noted, the terms not defined herein shall have the meanings set forth in the Agreement.

2. Modification to the Agreement. Subject to the satisfaction of the conditions precedent as set forth in Section 3 hereof, the Agreement is hereby modified as set forth below.

(a) The following defined terms and their respective definitions, which are set forth in Exhibit A of the Agreement, are given the following amended definitions:

" 'Letter of Credit Sublimit' means a sublimit for Letters of Credit under the Revolving Line not to exceed $250,000.

" 'Revolving Line' means a Credit Extension of up to $250,000 (inclusive of any amounts outstanding under the Letter of Credit Sublimit)."

"'Revolving Maturity Date' means **April 30, 2020."**

3. Legal Effect.

(a) Except as expressly set forth herein, the execution, delivery, and performance of this Modification shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all promissory notes, guaranties, security agreements, environmental agreements, and all other instruments, documents and agreements entered into in connection with the Agreement.

(b) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct as of the date of this Modification, and that no Event of Default has occurred and is continuing.

(c) The effectiveness of this Modification and each of the documents, instruments and agreements entered into in connection with this Modification is conditioned upon receipt by Bank of:

(i) this Modification and any other documents which Bank may require to carry out the terms hereof; and

(ii) payment of any Bank expenses incurred through the date of this Modification.

4. Recertification of Authority. The certificate of incorporation, bylaws, and corporation resolutions previously or concurrently delivered to Bank remain in full force and effect, have not been amended, repealed or rescinded in any respect and may continue to be relied upon by Bank until written notice to the contrary is received by Bank, the officers named therein continue to hold those positions, and Borrower continues to be in good standing under the laws of the State of Delaware.

5. No Other Changes. Except as specifically provided in this Modification, it does not vary the terms and provisions of any of the Loan Documents. This Modification shall not impair the rights, remedies, and security given in and by the Loan Documents. The terms of this Modification shall control any conflict between its terms and those of the Agreement.

6. Integration. This is an integrated Modification and supersedes all prior negotiations and agreements regarding the subject matter hereof. All amendments hereto must be in writing and signed by the parties.

7. Release and Waiver. Borrower waives, discharges, and forever releases Bank, Bank's employees, officers, directors, attorneys, stockholders, and their successors and assigns, from and of any and all claims, causes of action, allegations or assertions that Borrower has or may have had at any time up through and including the date of this Amendment, against any or all of the foregoing, regardless of whether any such claims, causes of action, allegations or assertions are known to Borrower or whether any such claims, causes of action, allegations or assertions arose as result of Bank's actions or omissions in connection with the Loan Agreement, any other Loan Document, any amendments, extensions or modifications thereto, or Bank's administration of the Indebtedness or otherwise. It is further understood and agreed that any and all rights under the provisions of Section 1542 of the California Civil Code are expressly waived by Borrower. Section 1542 of the California Civil Code provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

8. Counterparts. This Modification may be executed in one or more counterparts, each of which shall be deemed an original but all of which taken together shall constitute one and the same Agreement, and shall become effective when one or more counterparts have been signed by each of the parties hereto and delivered to the other party.

IN WITNESS WHEREOF, the parties have agreed to this Fifteenth Modification to Loan and Security Agreement as of the date first set forth above.

BANK: BORROWER:

Comerica Bank

By: _ Bryan W. Kana

Printed Name: -□-□-□□------
Its:

Vice President

Its: _

NeuroMetrix, Inc., a Delaware corporation

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ELEVENTH MODIFICATION TO LOAN AND SECURITY AGREEMENT

This Eleventh Modification to Loan and Security Agreement (this "Modification") dated March 25, 2019, is entered into by and between **Neurometrix, Inc.,** a Delaware corporation ("Borrower"), and **Comerica Bank** ("Bank").

RECITALS

Bank and Borrower previously entered into a Loan and Security Agreement dated March 5, 2010, as amended by the following:

the First Modification to Loan and Security Agreement dated March 1, 2011,
the Second Modification to Loan and Security Agreement dated February 15, 2012, the Third Modification to Loan and Security Agreement dated April 19, 2012,
the Fourth Modification to Loan and Security Agreement dated January 28, 2013,
the Fifth Modification to Loan and Security Agreement dated January 31, 2014, the Sixth Modification to Loan and Security Agreement dated January 23, 2015,
the Seventh Modification to Loan and Security Agreement dated January 14, 2016,
the Eighth Modification to Loan and Security Agreement dated December 29, 2016, the Ninth Modification to Loan and Security Agreement dated January 17, 2018, and
the Tenth Modification to Loan and Security Agreement dated January 14, 2019 (collectively **"Agreement").**

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as set forth below.

AGREEMENT

1. Incorporation by Reference. The Recitals and the documents referred to therein are incorporated herein by this reference. Except as otherwise noted, the terms not defined herein shall have the meanings set forth in the Agreement.

2. Modification to the Agreement. Subject to the satisfaction of the conditions precedent as set forth in Section 3 hereof, the Agreement is hereby modified as set forth below.

(a) The following defined term, which is set forth in Exhibit A of the Agreement, is given the following amended definition:

'Revolving Maturity Date' means **June 30, 2019."**

3. Legal Effect.

(a) Except as expressly set forth herein, the execntion, delivery, and performance of this Modification shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all promissory notes, guaranties, security agreements, environmental agreements, and all other instruments, documents and agreements entered into in connection with the Agreement.

(b) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct as of the date of this Modification, and that no Event of Default has occurred and is continuing.

(c) The effectiveness of this Modification and each of the documents, instruments and agreements entered into in connection with this Modification is conditioned upon receipt by Bank of:

(i) this Modification and any other documents which Bank may require to carry out the terms hereof; and

(ii) payment of any Bank expenses incurred through the date of this Modification.

4. No Other Changes. Except as specifically provided in this Modification, it does not vary the terms and provisions of any of the Loan Documents. This Modification shall not impair the rights, remedies, and security given in and by the Loan Documents. The terms of this Modification shall control any conflict between its terms and those of the Agreement.

5. Integration. This is an integrated Modification and supersedes all prior negotiations and agreements regarding the subject matter hereof. All amendments hereto must be in writing and signed by the parties.

6. Release and Waiver. Borrower waives, discharges, and forever releases Bank, Bank's employees, officers, directors, attorneys, stockholders, and their successors and assigns, from and of any and all claims, causes of action, allegations or assertions that Borrower has or may have had at any time up through and including the date of this Amendment, against any or all of the foregoing, regardless of whether any such claims, causes of action, allegations or assertions are known to Borrower or whether any such claims, causes of action, allegations or assertions arose as result of Bank's actions or omissions in connection with the Loan Agreement, any other Loan Document, any amendments, extensions or modifications thereto, or Bank's administration of the Indebtedness or otherwise. It is further understood and agreed that any and all rights under the provisions of Section 1542 of the California Civil Code are expressly waived by Borrower. Section 1542 of the California Civil Code provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST JN ms OR HER
FAVOR AT THE TIME OF EXECUTJNGTHE RELEASE AND THAT, IF KNOWN BY
HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.]

7. Counterparts. This Modification may be executed in one or more counterparts, each of which shall be deemed an original but all of which taken together shall constitute one and the same Agreement, and shall become effective when one or more counterparts have been signed by each of the parties hereto and delivered to the other party.

[end of Modification; signature page follows]

IN WITNESS WHEREOF, the parties have agreed to this Eleventh Modification to Loan and Security Agreement as of the date first set forth above.

BANK:

Comerica Bank

By

,Kana

Its: Vice President

NeuroMetrix, Inc., a Delaware corporation

By: _____

Printed Name: Thomas J. Higgins

Its: CFO

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BORROWER:

NEUROMetrix

December 28, 2019

Mr. Shai N. Gozani

Dear Shai,

On behalf of NeuroMetrix, Inc. (the "Company") and the Board of Directors, the Compensation Committee offers you revised tenns of employment in your position as President and Chief Executive Officer as follows:

• *Ejfecrive date:* January 1, 2020

• *Title & Responsibilities:* Chief Executive Officer reporting to the Board of Directors. In this role you guide the strategic direction of the Company and oversee its day-to-day operations. You also have such other duties as are assigned to you from time-to-time by the Board of Directors ..

Base Salary: The Company will pay an annual salary ("Base Salary") of $1.00, subject to periodic review and adjustment at the discretion of the Company.

- *Variable Con,pensation:* You will be eligible to receive an annual performance bonus. The Company shall consider and make a bonus determination not later than 90 days after the end of each fiscal year during which you arc employed by the Company. The Company will pay such bonus to you in stock before the end of the fifth month following the fiscal year. Bonus awards shall be determined by the Company in its sole discretion.

- *Equity Grant:* The Company will award options to purchase 100,000 shares of NeuroMetrix common stock at an exercise price of the closing price on Nasdaq on the day prior to the grant date. The options will have a ten-year life and will vest in even quarterly amounts over a one- year period

- *Benefits:* The Company will provide medical insurance coverage and other benefits on the same terms and conditions as provided to the Company's employees or other senior executives from time to time.

- *Vacation:* You will continue to be eligible to receive 27 vacation days per year of employment, which accrues on a prorated basis and shall be treated in a manner consistent with the Company's Employee Handbook, as amended from time to time. You also will be eligible for paid holidays and personal days recognized by the Company as set forth in the Company's Employee Handbook, as amended from time to time.

Other Terms: This Agreement commences on January I, 2020 and shall automatically renew for successive one-year terms unless notice of non-renewal is given by either party to the other party not Jess than ninety (90) days prior to expiration of the then term. In all events, however, your employment will

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be on an at-will basis, meaning that either you or the Company may terminate employment for any reason or at any time, with or without notice."

You have signed the Company's standard form of Confidentiality and Non-Compete Agreement. A copy of that Agreement is attached. Please note that the provisions of that Agreement survive your employment with the Company.

• *Separation Benefits:*

• If the Company terminates your employment for Cause or if you resign other than for Good Reason, you will not be entitled to any separation benefits as described in this section (the "Separation Benefits").

• If, other than within 12 months following a Change in Control, the Company terminates your employment for any reason other than Cause or if you resign for Good Reason, you will be entitled to receive monthly payment based on your prior Base Salary of$4 \5,000 for a period of 12 months from the date oftennination (the "Severance period").

• If, within 6 months prior to or 12 months following a Change in Control, the Company terminates your employment for any reason other than Cause or if you resign for Good Reason, you will be entitled *to* receive monthly payment based on your prior Base Salary of $415,000 for a period of 12 months from the date of termination (the "Severance Period"). In addition, the Company will accelerate your right to exercise shares under any stock option granted to you by the Company on or after the date of this Agreement.

• If you die or become totally disabled (as defined by the Company's long term disability insurance coverage), the Company will accelerate your right or the right of your Personal Representative to exercise shares under any stock option granted to you by the Company on or after the dated of this Agreement.

You will be entitled to the severance and acceleration of options described above so long as the ending of your employment constitutes a separation from service as defined in Section 409A of the Internal Revenue Code. During the Severance Period (but not for a period longer than your entitlement to COBRA continuation coverage), the Company will continue to contribute to your medical insurance coverage, which, subject to your eligibility, will be extended to you under the law known as COBRA at the same rate as if you continued to be employed by the Company. Notwithstanding the foregoing, your receipt of the Separation Benefits described in this paragraph will be subject, in all cases, to your execution, on or before the 21st day following its presentation to you (which shall occur no more than 14 days after the Date of Termination) of a release of any and all claims that you may then have against the Company in connection with your employment in a form that is satisfactory to the Company (the "Release") and the effectiveness and irrevocability of the Release upon its execution or the earliest day after its execution as is permitted by law. Payments of continuation of compensation owed pursuant to this paragraph will occur on
the regular payroll payment dates for the Company beginning with the first regular payroll

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payment date that occurs on or after the date that is 45 days after your termination or resignation (with the first payment to include the full amount owed for continuation of compensation for the payroll period to which such payment date relates and any prior payroll periods for which payment was not yet made).

- *Definitions:* For purposes of this Agreement, "Cause" shall mean a vote by the Board resolving that you shall be dismissed as a result of (i) your material breach of any agreement between you and the Company; (ii) your conviction of or plea of nolo contendere to a felony or a crime involving moral turpitude; or (iii) any material misconduct or willful and deliberate non• performance (other than by reason of disability) by you of your duties to the Company. However, for any reason specified in (i) or (iii), if the Board makes a good faith judgment that the cause is capable of being cured within fifteen (15) days, it shall specify the reason and give you fifteen (15) days from the date of its notice to effect a cure and if after such fifteen (15) days in the judgment of the Board you have not done so, the Board's vote of dismissal shall be final.

  Resignation for "Good Reason" shall mean your resignation following your prior written notice to the Company that the Company has materially breached this agreement (with such written notice to describe such material breach in detail), provided that (i) such written notice is provided within thirty (30) days after the initial existence of such breach, (ii) such breach has, in fact, occurred and remains uncured by the Company for thirty (30) days following its receipt of such written notice (the "Cure Period"), (iii) you resign upon not less than 30 days' nor more than 60 days' prior written notice and (iv) you provide the Company with the written notice of your resignation on or before the fifteenth (15th) day after the end of the Cure Period. For purposes of this paragraph, a "material breach" shall mean (i) a material reduction in your base salary other than as part of a broader executive pay reduction; (ii) a material reduction in your incentive compensation participation level other than as part of a broader executive reduction; (iii) a material change in the employment benefits made available to you if such change does not similarly affect alt employees of the Company eligible for such benefits; (iv) a material reduction in your duties, responsibilities, or authority as then in effect; (v) a requirement that you relocate except for relocations that would not increase your one way commuting distance by more than 35 miles.

  "Change in Control" shall be deemed to occur as of the date that: (i) the Company completes a reorganization, merger, consolidation, sale or other disposition of all or substantially all of the assets of the Company whether held directly by the Company or by a subsidiary of the Company; (ii) a change in the composition of the Company's Board of Directors which results in the replacement of more than fifty percent (50%) of the Company's Board of Directors within a period of 12 months; (iii) acquisition by any individual, entity, or group resulting in such individual, entity or group having ownership of fifty percent (50%) or more of either (a) the then-outstanding shares of common stock of the Company, or (b) the combined voting power of the then• outstanding voting securities of the Company entitled to vote generally in the election of directors; or (iv) approval by the stockholders of the Company of a complete liquidation or dissolution of the Company.

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- *Section 409A:* Solely for purposes of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), each periodic severance payment made pursuant to this agreement shall be considered a separate payment. Anything in this agreement to the contrary notwithstanding, if at the time of your termination or resignation, you are considered a 'specified employee' within the meaning of Section 409A(a)(2)(B)(i) of the Code, and if any payment that you become entitled to under this agreement would be considered deferred compensation subject to interest and additional tax imposed pursuant to Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, then no such payment shalt be payable prior to the date that is the earlier of(i) six months and one day after your separation from service, or (ii) your death.

- *Arbitration of Disputes:* Any dispute arising hereunder or arising out of your employment, termination thereof, or any other relations with the Company, whether sounding in tort or contract, by statute or otherwise, including, but not limited to claims of employment discrimination, shall be settled by arbitration in Boston, Massachusetts, in accordance with the National Rules for the Resolution of Employment Disputes of the American Arbitration Association before a single Arbitrator. Notwithstanding the foregoing, disputes arising under the Confidentiality and Non• compete Agreement shall not be subject to arbitration.

- *Taxation:* You understand that payments made pursuant to this agreement may be subject to applicable federal and state withholdings.

- *Entire Agreement:* This agreement, the Confidentiality and Non-Compete Agreement and the Option Agreement set forth the entire agreement and understanding between you and the Company regarding all subjects covered herein, the tenns of which may not be changed or modified except by agreement in writing signed by you and the Company.

- *Severability:* Should any provision of this agreement, or portion thereof, be found invalid and unenforceable, the remaining provisions shall continue in force and effect.

- *Governing Law:* This agreement shall be governed, construed and enforced in accordance with the laws of the Commonwealth of Massachusetts, without regard to principles of conflict of law.

Please contact me if you have any questions. Please acknowledge your acceptance by signing below. Sincerely,

NEUROMETRJX, INC.

By□

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On behalf of the Compensation Committee,
NeuroMetrix Board of Directors

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Date: 1/3/20 SruN.Gozani, M.D., PhD.

ACCEPTED.u *L*

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NEUROMetrix

December 20, 2019

[redacted]
[redacted] Mr. Thomas T. Higgins

Dear Torn,

On behalf ofNeuroMetrix, Inc. (the "Company") and the Board of Directors, I offer you revised terms of e,nployment in your position as Chief Financial Officer as follows:

• *Effeclive date:* January I, 2020

- *Title & Responsibilities:* Chief Financial Officer reporting to the Chief Executive Officer, overseeing the Company's Finance Department, Investor Relations, Human Resources, Information Technology, Manufacturing and Fulfilhnent. You will also have such other duties as are assigned to you by the Chief Executive Officer of the Company.

  Base Salary: The Company will pay an annual salary ("Base Salary") of $150,000 paid at the bi-monthly rate of$6,250.00, subject to periodic review and adjustment at the discretion of the Company.

• *Variable Compensation:* You will be eligible to receive an annual performance bonus of up to 50% of your Base Salary. The Company shall consider and make a bonus determination not later than 90 days aft.er the end of each fiscal year during which you are employed by the Company. The Company will pay such bonus to you in stock before the end of the fifth month following the fiscal year. Bonus awards shall be determined by the Company in its sole discretion.

- *Equity Grant:* The Company will award options to purchase 50,000 shares of NeuroMetrix common stock at an exercise price of the closing price on Nasdaq on the day prior to the grant date. The options will have a ten-year life and will vest in even quarterly amounts over a one year period.

- *Benefits:* The Company will provide medical insurance coverage and other benefits on the same terms and conditions as provided to the Company's employees or other senior executives from time to time.

- *Vacation:* You will continue to be eligible to receive 27 vacation days per year of employment, which accrues on a prorated basis and shall be treated in a manner consistent with the Company's Employee 1-landbook, as amended from time to time. You also will be eligible for paid holidays and personal days recognized by the Company as set forth in the Company's Employee Handbook, as amended from time to time.

Other Ter111s: This Agreement commences on January I, 2020 and shall automatically renew for successive one-year terms unless notice of non-renewal is given by either party to the other party not less

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than ninety (90) days prior to expiration of the then term. In all events, however, your employment will be on an at-will basis, meaning that either you or the Company may tenninate employment for any reason or at any time, with or without notice."

You have signed the Company's standard fonn of Confidentiality and Non-Compete Agreement. A copy of that Agreement is attached. Please note that the provisions of that Agreement survive your employment with the Company.

• *Separation Benefits:*

- If the Company terminates your employment for Cause or if you resign other than for Good Reason, you will not be entitled to any separation benefits as described in this section (the "Separation Benefits").

- If, other than within 12 months following a Change in Control, the Company tenninates your employment for any reason other than Cause or if you resign for Good Reason, you will be entitled to receive continuation of your prior Base Salary of$325,000 for a period of 12 months from the date of termination (the "Severance period").

- If, within 6 months prior to or 12 months following a Change m Control, the Company tenninatcs your employment for any reason other than Cause or if you resign for Good Reason, you will be entitled to receive continuation of your prior Base Salary of $325,000 for a period of 12 months from the date of tennination (the "Severance Period"). In addition, the Company will accelerate your right to exercise shares under any stock option granted to you by the Company on or after the date of this Agreement.

- If you die or become totally disabled (as defined by the Company's long tenn disability insurance coverage), the Company will accelerate your right or the right of your Personal Representative to exercise shares under any stock option granted to you by the Company on or after the dated of this Agreement.

You will be entitled to the severance and acceleration of options described above so long as the ending of your employment constitutes a separation from service as defined in Section 409A of the Internal Revenue Code. During the Severance Period (but not for a period longer than your entitlement to COBRA continuation coverage), the Company will continue to contribute to your medical insurance coverage, which, subject to your eligibility, will be extended to you under the law known as COBRA at the same rate as iF you continued to be employed by the Company. Notwithstanding the foregoing, your receipt of the Separation Benefits described in this paragraph will be subject, in all cases, to your execution, on or before the 21st day following its presentation to you (which shall occur no more than 14 days after the Date of Termination) of a release of any and all claims that you may then have against the Company in connection with your employment in a form that is satisfactory to the Company (the "Release") and the effectiveness and irrevocability of the Release upon its execution or the earliest day after its execution as is permitted by law. Payments of continuation of compensation owed pursuant to this paragraph will occur on the regular payroll payment dates for the Company beginning with the first regular payroll

payment date that occurs on or after the date that is 45 days after your termination or resignation (with the first payment to include the full amount owed for continuation of compensation for the payrol I period to which such payment date relates and any prior payrol I periods for which payment was not yet made).

- *Definitions:* For purposes of this Agreement, "Cause" shall mean a vote by the Board resolving that you shall be dismissed as a result of (i) your material breach of any agreement between you and the Company; (ii) your conviction of or plea of nolo contendere to a felony or a crime involving moral turpitude; or (iii) any material misconduct or willful and deliberate non• performance (other than by reason of disability) by you of your duties to the Company. However, for any reason specified in (i) or (iii), if the Board makes a good faith judgment that the cause is capable of being cured within fifteen (15) days, it shall specify the reason and give you fifteen (15) days from the date of its notice to effect a cure and if after such fifteen (15) days in the judgment of the Board you have not done so, the Board's vote of dismissal shall be final.

  Resignation for "Good Reason" shall mean your resignation following your prior written notice to the Company that the Company has materially breached this agreement (with such written notice to describe such material breach in detail), provided that (i) such written notice is provided within thirty (30) days after the initial existence of such breach, (ii) such breach has, in fact, occurred and remains uncured by the Company for thirty (30) days following its receipt of such written notice (the "Cure Period"), (iii) you resign upon not less than 30 days' nor more than 60 days' prior written notice and (iv) you provide the Company with the written notice of your resignation on or before the fifteenth (15th) day after the end of the Cure Period. For purposes of this paragraph, a "material breach" shall mean (i) a material reduction in your base salary other than as part of a broader executive pay reduction; (ii) a material reduction in your incentive compensation participation level other than as part of a broader executive reduction; (iii) a material change in the employment benefits made available to you if such change does not similarly affect all employees of the Company eligible for such benefits; (iv) a material reduction in your duties, responsibilities, or authority as then in effect; (v) a requirement that you relocate except for relocations that would not increase your one way commuting distance by more than *35* miles.

  "Change in Control" shall be deemed to occur as of the date that: (i) the Company completes a reorganization, merger, consolidation, sale or other disposition of all or substantially all of the assets of the Company whether held directly by the Company or by a subsidiary of the Company; (ii) a change in the composition of the Company's Board of Directors which results in the replacement of more than fifty percent (50%) of the Company's Board of Directors within a period of 12 months; (iii) acquisition by any individual, entity, or group resulting in such individual, entity or group having ownership of fifty percent (50%) or more of either (a) the then-outstanding shares of common stock of the Company, or (b) the combined voting power of the then• outstanding voting securities of the Company entitled to vote generally in the election of directors; or (iv) approval by the stockholders of the Company of a complete liquidation or dissolution of the Company.

- *Section 409A:* Solely for purposes of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), each periodic severance payment made pursuant to this agreement shall be considered a separate payment. Anything in this agreement to the contrary notwithstanding, if at the time of your termination or resignation, you are considered a 'specified employee' within the meaning of Section 409A(a)(2)(B)(i) of the Code, and if any payment that you become entitled to under this agreement would be considered deferred compensation subject to interest and additional tax imposed pursuant to Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, then no such payment shall be payable prior to the date that is the earlier of(i) six months and one day after your separation from service, or (ii) your death.

- *Arbitration of Disputes:* Any dispute arising hereunder or arising out of your employment, termination thereof, or any other relations with the Company, whether sounding in tort or contract, by statute or otherwise, including, but not limited to claims of employment discrimination, shall be settled by arbitration in Boston, Massachusetts, in accordance with the National Rules for the Resolution of Employment Disputes of the American Arbitration Association before a single Arbitrator. Notwithstanding the foregoing, disputes arising under the Confidentiality and Non• compete Agreement shall not be subject to arbitration.

- *Taxation:* You understand that payments made pursuant to this agreement may be subject to applicable federal and state withholdings.

- *Enlire Agreement:* This agreement, the Confidentiality and Non-Compete Agreement and the Option Agreement set forth the entire agreement and understanding between you and the Company regarding all subjects covered herein, the tenns of which may not be changed or modified except by agreement in writing signed by you and the Company.

- *Severability:* Should any provision of this agreement, or portion thereof, be found invalid and unenforceable, the remaining provisions shall continue in force and effect.

- *Governing Law:* This agreement shall be governed, construed and enforced in accordance with the laws of the Commonwealth of Massachusetts, without regard to principles of conflict of law.

Please contact me if you have any questions. Please acknowledge your acceptance by signing as indicated below.

Sincerely,

By: NEUROMETRIX, INC.

Shai Gozani, ., Ph.D.

President and Chief Executive Officer

12/21/19 Thomas T. Higgins

ACCEPTED: Date:

NEUROMETRIX, INC.

Amended and Restated Management Retention and Incentive Plan

1. Purpose of the Plan. The purpose of this Management Retention and Incentive Plan (the "Plan") is to provide the executive officers and certain other key employees of NeuroMetrix, Inc., a Delaware corporation (the "Company"), listed on Schedule A hereto (the "Participants," and each, a "Participant") with consideration in the event of a Change of Control Transaction (as defined below) involving the Company and another entity (the "Successor Company") based on the allocations listed on Schedule A hereto (the "Percentage Interest"). These allocations relate to the Total Consideration (as defined below) to be received in the Change of Control Transaction by the Company and/or its stockholders. The Plan is designed to retain the Company's executive officers and certain key employees while providing an incentive to build corporate value. This Plan, as amended, shall be effective as of January 20, 2020.

2. Definitions. For the purposes of this Plan, capitalized terms not defined in Section 1 above shall have the following meanings:

(a) Additional Plan Consideration shall mean, for any Participant, the portions of the Contingent Consideration to be received by the Participant pursuant to the Plan as calculated pursuant to Section 6 of the Plan.

(b) Board shall mean the Board of Directors of the Company.

(c) Change of Control Transaction shall mean the first to occur of the following events:

(i) *Ownership Change through Company Stock Sale or Third Party Tender Offer*: any "person" or "group" as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934 (the "Act"), becomes a beneficial owner, as such term is used in Rule 13d-3 promulgated under the Act, of securities of the Company representing more than 50% of the combined voting power of the outstanding securities of the Company having the right to vote in the election of directors. This is not intended to include equity financing transactions involving passive, non-strategic investors; or

(ii) *Merger Transaction*: a merger or consolidation involving the Company or a wholly-owned subsidiary of the Company, other than a merger or consolidation in which the voting securities of the Company outstanding immediately prior to such transaction continue to represent (either by remaining outstanding or by conversion into voting securities of the surviving entity or the parent of such corporation) more than fifty percent (50%) of the total voting power represented by the voting securities of the Company or such surviving entity or parent of such corporation, as the case may be, outstanding immediately after such merger or consolidation; or

(iii) *Sale of Assets*: the sale or disposition by the Company of all or substantially all of the Company's assets in a transaction requiring stockholder approval;

provided that a Change of Control Transaction shall be interpreted in a manner, and limited to the extent necessary, so that it will not cause adverse tax consequences under Section 409A of the Code.

(d) Code shall mean the Internal Revenue Code of 1986, as amended, including any successor statute, regulation and guidance thereto.

(e) Common Stock shall mean the common stock, $0.0001 par value per share, of the Company.

(f) Common Stock Equivalents shall mean rights, options, or other instruments to subscribe for, purchase or otherwise acquire Common Stock pursuant to any equity plan of the Company.

(g) Contingent Consideration shall mean the portion of the Total Consideration to be received after the date of the closing of the Change of Control Transaction, the receipt of which will be contingent upon the passage of time or the occurrence or non- occurrence of some event(s) or circumstance(s), including, without limitation, amounts of Total Consideration subject to an escrow, a purchase price adjustment, an earn-out, or indemnity claims.

(h) Initial Consideration shall mean the amount of the Total Consideration that is not Contingent Consideration.

(i) Initial Plan Consideration shall mean, for any Participant, the portion of the Initial Consideration to be received by the Participant pursuant to the Plan as calculated pursuant to Section 6 of the Plan.

(j) Plan Consideration shall mean, for any Participant, the portion of the Total Consideration to be received by the Participant pursuant to the Plan as calculated pursuant to Section 6 of the Plan which shall be comprised of the Initial Plan Consideration and any Additional Plan Consideration.

(k) Representative shall mean one or more members of the Board or persons designated by the Board prior to, or in connection with the Change of Control Transaction.

(l) Total Consideration shall mean the total amount of cash and the fair market value of all other consideration paid or payable including Contingent Consideration by the Successor Company or any other person to the Company or its securityholders in connection with the Change of Control Transaction, including amounts paid or payable in respect of convertible securities, warrants, stock appreciation rights, option or similar rights, whether or not vested and any additional amounts paid by the Successor Company in connection with this Plan, less (i) transaction fees incurred in the course of the Change of Control Transaction (such as fees related to legal services, accounting services, financial advisory services, investment banking

services or other professional services), plus (ii) any debt or other liabilities of the Company that are paid off, satisfied or otherwise assumed by the Successor Company, specifically including, but not limited to, any bank debt or line of credit and accounts payable (excluding any liabilities under this Plan), and less (iii) any taxes payable by the Company (but not those payable by the stockholders) as a result of the Change of Control Transaction. The fair market value of any securities (whether debt or equity) or other property shall be determined as follows:

(i) the value of securities that are freely tradable in an established public market will be determined by the method or methods set forth in the applicable contract or contracts concerning the Change of Control Transaction; and

(ii) the value of securities that are not freely tradable or have no established public market, and the value of aggregate consideration that consists
of other property, shall be the fair market value as determined in good faith by the
Board;

provided however, notwithstanding the foregoing, that in the event of a Change of Control Transaction that is effected in the form of a reverse merger, in which shares of Common Stock are issued to the securityholders of a third party, the Total Consideration shall mean the product of: (a) the number of shares of Common Stock outstanding immediately prior to the closing of the Change of Control Transaction; and (b) the closing price of the Common Stock, as reported on the principal stock exchange on which the Common Stock is then traded, on the closing date of the Change of Control Transaction; provided further, however, that the number of outstanding shares of Common Stock and the closing price shall be appropriately adjusted as necessary to reflect any stock split, reverse stock split or other structural reorganization. In such event, the Total Consideration shall be deemed to be Initial Plan Consideration for purposes of this Agreement.

3. Interpretation and Administration of the Plan. Prior to the Change of Control Transaction, the administrator of the Plan will be the Compensation Committee of the Board. After the Change of Control Transaction, the administrator of the Plan will be the Representative. The administrator will be responsible for interpreting and administering all
provisions hereof. All actions taken by the administrator in interpreting the terms of the Plan and administration of the Plan will be final, binding and conclusive on all Participants. The administrator shall not be personally liable by reason of any contract or other instrument related
to the Plan executed by an individual or on its or their behalf in its or their capacity as the administrator, or for any mistake of judgment made in good faith, and the Company shall indemnify and hold harmless each individual to whom any duty or power relating to the administration or interpretation of the Plan may be allocated or delegated, against any cost or expense (including legal fees) or liability arising out of any act or omission to act in connection with the Plan unless arising out of such person’s own fraud or bad faith.

4. Eligibility to Earn Plan Consideration. Except as otherwise provided in Section 8 below, each Participant will have the right to receive Plan Consideration, subject to the Participant’s continued employment or service with the Company through the date of the closing of the Change of Control Transaction unless terminated by the Company other than for cause

within 180 days prior to the announcement of the Change of Control Transaction. If a Participant's service to the Company in all capacities (whether as an employee, consultant, advisor, director or any other service provider) terminates for any reason prior to the date of the closing of the Change of Control Transaction (other than by the Company not for cause within 180 days of the announcement of the Change of Control Transaction), whether initiated by the Company or the Participant, and with or without cause, then such Participant shall no longer be considered a "Participant" thereafter for purposes of the Plan, and such Participant will not be entitled to receive any Plan Consideration hereunder. The Company in its sole discretion will determine whether a Participant's service relationship has terminated for this purpose.

5. Type of Plan Consideration. Pursuant to this Plan, the Participants who are employed by the Company on the date of the closing of a Change of Control Transaction, or whose employment is terminated by the Company not for cause within 180 days of a Change of Control Transaction, shall receive their Plan Consideration from the Successor Company in cash and at the times set forth in Section 7 of the Plan.

6. Calculation of Plan Consideration. Each Participant's Plan Consideration shall be calculated as follows:

The Initial Plan Consideration shall be calculated on the date of the closing of the Change of Control Transaction by multiplying the Participant's Percentage Interest by the Initial Consideration and the resulting product shall then be reduced by the value of any Common Stock Equivalents held by the Participant and assumed by the Successor Company in the Change of Control Transaction, which value shall be calculated by determining the deemed price per share of the Common Stock in the Change of Control Transaction as determined by the Board in its sole discretion based on the method or methods set forth in the applicable contract or contracts concerning the Change of Control Transaction and after subtracting any exercise price or purchase price paid or to be paid by the Participant in connection with such issuances and, in the case of Common Stock Equivalents, shall be valued using a Black Scholes calculation of such Common Stock Equivalents immediately prior to the closing of the Change of Control Transaction using the same deemed price per share of Common Stock in such calculation.

The Additional Plan Consideration shall be calculated by multiplying the Contingent Consideration to be received by a fraction the numerator of which is each Participant's Initial Plan Consideration and the denominator of which is the Initial Consideration.

7. Payment of Plan Consideration. If the conditions for earning the Plan Consideration set forth herein are satisfied, each Participant will be entitled to earn and be paid his or her Plan Consideration as follows:

(a) Each Participant will be paid by the Successor Company from the Initial Consideration the Participant's Initial Plan Consideration in a lump sum by no later than the thirtieth (30th) day following the date of the closing of the Change of Control Transaction.

(b) Each Participant will be paid by the Successor Company from the Contingent Consideration the Participant's Additional Plan Consideration in lump sums, as, if and when the Contingent Consideration is paid or released to the Company or its stockholders.

However, if a condition (as described in Treasury Regulation Section 1.409A-1(d)), when applied to any Contingent Consideration, would not constitute a "substantial risk of forfeiture" (as defined in Treasury Regulation Section 1.409A-1(d)), and Section 1.409A-3(i) (5) (B) such that the Additional Plan Consideration related to such condition would not be reasonably likely to be payable in compliance with either Treasury Regulation Section 1-409A-1(b)(4) or Treasury Regulation Section 1.409A-3(i) (5)(iv)(A), or the Board determines in its reasonable good faith that any Additional Plan Consideration is not otherwise payable under the regular payment schedule of this Plan in compliance with or under an exemption from Section 409A of the Code, then the Participant instead will be paid the fair market value (as of the date of the closing of the Change of Control Transaction), as determined by the Board in its reasonable good faith, of the Additional Plan Consideration related to such condition (that is, the present value of the Additional Plan Consideration that may be earned upon satisfaction of the condition), in a lump- sum on the thirtieth (30th) day following the date of the closing of the Change of Control Transaction.

(c) It is intended that each installment of the payments provided under the Plan is a separate "payment" for purposes of Section 1.409A-2(b)(2)(i) of the Treasury Regulations. For the avoidance of doubt, it is intended that the Plan Consideration satisfy, to the greatest extent possible, the exemption from the application of Section 409A of the Code and the Treasury Regulations and other guidance issued thereunder and any state law of similar effect (collectively "Section 409A") provided under Treasury Regulations Section 1.409A-1(b)(4) and, to the extent not so exempt, that the Plan Consideration comply, and the Plan be interpreted to
the greatest extent possible as consistent, with Treasury Regulations Section 1.409A-
3(i)(5)(iv)(A) – that is, as "transaction-based compensation." Accordingly, any Plan Consideration will only be paid pursuant to this transaction-based exemption from Section 409A in the case of a Change of Control Transaction that is also a "change in ownership of a corporation" or "change in ownership of a substantial portion of a corporation's assets" defined in Treasury Regulation Sections 1.409A-3(i)(5)(v) and (vii). Additionally, no Plan
Consideration that is being paid in reliance on the transaction-based exemption from Section
409A will be earned or paid after the fifth (5th) anniversary of the date of the closing of the Change of Control Transaction and the Participants will not be entitled to any payments under the Plan with respect to any Contingent Consideration after such date, subject, however, to Treasury Regulation Section 1.409A-3(g) (regarding timing of payments for certain disputed payments).

8. Release. As a further condition to earning any Plan Consideration, a Participant must execute and allow to become effective a general release of claims in substantially the form of Exhibit A1 hereto prior to the thirtieth (30th) day following the date of the closing of the Change of Control Transaction, and if the form of release is provided to the Participant sooner than the date of the closing of the Change of Control Transaction, within thirty (30) days of the date the Participant receives the form of release. If any Participant refuses to execute such release and allow it to become effective within such time period, then such Participant will not be eligible to earn Plan Consideration, and the Participant's rights under this Plan to receive any consideration will be forfeited.

9. Withholding of Compensation. The Successor Company will withhold from any payments under the Plan any amount required to satisfy the income and employment tax

withholding obligations arising under applicable federal, state and local laws in respect of the Plan Consideration. Each Participant should contact his or her personal legal or tax advisors with respect to the benefits provided by the Plan. Neither the Company nor any of its employees, directors, officers or agents are authorized to provide any tax advice to Participants with respect to the benefits provided under the Plan.

10. Adjustments for Excess Parachute Payments. In the event that (A) any consideration to be received by the Participant in connection with a Change of Control Transaction (whether pursuant to the terms of the Plan or any other plan, arrangement, or agreement with the Company, any person whose actions result in a Change of Control Transaction, or any person affiliated with the Company or such person) (collectively "Parachute Payments") would not be deductible by the Successor Company, an affiliate or other person making such payment or providing such benefit (in whole or part) as a result of Section 280G of the Code; and (B) it is determined in good faith by the administrator that the net after-tax amount of the Parachute Payments retained by the Participant after deduction for any excise tax imposed by Section 4999 of the Code and any federal, state, and local income and employment taxes would not exceed the net after-tax amount of the Parachute Payments retained by the Participant after limiting the Parachute Payments to an amount that is 2.99 times the Participant's "base amount" (as such term is defined by Section 280G of the Code), then the Parachute Payments shall be reduced until no portion of the Parachute Payments is not deductible.

For purposes of this provision,

(i) no portion of the Parachute Payments the receipt or enjoyment of which the Participant shall have effectively waived in writing prior to the date of payment of the Parachute Payments shall be taken into account;

(ii) no portion of the Parachute Payments shall be taken into account which in the opinion of the Company's or the Successor Company's independent auditors or tax counsel serving as such immediately prior to the Change of Control Transaction (or other tax counsel selected by the administrator) does not constitute a "parachute payment" within the meaning of Section 280G(b)(2) of the Code;

(iii) the Parachute Payments shall be reduced only to the extent necessary so that the Parachute Payments (other than those referred to in the immediately preceding clause (i) or (ii)) in their entirety constitute reasonable compensation for services actually rendered within the meaning of Section 280G(b)(4) of the Code or are otherwise not subject to disallowance as deductions, in the opinion of the auditor or tax counsel referred to in such clause (ii); and

(iv) the value of any non-cash benefit or any deferred payment or benefit included in the Parachute Payments shall be determined by the Company's or the Successor Company's independent auditors or tax counsel based on Sections 280G and 4999 of the Code and the regulations for applying those Code

Sections, or on substantial authority within the meaning of Section 6662 of the Code.

11. Amendments. This Plan may be amended by the Compensation Committee or the Board, as applicable at any time to amend Schedule A of this Plan to add additional Participants. In addition, the Plan may also be amended at any time by the Compensation Committee or the Board, as applicable, provided that no amendment shall adversely affect the rights of a Participant hereunder without the written consent of such Participant. Notwithstanding anything herein to the contrary, the Board reserves the right to equitably adjust the Percentage Interest of a Participant if, in the context of an actual Change of Control Transaction, the definitions or calculations herein do not fairly represent the parties' understanding regarding the amount, allocation or payment of the sale proceeds to Participants.

12. Not a Condition of Employment; No Guarantee of Employment. The Plan is not a term or condition of any individual's employment and no Participant shall have any legal right to payments hereunder except to the extent that all conditions required by a Participant have been satisfied in accordance with the terms set forth herein. The Plan is intended to provide a financial incentive to Participants and is not intended to confer upon Participants any rights to continued employment, consultancy or other service provider relationship other than those set out in any separate agreement between the Company and such individuals governing such relationship. Each such Participant's service may be terminated by the Company, the Successor Company or the Participant at any time for any reason, subject to any agreements then in effect regarding such Participant's service or the termination thereof.

13. No Equity Interest; Status as Creditor. Neither the Plan nor the Percentage Interest hereunder creates or conveys any equity or ownership interest in the Company or any rights commonly associated with any such interest, including, but not limited to, the right to vote on any matters put before the Company's stockholders. A Participant's sole right under the Plan will be as a general unsecured creditor of the Company and the Successor Company.

14. No Assignment or Transfer by Participant. None of the rights, benefits, obligations or duties under the Plan may be assigned or transferred by any Participant except by will or under the laws of descent and distribution. Any purported assignment or transfer by any such Participant will be void.

15. Assumption by Successor Company. As a condition to the consummation of a Change of Control Transaction, in addition to any obligations imposed by law upon the Successor Company, the Company shall require the Successor Company to expressly assume the Plan and agree to perform obligations hereunder. All payments under this Plan shall be made by the Successor Company. Neither the Company nor any former or current director, officer, employee or consultant of the Company, nor any agent of any such person or of the Company, shall be personally liable in the event the Company is unable to make payments under this Plan.

16. Severability. If any provision of the Plan is held invalid or unenforceable, its invalidity or unenforceability will not affect any other provision of the Plan, and the Plan will be construed and enforced as if such provision had not been included.

17. Governing Law. This Plan and the rights and obligations of a Participant under the Plan will be governed by and interpreted, construed and enforced in accordance with the laws of the State of Delaware, without reference to principles of conflict of laws. The parties hereby submit to the jurisdiction of the state and federal courts of the Commonwealth of Massachusetts for the resolution of any claims, disputes or other proceedings arising under this Plan.

18. Entire Agreement. The Plan sets forth all of the agreements and understandings between the Company and the Participants with respect to the subject matter hereof, and supersedes and terminates all prior agreements and understandings between the Company and the Participants with respect to the subject matter hereof.

SCHEDULE A

NAME	PERCENTAGE INTEREST
Kong	1.20%
Gozani	5.60%
Higgins	2.30%
McGillin	1.90%

FORM OF GENERAL RELEASE

I understand that I am a Participant in the Management Retention and Incentive Plan (the "Plan") of NeuroMetrix, Inc. (the "Company"). In consideration of receiving certain benefits under the Plan, I have agreed to sign this Release. I understand that I am not entitled to benefits under the Plan unless I sign this Release on or before .1/

In consideration for the benefits I am receiving under the Plan, I hereby release (i) the Company; (ii) the **[name of Successor Company will be inserted at time of the Change of Control Transaction]** (the "Successor Company"); and (iii) each of the foregoing person's respective current and former officers, directors, agents, attorneys, employees, shareholders, parents, subsidiaries, and affiliates (collectively, the "Releasees") from any and all claims, liabilities, demands, causes of action, attorneys' fees, damages, or obligations of every kind and nature, whether or not arising from contract, intentional or negligent tort, fraud, fraud in the inducement, breach of fiduciary duty or duty of loyalty, local, state or federal ordinance, rule, regulation or statute, or any other matter and whether known or unknown, (collectively, "Claims") arising at any time prior to and including the date I sign this Release (the "Release Date"). This general release includes, but is not limited to, any Claims related to or arising out of: (i) my employment with the Company; (ii) my rights as a shareholder of the Company, including my entitlement to receive any stock, option or any other equitable interest or right
convertible into an equity interest in the Company; (iii) any contract, whether express or implied, written or oral; (iv) any tort, including tort of wrongful termination; and (v) the United States Constitution, any State Constitution, or any federal, state or other governmental statute,
regulation or ordinance, including, without limitation, the National Labor Relations Act, Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act of 1967, the Older Workers' Benefit Protection Act of 1990, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1871, the Civil Rights Act of 1991, the Equal Pay Act of 1963, the Worker Adjustment and Retraining Notification Act of 1988, the Employee Retirement Income Security Act of 1974, and the Massachusetts Fair Employment Practices Act, the Massachusetts Wage
and Hour Laws, **[all other applicable state law statutes for employees employed in states other than Massachusetts]**, all as amended.

I understand and expressly agree that this Release extends to all claims prior to the Release Date of every nature and kind whatsoever, known or unknown, suspected or unsuspected, past or present.

I warrant that as of the Release Date, I have not commenced, initiated or made any Claim and that I will not at any time thereafter commence, initiate or make any Claim whatsoever, whether direct or indirect, express or derivative, against the Company, the Successor Company
or any of the Releasees, in respect of any Released Matter. Notwithstanding the above, I understand that I am not releasing any of the following rights and may after the Release Date initiate an action to enforce the following rights: (1) any Claim that cannot be waived under applicable state or federal law, (2) any rights that I have to be indemnified (including any right to

1/ Insert date that is 30 days from date of Participant's receipt.

reimbursement of expenses), arising under applicable law, the Certificate of Incorporation or by- laws (or similar constituent documents of the Company) or any indemnification agreement between me and the Company, or any directors' and officers' liability insurance policy of the Company, for any liabilities arising from my actions within the course and scope of my employment with the Company or within the course and scope of my role as a member of the Board of Directors of the Company, (3) claims for any amounts due to me under the Plan, (4) claims for vested retirement benefits under any tax-qualified retirement plan of the Company, or (5) claims for any compensation or bonuses that have been earned and accrued for periods ending on or prior to the Release Date, but which have not yet been paid. I am not releasing and nothing in this Release will prevent me from filing, cooperating with, or participating in any proceeding before the Equal Employment Opportunity Commission, or the Department of Labor, except that I hereby acknowledge and agree that I will not recover any monetary benefits in connection with any such proceeding with regard to any Claim released in this Release. Nothing in this Release will prevent me from challenging the validity of my general release in a legal or administrative proceeding.

By signing and returning this Agreement, I acknowledge that:

(1) I have carefully read and fully understand the terms of the Plan and this Release; (2) I have entered into this Release

voluntarily and I knowingly release all Claims

that I may have against the Company, the Successor Company and the Releasees; and

(3) The Company advised me that I have the right to and that I should consult with an attorney of my choosing prior to signing this Release.

I may review and consider this Release for a period of up to twenty-one (21) days from the date that I receive it. I agree and understand that my failure to execute and deliver this Release on or before twenty-one (21) days after the date I receive it will release the Company and the Successor Company from any obligation under the Plan to provide any benefits to me. To the extent I execute this Release within less than twenty-one (21) days after the date I receive it, I acknowledge that my decision was entirely voluntary and that I waive the balance of my time.

I will be entitled to revoke this Release at any time within seven (7) days, provided I timely execute and deliver to the Company a written revocation of this Release. Such revocation must be delivered in writing, by certified mail, by hand or courier service (signature of receipt required) within the time permitted to the Chief Executive Officer of the Company at his or her office. If I elect to exercise this right to revoke this Release, I understand that I will forfeit any and all rights to receive any benefits that might otherwise be due to me under the Plan following my revocation.

I acknowledge that the Company may be required to withhold taxes on amounts to be paid to me under the Plan.

I understand and accept that the final decision as to the amounts that I have earned under the Plan will be made by the Board of Directors of the Company in accordance with the Plan.

Date: By: Name:

Exhibit A - 3

EXHIBIT 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-118059, 333-135242, 333-151195, 333-159712, 333-159713, 333-167180, 333-173769, 333-183071, 333-186827, 333-189393, 333-190177, 333-197407, 333-205827, 333-211379, 333-218431 and 333-226245) and on Form S-3 (Nos. 333-150087, 333-162303, 333-189392, 333-197405, 333-199359, 333-208923, 333-209528, 333-211919, 333-215792 and 333-219783) of our report dated January 27, 2020 relating to the financial statements and schedule of NeuroMetrix, Inc, which appears in the Company's Annual Report on Form 10-K for the year ended December 31, 2019. Our report contains an explanatory paragraph regarding the Company's ability to continue as a going concern.

/s/ Moody, Famiglietti, & Andronico, LLP

Moody, Famiglietti, & Andronico, LLP
Tewksbury, Massachusetts
January 27, 2020

Exhibit 31.1

CERTIFICATION

I, Shai N. Gozani, certify that:

1. I have reviewed this Annual Report on Form 10-K of NeuroMetrix, 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

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: January 27, 2020

/s/ SHAI N. GOZANI, M.D., PH.D.

Shai N. Gozani, M.D., Ph.D.
Chairman, President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION

I, Thomas T. Higgins, certify that:

1. I have reviewed this Annual Report on Form 10-K of NeuroMetrix, 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

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: January 27, 2020

/s/ THOMAS T. HIGGINS

Thomas T. Higgins
Senior Vice President, Chief Financial Officer and Treasurer

Exhibit 32

CERTIFICATION

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), each of the undersigned officers of NeuroMetrix, Inc., a Delaware corporation (the "Company"), does hereby certify, to such officer's knowledge, that:

The Annual Report for the year ended December 31, 2019 (the "Form 10-K") of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: January 27, 2020

/s/ SHAI N. GOZANI, M.D., PH.D.

Shai N. Gozani, M.D., Ph.D.
Chairman, President and Chief Executive Officer

Date: January 27, 2020

/s/ THOMAS T. HIGGINS

Thomas T. Higgins
Senior Vice President, Chief Financial Officer and Treasurer