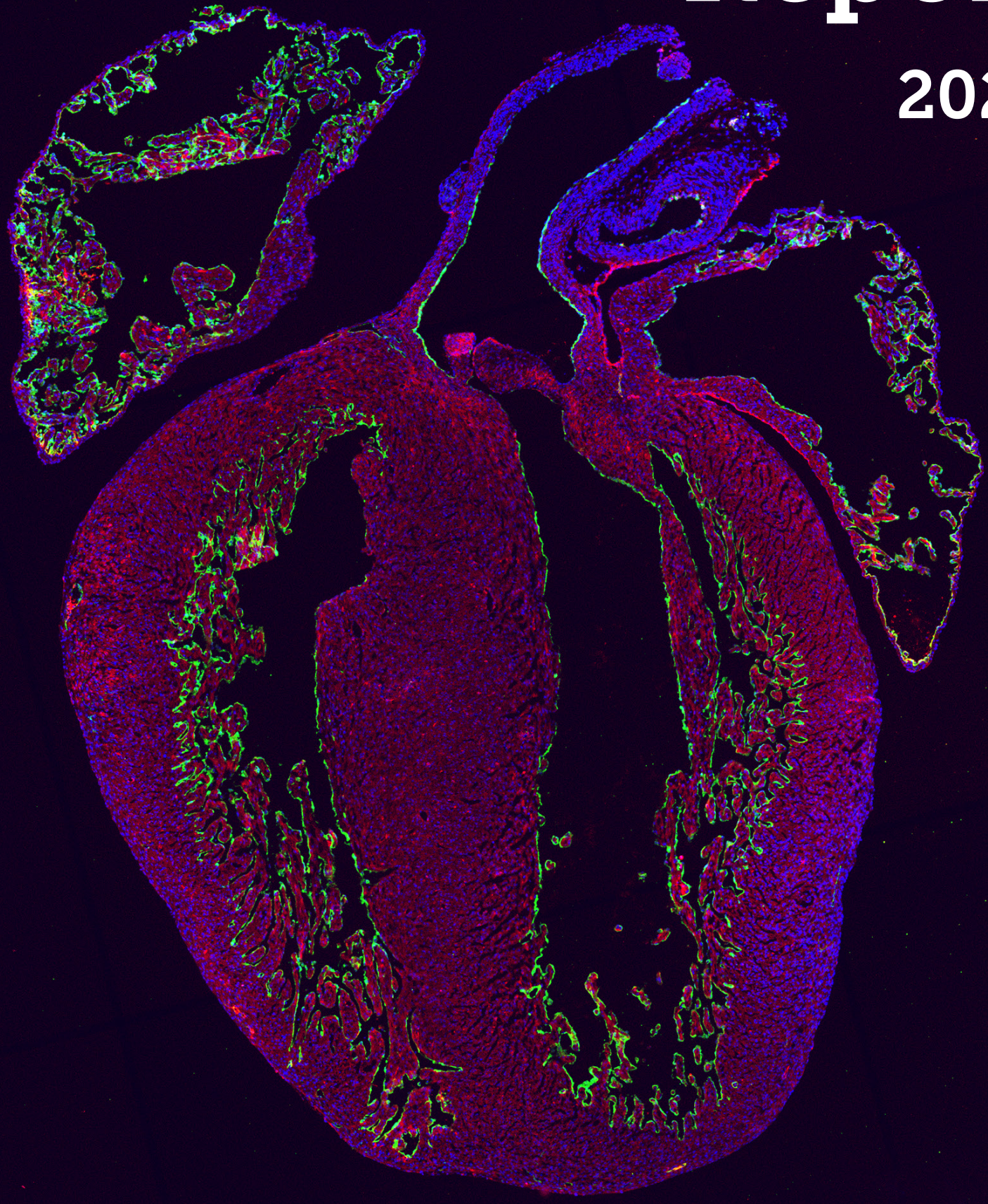
MMRI
Masonic Medical Research Institute

Annual Report

2024



2024 Annual Report Cover Image

2024 Annual Report image taken by Tongbin Wu, Ph.D., assistant professor of biomedical research and translational medicine at MMRI.

The cover image shows immunofluorescent staining of a neonatal mouse heart under a fluorescent microscope. The heart's four chambers and aorta are visible. This heart is stained for cardiac proteins expressed at distinct locations (green: endocardium; red: myocardium; blue: DNA in cell nuclei).

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About MMRI

Masonic Medical Research Institute (MMRI) is an independent medical research laboratory performing collaborative research in complex diseases and genetic disorders to *enable tomorrow's cures.*

In 1958, MMRI was founded by the New York State Grand Lodge of Free and Accepted Masons after they helped raise funds to eradicate rheumatic diseases. Today, MMRI focuses on **propelling** medical science, **empowering** scientists to take risks, **sharing** ideas, and **building** an inclusive community.

2024 All Staff Photo

Cardiovascular Disease Research

Heart disease is the leading cause of death in the U.S., and since 1958, MMRI has been making great progress in understanding its causes and creating ways to treat it. Our research focuses on how certain genes and molecular changes contribute to various heart conditions, like cardiomyopathies, congenital heart disease, heart failure, diabetes-related heart disease, as well as inflammation and abnormal heart rhythms.

Neurocognitive Disease Research

We also research genes linked to neurocognitive conditions such as autism and PTSD. In 2023, incidences of autism rose to 1 in 36 children and 70 to 80% of the risk for autism is inherited or caused by other genetic factors (TACA). Therefore, we are studying how genetics, environment and social factors play a role in the rise of autism and PTSD, and exploring connections between brain and heart health.

Autoimmune Disease Research

In autoimmune diseases like lupus, our research is uncovering new genes and pathways that cause this devastating ailment. It is estimated that 322,000 to 1.5 million people have some form of lupus. Importantly, ninety percent of people living with it are female and it disproportionately affects minority populations (Lupus Foundation of America). MMRI aims to find better ways to diagnose, treat, and hopefully cure these conditions by targeting their underlying genetic and molecular changes.

Mission

MMRI is dedicated to improving the health and quality of life for all humankind. Our primary mission is to conduct high-quality basic biomedical and clinical research aimed at generating knowledge and information necessary for understanding molecular mechanisms of disease and the development of medical cures and treatments of tomorrow. MMRI is also committed to providing education and training to basic scientists, clinical researchers, and students who will perpetuate and extend the fight against disease worldwide.

Vision

MMRI's vision is to build scientific teams that can combine molecular biology, chemistry, computation, technology, and engineering to create novel approaches to understanding and deciphering causes of disease. Using this knowledge, we will advance basic research to clinical applications, therapeutics, and cures. To this end, the Institute will foster an environment of creativity, risk-taking, and open sharing of data and research. Finally, this new model will seek collaborations, both within the Institute and worldwide, in our mission to combat disease.

Board of Directors

The Board of Directors consists of 15 distinguished Freemasons elected to three-year terms by the Grand Lodge of the State of New York, Free and Accepted Masons. Their selection is based upon their outstanding business and professional experience. They all serve the Institute without compensation.

EXECUTIVE COMMITTEE

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Update From Our Board President

To the Grand Lodge,

On behalf of the board of directors of MMRI, I am pleased to provide you with this annual report.

In many measures, 2024 was another successful year for the MMRI. We continue to receive highly competitive grants from the National Institute of Health and the Department of Defense. Our long-established relationship with the Lupus and Allied Disease Association, Inc. continued with three grants. Our first annual gala was a huge success as was our second annual golf tournament. We hired several new scientists, expanding our incredible scientific workforce. We made several key improvements in our administrative team, ensuring our continued local, state, and national exposure.

Unfortunately, even having received several estate gifts, finances remain of utmost concern. With the future of NIH funding currently unclear and our for-profit entity continuing to require more runway to reach solvency, we need your support now more than ever. Please help us fill the gap between our research costs and what government grants give us, so we can fulfill our mission to find ways to save lives.

We are also exploring multiple additional options to increase our financial resources. We have established an ambassador program to increase our awareness across New York State. We also continue to promote MMRI as the National Masonic Charity across the United States and overseas. Our scientists continue to apply for federal, foundational, and industry grants and already exceed the national average for acceptance.

Everyone, every staff member, every scientist, and every board member of MMRI is dedicated to assuring its viability. We are all working tirelessly to guarantee the success of our vital research and accomplishing our mission of improving the health and welfare of all mankind.

Sincerely,

R.∴W.∴ Robert A. Hewson, DPM
President, MMRI Board of Directors

Update From Our Executive Director

Dear Supporters and Stakeholders,

As executive director of the Masonic Medical Research Institute (MMRI), I am proud to highlight the remarkable achievements of the fiscal year ending December 31, 2024.

Thanks to the dedication and hard work of our researchers, staff and collaborators, we have made significant strides in advancing biomedical research focused on critical areas of human health, including autoimmunity, heart disease, and neuronal disorders. In this regard, our six principal investigators have continued to make remarkable contributions to the field, with numerous publications in prestigious scientific journals. Indeed, MMRI's total lifetime publications in peer-reviewed top journals now total over 420!

One of the publications I would like to highlight is from the laboratory of Dr. Jason McCarthy, associate professor of biomedical research and translational medicine and scientific operations director at MMRI. His research showed that, when targeted specifically to the spleen, histone deacetylase (HDAC) inhibitors, chemical compounds that can be used to treat cancers and other diseases, can improve the healing response in the heart following a heart attack. As a result of Dr. McCarthy's findings, this targeting strategy may be used clinically, to reduce the possibility of having an arrhythmia or a second adverse event following the first heart attack.

With respect to our Summer Fellowship Program, our dedication to education remains steadfast. In 2024, we had a record-breaking participation in our highly competitive Summer Fellowship Internship Program, with 19 undergraduate students participating in this prestigious program. Students accepted into this program are provided an invaluable hands-on experience in groundbreaking research. For many, this opportunity serves as a springboard to top-tier graduate programs, medical schools, pharmaceutical schools, veterinarian schools and beyond. We are deeply thankful to our donors, whose generosity once again fully funded this program.

In this regard, because of the breadth and impact of our work, our research programs continue to receive support from esteemed federal agencies and national foundations, including the National Institutes of Health (NIH), Department of Defense (DOD), American Heart Association (the association), and the Lupus and Allied Diseases Association, Inc. (LADA). This recognition underscores the quality and importance of the work we do at MMRI.

However, it is important to note that grants only cover science, approximately 50% of our total budgetary costs. Like other major research institutions across the U.S., MMRI relies heavily on philanthropy to bridge this funding gap. Your generosity is vital to achieving our research goals and finding solutions to some of the world's most challenging diseases. Together, we can make a lasting impact.

With that in mind, I am excited to report that 2024 brought us more than 480 new/first-time donors! We hope to continue this momentum into 2025 and increase this number even more! Indeed, the addition of two new members to our fundraising team will help us do just that. I am pleased to introduce Pamela G. Matt, Esq. as the director of development and Zachary Nordstrom as development officer/regional liaison. They, alongside our principal development officer, Stephen Izzo, have immensely impacted our philanthropic goals, including the growth of our Upstate Community Advisory Committee (CAC) and the formal establishment of a Downstate Advisory Committee (DAC). The two groups are working hard to promote MMRI as a leader in biomedical research across the country and already have some very exciting things planned, including the inaugural *Together for Autism Research* Gala on Thursday, May 29, 2025, at the Grand Lodge of the State of New York. More information about this can be found at mmri.edu/autismgala. We hope to see you there!

We also launched a new MMRI Ambassador Program, an opportunity that allows fellow Masons to get involved with all the excitement happening at MMRI! Volunteers in New York State can sign up to serve as our advocates, helping us spread the message to the masonic community across the state about the amazing groundbreaking medical research. Ambassadors represent MMRI at lodge meetings, tabling opportunities, events and much more! If you are interested in this program, please contact Zachary Nordstrom at znordstrom@mmri.edu for more information.

Hopefully, many have also noticed our new website- please check us out at mmri.edu! Our marketing and communications team worked hard this year to launch a modernized website that makes it easier to navigate and learn about our scientific research. They have also held three successful fundraising events this past year: the inaugural 1958 Gala, Utica's First Lupus Walk, and the Annual Charity Golf Classic in honor of Sal Raspante— all three events were the talk of the town, and we hope you choose to attend/support these events again in 2025. Information on dates and events can be found at mmri.edu/events.

In more administrative news, Dr. Zhiqiang Lin was promoted to associate professor of biomedical research and translational medicine, recognizing his significant contributions since joining the MMRI in 2018. Dr. Lin has been instrumental in advancing cardiovascular research, particularly for his efforts focused on the effects of long COVID-19 on heart and lung health.

In addition, Dr. Khanh Ha, a postdoctoral fellow in the McCarthy Laboratory since 2018, was promoted to instructor this year. Dr. Ha has demonstrated leadership qualities, initiatives towards leading our summer fellowship program and a strong work ethic that aligns with the values and goals of our organization.

This year, too, we were fortunate to recruit another key principal investigator to MMRI. Dr. Matthew Nystoriak, associate professor of biomedical research and translational medicine, was recruited to MMRI from the University of Louisville, Kentucky. Dr. Nystoriak's work focuses primarily on cardiovascular research, and specifically, on cardiac blood flow to the heart. Indeed, his most recent work in these areas was recently published in Arteriosclerosis, Thrombosis, and Vascular Biology, one of the leading journals by The American Heart Association.

Finally, I was honored this year to receive a prestigious 2-year appointment as the elected chair of the Basic Cardiovascular Sciences (BCVS) Council, the largest scientific council at the American Heart Association, with over 5,000 members globally from more than 45 countries.

As we set our sights on 2025, we are excited to pursue our strategic goals and expand our vision with a heightened sense of purpose and a focus on sustainability—both for the institute and for our future. Thank you to the unwavering support of our donors, community members, staff, board of directors, and Grand Lodge of the State of New York. 2024 marked a year of significant impact. We hope and look forward to this continued momentum in 2025, as, together, we will combat the world's most devastating diseases, one family at a time.

Sincerely,

Maria Kontaridis

Maria I. Kontaridis, Ph.D.
Executive Director
Gordon K. Moe Professor and Chair of Biomedical Research and Translational Medicine
Director of Research

Our Administrative Team

Maria Kontaridis, Ph.D.

Executive Director
Gordon K. Moe Professor and Chair of Biomedical Research and Translational Medicine
Director of Research

Varun Balaji

IT Director

Lisa Cooper, CPA

Finance Director

Curt Fowler

Facilities Manager

Pamela G. Matt, Esq.

Development Director

Michael Mayo

Interim Finance Director

Jason McCarthy, Ph.D.

Scientific Operations Director
Associate Professor of Biomedical Research and Translational Medicine

Millie Occhionero

Marketing and Communications Director

ADMINISTRATIVE ASSISTANT

Chrissy Ade
Administrative Assistant

COMPLIANCE

Kelé Piper
Compliance Officer – Consultant

DEVELOPMENT, MARKETING & COMMUNICATIONS

Rebekah Hedeen
Marketing Coordinator

Stephen Izzo
Principal Development Officer

Nicole Knoblock
Events & Internal Communications Coordinator

Colleen LeFever
Public Relations & Marketing Associate

Zachary Nordstrom
Development Officer – Regional Liaison

Christie Schleider
Administrative Assistant to Development, Marketing & Communications

Lyndsay Schoen
Multi-Media Associate

Shannon Smith
Data Analyst

EXECUTIVE ASSISTANT

Terri Cronin
Executive Assistant to Executive Director/ Executive Support to the Board of Directors

FACILITIES

Edgardo Colon
Lead Maintenance Mechanic

John DeMarco
Senior Maintenance Technician

Tom Lloyd
Facilities Associate

Ricky Spight
Facilities Associate

Richard Thomas
Security and Receiving Officer

Randy Tulloch
Facilities Associate

FINANCE

Crystal Jadwick
Accounts Administrator

Brandee Mason
Accounts Specialist

Victoria Ogrodnik
Sr. Accountant

Travis Thibodeaux
Procurement and Contracts Administrator

GRANTS

Jessica Densten
Grants Administrator

Eleanor Kuszmar
Grant Administrator – Consultant

HUMAN RESOURCES

Anthony LaPolla
Human Resources Officer – Consultant

Jennifer Stiffler
HR Generalist

INFORMATION TECHNOLOGY

Tom Massaro
IT Specialist

Steven Negron
IT Support Technician

SCIENTIFIC WRITER

Frank Dinenno, Ph.D.
Scientific Grants and Manuscript Writer

Our Principal Investigators

Maria Kontaridis, Ph.D.

The Kontaridis lab is focused on understanding the mechanisms causal to the development of congenital heart diseases, heart failure, diabetes/obesity, autism, autoimmune disorders, gastrointestinal diseases, and cancer. Dr. Kontaridis' research is rooted in identifying novel genetic mutations and determining their effects on the cellular and molecular pathways that ultimately modulate development, severity, and pathogenicity of these conditions. With a commitment to advancing scientific understanding, she strives to uncover transformative mechanistic insights that can lead to the development of novel therapeutics for these disorders in the near future.

Chase Kessinger, Ph.D.

The Kessinger Lab is dedicated to the study of venous thromboembolism, cardiovascular disease, PTSD, and lupus. Through the use of advanced imaging techniques and novel diagnostic and therapeutic agents, their work aims to understand these diseases to improve the treatment and diagnosis of patients world-wide.

Zhiqiang Lin, Ph.D.

Dr. Zhiqiang Lin's research centers on basic molecular mechanisms that govern organ and tissue growth, as well as understanding cellular responses to disease-induced stress.

Jason McCarthy, Ph.D.

Dr. Jason McCarthy creates molecular imaging and drug delivery materials to modulate biology, and visualize biological processes, investigating diseases throughout the body.

Matthew Nystoriak, Ph.D.

Dr. Matthew Nystoriak is dedicated to understanding how blood flow to the heart is regulated by crosstalk between intermediary metabolism and electrical signals in cells of the vasculature.

Nathan Tucker, Ph.D.

The Tucker lab is dedicated to the study of cardiac health through genetic diversity. His team uses human genetics and ambitious technological approaches to define the interactions among genes and pathways associated with human disease with a focus on the cardiovascular system.

Tongbin Wu, Ph.D.

The Wu lab is dedicated to the study of left ventricular noncompaction (LVNC) and dilated cardiomyopathy (DCM). Using genetics, next-generation sequencing tools and molecular biology, Dr. Wu's work aims to understand LVNC and DCM during embryonic development to prevent congenital heart disease and to improve the treatment and diagnosis of patients worldwide.

Our Scientific Team

INSTRUCTOR
Khanh Ha, Ph.D.

POSTDOCTORAL FELLOWS
Juan Carlos Gutiérrez Suárez, M.D., M.Sc.
Myles Hodgson, Ph.D.
Samantha Le Sommer, Ph.D.
Enxu Li, Ph.D.
Zizhen Liu, Ph.D.
Farheen Naz, Ph.D.
Abhishek Mishra, Ph.D.
Luana Nunes Santos, Ph.D.
Vikas Sharma, Ph.D.
Yan Sun, Ph.D.
Genyu Wang, Ph.D.

RESEARCH SCIENTISTS
Gary Aistrup, Ph.D.
Saravanakkumar Chennappan, Ph.D.
Robert Gardner, Ph.D.
Vipin Verma, Ph.D.
Greg Wang, Ph.D.
Bing Xu, Ph.D.

RESEARCH ASSOCIATES
Michelle Lance, Ph.D.
Associate Computational Biologist II

Ryan Pfeiffer
Research Associate II

Robert Goodrow
Research Associate

RESEARCH ASSISTANTS
Riley Cott
Amanda Davenport
Ariana Della Posta
Mayurika Desai
Aaron Farley
Maddelyn Hoehn
Levi Legler
Joshua Macera
Yuriy Milobog
Elise Stanley

MVHS CLINICAL RESARCH FELLOWS
Alice Bukrinsky, M.D.
Negar Mehrabi, M.D.

AFFILIATED FACULTY
Ben Bovin, Ph.D.
Lauren Endres, Ph.D.
Zhen Ma, Ph.D.
Max Majireck, Ph.D.
Nicholas Qandah, DO, FACOS
Kenneth Reed, Ph.D.
Randy Stout, Ph.D.
George Tegos, Ph.D.
Sathyadev Unudurthi, Ph.D.

ANIMAL CARE
Damian Bohler, LATG
Animal Research Facilities Manager

Laura Coon
Sr. Animal Care Technician

Lauren Evans
Animal Care Technician

ELECTROPHYSIOLOGY
Robert Goodrow, Jr.
Electrophysiology Core Manager

FLUORESCENCE-ACTIVATED CELL SORTING (FACS)
Samantha Le Sommer, Ph.D.
FACS Core Manager

GENE THERAPY
Zhiqiang Lin, Ph.D.
Gene Therapy Core Manager

GENETICS
Nathan Tucker, Ph.D.
Genetics Core Manager

Ryan Pfeiffer
Genetics Core Manager

HISTOLOGY/IMAGING
Chase Kessinger, Ph.D.
Histology/Imaging Core Manager

iPSCs
Maria I. Kontaridis, Ph.D.
iPSCs Core Manager

Core Facilities

ANIMAL CARE
Damian Bohler, LATG
Animal Research Facilities Manager

The animal care department is a support unit for animal-based research at MMRI. Our mission is to provide the best possible veterinary and humane care for the laboratory animal species used by researchers at our institution. We are licensed by the United States Department of Agriculture (USDA), hold a New York State, Department of Health (NYS DOH) license and we hold an assurance with the Office of Laboratory Animal Welfare (OLAW) as part of the Public Health Service (PHS) Policy.

GENE THERAPY
Zhiqiang Lin, Ph.D.
Gene Therapy Core Manager

The core provides services of packaging adenovirus, adeno-associated virus (AAV) and lenti virus, which are convenient tools for expressing genes of interest in cultured cells or mice. For tissue-specific gene delivery studies, we can package heart specific, adipose tissue-specific or liver-specific AAV vectors. AAV vectors are safe and have been widely used in gene therapy drugs and clinical trials.

GENETICS CORE
Nathan Tucker, Ph.D.
Genetics Core Manager

Ryan Pfeiffer
Genetics Core Co-manager

The ultimate goal of our genetics core is to identify the factors that are responsible for disease. This knowledge will facilitate the development of gene-specific therapies and cures for heart failure, congenital heart disease, and arrhythmias. It also provides us the opportunity to identify individuals at risk for sudden cardiac death.

ELECTROPHYSIOLOGY
Robert Goodrow, Jr.
Electrophysiology Core Manager

The electrophysiology core utilizes cardiac and neuronal cells and tissues to study heart or brain electrical activity, respectively. Data is used to understand and compare normal and abnormal heartbeats or arrhythmias, as well as determine signaling functions in neuronal cells of the brain. Techniques include voltage-clamping, utilizing single cells for cardiac ionic channel currents and utilizing tissues for action potential recordings.

FACS
Samantha Le Sommer, Ph.D.
FACS Core Manager

The flow cytometry core at MMRI provides instrumentation and expertise in a broad range of basic and medical science disciplines. Samples are prepared by individual investigators, who then deliver samples to the core for flow cytometric analysis, cell labeling or cell sorting.

HISTOLOGY, IMAGING & SURGERY
Chase Kessinger, Ph.D.
Histology, Imaging & Surgery Core Manager

The imaging core was developed to facilitate the non-invasive analysis of preclinical models of disease. The imaging suite is outfitted with state-of-the-art equipment for small animal in vivo imaging using fluorescence, x-ray computed tomography and ultrasound. The histopathology core provides a range of histological services, including tissue fixation and processing, paraffin and cryosectioning, common and advanced histological stains, as well as immunohistochemistry and fluorescence staining. The surgical core provides a range of cardiovascular focused surgical services, including heart attack, heart failure, ischemic reperfusion – heart attack; various chronic vascular surgeries to induce blood clots, and pressure-volume loops. Other surgical procedures can also be requested.

iPSCs CORE
Maria I. Kontaridis, Ph.D.
iPSCs Core Manager

The inducible pluripotent stem cells core is a state-of-the-art tissue culture facility that utilizes CRISPR-technology and genome editing to elevate stem cell investigations. The iPSCs Core provides various services, trainings, and access to top-of-the-line equipment, including:

- Multi Electrode Array (MEA)
- Electroporation system
- Dedicated cell culture room
- Dedicated brightfield microscope.

Zhiqiang Lin, Ph.D. Promoted to Associate Professor

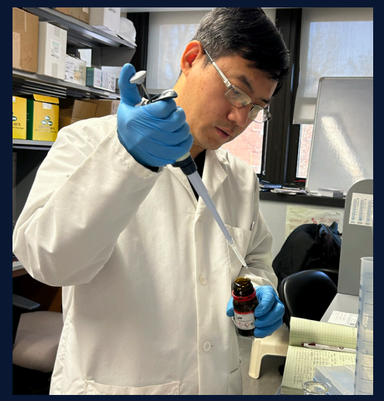
Zhiqiang Lin, Ph.D., has been promoted to associate professor of biomedical research and translational medicine at MMRI, recognizing his significant contributions since joining the organization in 2018. Lin has been instrumental in advancing cardiovascular research as a key faculty member.

Lin earned his Ph.D. from Peking University in 2008, followed by postdoctoral research at Boston Children's Hospital of Harvard Medical School under the tutelage of Dr. William T. Pu. In 2013, Dr. Lin was promoted to instructor at Harvard Medical School prior to being recruited by MMRI as assistant professor and principal investigator in 2018.

"It's a tremendous honor to work and be recognized at MMRI," said Dr. Lin. "I am energized and committed to advancing cardiac medicine and look forward to continuing impactful research that enhances human health."

Lin's area of investigation is focused on heart development and disease, with an emphasis on cardiomyocyte regeneration, metabolism and immune responses in the heart. Among his many accomplishments is his groundbreaking work on the role of the SARS-CoV-2 Spike protein in COVID-19-related heart injury, alongside a series of publications and a patent on cardiac repair.

"Dr. Lin's promotion underscores MMRI's growing reputation as a leader in cardiovascular and biomedical research," said Maria Kontaridis, Ph.D., executive director at MMRI. "We are proud of his achievements and excited for the continued success of his lab's innovative work."



Promotion of Khanh Ha, Ph.D., to Instructor

MMRI is pleased to announce Khanh Ha, Ph.D., has been named instructor in the McCarthy lab at MMRI.

"We are delighted to announce the promotion of Dr. Ha to instructor," said Maria Kontaridis, Ph.D., executive director. "He has demonstrated leadership qualities, initiative and a strong work ethic that align with the values and goals of our organization."

In this role, Ha will continue to work under Jason McCarthy, Ph.D., associate professor of biomedical research and translational medicine and scientific operations director at MMRI, to research the synthesis of novel imaging agents and grow MMRI's coveted Summer Fellowship Program to new heights.

"I am beyond thrilled to receive this promotion and look forward to taking on new responsibilities and challenges," said Dr. Ha.

MMRI Recruits New Associate Professor

Matthew Nystoriak, Ph.D., has been recruited to MMRI and named associate professor of biomedical research and translational medicine. In this role, Dr. Nystoriak will spearhead a laboratory dedicated to coronary blood flow and cardiovascular medicine. Dr. Nystoriak earned his bachelor's degree in biology and his doctorate in pharmacology at the University of Vermont, Burlington, Vermont. He then went on to complete his postdoctoral training at both the University of Washington, Seattle, Washington, and the University of California, Davis, California. His research has been published in several prestigious scientific journals, including Circulation Research, Nature Communications, Science Signaling, and the Journal of Physiology.

"Heart disease is the leading cause of death in the United States. My research is focused on understanding how various lifestyle and environmental factors affect the heart and blood vessels, which are crucial to cardiovascular health. MMRI is at the forefront of cardiovascular research, and I am thrilled to contribute to this world-class institute's mission."

"The Halfond-Weil Postdoctoral Fellowship has provided me the opportunity to expand autoimmunity research and has also provided me with experience in writing a grant and managing an award, which is vital in moving up the academic ladder."

Halfond-Weil Postdoctoral Fellowship Awarded to Dr. Samantha Le Sommer

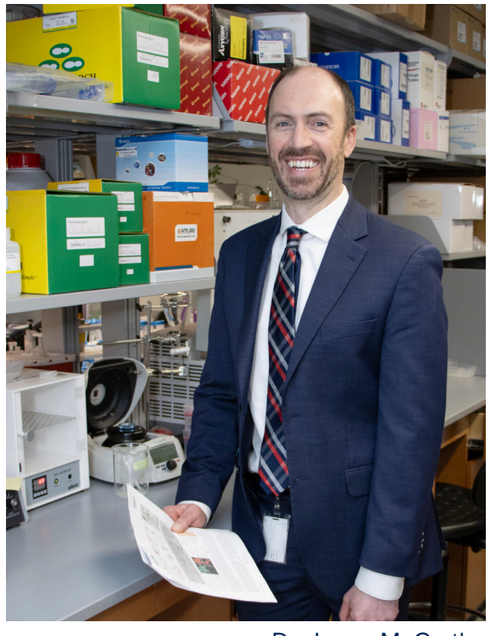
Samantha Le Sommer, Ph.D., postdoctoral fellow in the Kontaridis lab since 2021, has been awarded the 2024 Halfond-Weil Postdoctoral Fellowship Award. Le Sommer's research project is focused on identifying how and why people acquire autoimmune diseases, specifically systemic lupus erythematosus (SLE). Approximately 90% of cases of lupus occur in women who are over the age of 18, however, it has also been observed in young children born with a rare genetic disorder called Noonan Syndrome (NS). This has led to the hypothesis in the lab that the genes involved in causing NS, play a role in the development of lupus. As such, the proteins that encode these genes may be viable drug targets for the treatment of SLE.

The Halfond-Weil Postdoctoral Fellowship is a competitive grant awarded annually to a talented postdoctoral fellow at MMRI. This grant helps support new scientists as they grow into their independent scientific careers. MMRI thanks the Eighth Masonic District Association of Manhattan Charity Fund for its support of the Halfond-Weil Postdoctoral Fellowship.

MMRI Publishes Breakthrough Study

Detailing a Novel Approach to Minimize Damage After a Heart Attack

JASON R. MCCARTHY, PH.D., associate professor of biomedical research and translational medicine and scientific operations director at MMRI, recently published an innovative manuscript titled, *Biomimetic Nanomaterials for the Immunomodulation of the Cardiosplenic Axis Post-Myocardial Infarction*.



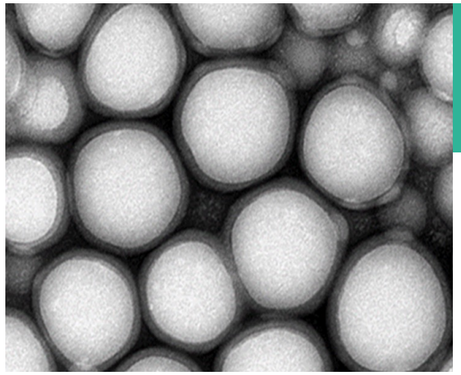
Dr. Jason McCarthy

The manuscript details how, when targeted specifically to the spleen, histone deacetylase (HDAC) inhibitors, chemical compounds that can be used to treat cancers and other diseases, have the potential to improve the healing response following a heart attack.

Normally after a heart attack, immune cells migrate from the spleen to the heart in response to injury. Here, Dr. McCarthy and his team found that they could design nanomaterials that mimic dead and dying red blood cells, causing them to be retained in the spleen and enabling them to deliver inhibitors that modulate the inflammatory response.

Notably, this targeting strategy results in a significant decrease in cardiac scar size and a preservation of heart function, even after just one dose, when given within two hours of heart attack injury.

As a result of Dr. McCarthy's findings, there is a potential for his strategy to be used more clinically, to significantly reduce cardiac damage and possibly prevent a second event or an arrhythmia following a heart attack.



Negatively stained transmission electron microscopy images of core–shell hybrid nanostructure of eSENTs.

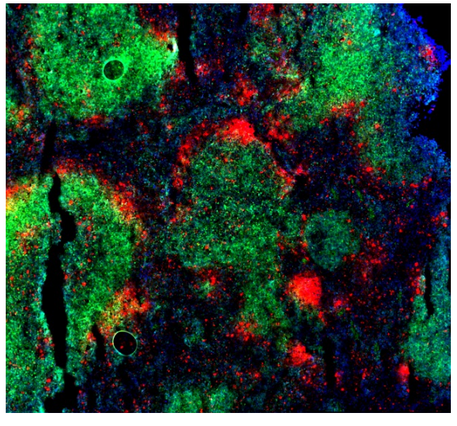
According to the CDC, heart disease is the leading cause of death in the United States, which affects approximately one in five Americans.

MMRI scientists who contributed to the study include Jason R. McCarthy, Ph.D., Rajendran JC Bose, Ph.D., Chase W. Kessinger, Ph.D., Khanh Ha, Ph.D., Bing Xu, Ph.D., and Maria I. Kontaridis, Ph.D. This work was a collaboration with scientists at the Medical University of South Carolina, Charleston, South Carolina; McMaster University, Hamilton, Ontario; the Ralph H. Johnson Veterans Affairs Medical Center, Charleston, South Carolina; and Stanford University School of Medicine, Stanford, California.

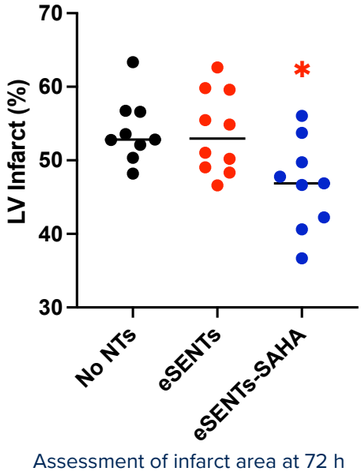
"We are thrilled to have our study published in Advanced Materials, one of the leading journals in my field of research," said Dr. McCarthy. "The novelty of our research may have far-reaching applicability for the treatment of a number of both acute and chronic conditions where the spleen may be involved."

In continuation of their studies, Dr. Donald Menick, Medical University of South Carolina, Columbia, South Carolina, and Dr. McCarthy were recently awarded a joint four year $3 million grant from the National Institutes of Health (NIH). This award will allow Dr. McCarthy and team to utilize advanced nanomaterials as tools to localize inhibitors to the spleen and to dissect the mechanisms by which HDACs modulate cardiac inflammatory effects after myocardial infarction.

To learn more about Dr. McCarthy's research, visit mmri.edu/mccarthy-lab.



Immunofluorescence microscopy demonstrating nanoparticle localization within the marginal zone of the spleen (red). The B cells are stained in green.



Assessment of infarct area at 72 h post-myocardial infarction depicting a 14% decrease in infarct size in the treated group.

2024 MMRI Publications

All of our publications are published in high profile, top tier peer reviewed journals.

Identification and characterization of two novel KCNH2 mutations contributing to long QT syndrome.

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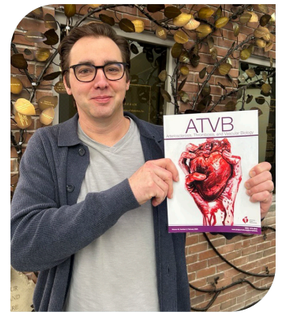

Published on the cover.

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MMRI Scientist Publishes Breakthrough Study Detailing the Keto Diet's Potential in Improving Blood Flow to the Heart

"These findings suggest that ketone body delivery to the heart could represent a promising strategy for improving oxygen delivery in patients with ischemic heart disease. This research further highlights the potential of ketogenic approaches, such as lifestyle changes or targeted therapies, to improve cardiovascular health." said Nystoriak.

Matthew Nystoriak, Ph.D., associate professor of biomedical research and translational medicine at Masonic Medical Research Institute (MMRI), has uncovered groundbreaking insights into heart health in a recent study titled, Myocardial Hyperemia via Cardiomyocyte Catabolism of β-Hydroxybutyrate. The research highlights how a ketone body called β-hydroxybutyrate (3-OHB) — a molecule produced by the liver when breaking down fat — can enhance blood flow to the heart.

According to the CDC, heart disease is the leading cause of death in the United States, and ischemic heart disease, caused by insufficient blood and oxygen supply to the heart, is the number one cause in the world. Understanding how to regulate and improve blood flow to the heart is essential for developing new treatments and improving patient outcomes.

In collaboration with the University of Louisville, Dr. Nystoriak, who was recently recruited to MMRI, showed that elevated levels of 3-OHB, which occurs during fasting, exercise, or as a result of certain diabetes medications like SGLT2 inhibitors, improves cardiac blood flow. While ketones have long been associated with heart health, how they work has remained unclear — until now. This research revealed that heart muscle cells using 3-OHB as an energy source drive better blood flow, a process known as hyperemia, suggesting that the heart's ability to switch between different energy sources, such as fats, sugars, and ketones, plays a crucial role in maintaining its blood and oxygen supply. In support of this work, Nystoriak's research was recently funded by a five-year $2.7 million National Institutes of Health (NIH) grant that is in collaboration with Dr. Brad Hill from the University of Louisville. These new studies pave the way for new therapies aimed at treating heart disease.

NIH Awards 5 year $3.7 Million Grant to MMRI Researcher Chase Kessinger, Ph.D., to Investigate Pulmonary Embolism

Dr. Kessinger hopes to improve diagnosis and treatment for patients with pulmonary embolism.

The National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH) recently awarded a five-year $3.7 million grant for Dr. Kessinger's research into the third most common cause of cardiovascular death, pulmonary embolism (PE).

The study aims to use advanced imaging techniques to understand how the size and age of blood clots impact lung inflammation and scarring. Advanced imaging techniques may also allow researchers to measure the effectiveness of promising clot-dissolving therapies.

"PE is a devastating cardiovascular ailment that can lead to drastic reductions in quality of life and chronic, long-lasting limitations," said Kessinger. "This project aims to help clinicians better diagnose and treat patients with PE."

"We're conducting groundbreaking research right here in the Mohawk Valley," said Kessinger. "This funding will empower us to support talented scientists and their transformative projects in Utica, fostering a thriving world-class scientific community."

A PE is a sudden blockage in one of the pulmonary arteries in the lungs. It is usually caused by a blood clot that has traveled from a deep vein to the lungs and prevents blood from flowing properly. This often happens during extended periods of immobility, such as long-distance travel, when reduced blood flow can lead to complications.

Kessinger specializes in integrating translational imaging techniques and novel diagnostic and therapeutic agents to study and treat cardiovascular disease. His current work aims to understand the biology of PE and pulmonary hypertension and its inflammatory response. His hope is to find tools to better identify and target blood clots to prevent PE.

2024 Federal and Foundational Grant Funding

National Institutes of Health R01 Research Grant
02/01/20 – 01/31/24 · $62,269/year
(Henke, PI; McCarthy, Co-Inv.)

The Monocyte/Macrophage Role in Experimental Deep Vein Thrombosis Resolution and Vein Wall Injury
Monocyte/macrophages (Mo/MØ) are the primary leukocyte directing two key pathobiologic processes: venous thrombosis resolution and the associated vein wall fibrotic injury. Mo/MØ are classified by their inflammatory or anti-inflammatory functions, which is a dynamic process in vivo. In this proposal, we will: 1. Define the origin and phenotype of Mo/MØ in the thrombosed vein with sex, age, and thrombogenic model variation; 2. Directly determine the Mo/MØ mediated mechanisms of VT resolution and vein wall injury; and 3. Determine if systemic Mo/MØ polarization or local exogenous modulation of thrombus environment can promote VT resolution and vein wall healing.

Department of Defense Lupus Impact Award
09/30/21 – 09/29/25 · $187,500/year
(Kontaridis, PI)

Elucidating the Functional Mechanisms by Which the Protein Tyrosine Phosphatase SHP2 is Involved in the Pathogenesis of Systemic Lupus Erythematosus
The project will determine the signaling pathways and mechanisms by which SHP2 functions to induce lupus pathogenicity

National Institutes of Health R01 Research Grant
12/15/21 – 11/30/26 · $640,967/year
(Lin, PI; McCarthy, Co-Inv.)

YAP and IRF2BP2 regulation of cardiomyocyte innate immune responses
YAP and IRF2BP2 play important roles in modulating the innate immune response within cardiomyocytes. Insights into the function of these proteins may potentiate novel therapeutic options for the sequelae of a number of cardiovascular insults including myocardial infarction and sepsis.

American Heart Association Institutional Research Enhancement Award
04/01/22 – 03/31/24 · $38,500/year
(Majireck, PI; Ha, Co-Inv.)

CD47-Targeted Nano-Immunotherapy for Treatment of Atherosclerosis

National Institute of Health R21 Research Grant
06/03/22 – 05/31/24 · $222,160/year
(McCarthy, PI; Schoenecker, PI)

Mechanistic insights into polyphosphate-mediated osteoinduction
There is an urgent need for the creation of cost-effective biomaterials to promote bone growth in clinical situations where fractures are not healing properly or where extra bone is required, such as in spinal fusion. This proposal is designed to determine if a natural grafting material derived from platelets, called polyphosphates, are superior to currently available grafting agents. Given the relative availability of polyphosphates as compared to other bone grafting material, the results of these investigations have the potential to greatly impact public health as they will provide a more cost-effective and efficient alternative to currently available products.

National Institute of Health R21 Research Grant
06/04/22 – 04/30/24 · $55,314/year
(Schoenecker, PI; McCarthy, PI)

An inorganic polyphosphate-impregnated synthetic periosteum drives allograft osteointegration
Bone allografts have transformed clinical practice in orthopaedics by providing an alternative source of osteoconductive material in lieu of autograft, yet despite their success there remains a significant need to improve osteointegration between the allograft and host bone. This proposal will investigate if application of a 'synthetic periosteum' comprised of polyphosphates contained within a hydrogel to the outer surface of a structural allograft, can maximize the biologic potential and drive osteointegration while limiting inflammatory toxicity. Compared to previously proposed biological constructs, this hydrogel-polyphosphate construct is designed to be cost-effective, shelf-stable, and result in limited toxicity and host-rejection, thereby making it promising for clinical translation.

National Institute of Health U01 Research Grant
09/01/22 – 06/30/27 · $168,246/year
(McCarthy, PI; Atkinson, PI)

Targeted delivery of immunosuppressive agents to the graft endothelium for the prevention of rejection in lung transplantation.
Lung transplantation is an established therapy for patients with end stage pulmonary failure, yet survival rates after lung transplantation lag behind those observed after transplantation of other solid organs (SOT). Unlike other SOTs where the initiation of rejection depends on cell trafficking to graft-draining lymphoid organs, in the lung, lymphocyte priming occurs in the lung graft itself. Utilizing this knowledge, we will investigate the efficacy of bi-functional nanoagents capable of preventing immune cell infiltration and priming while concomitantly eliciting immunosuppression, with the overall goal of inducing graft tolerance

Battle Within Foundation
04/01/23 – 05/31/25 · $62,500/year
(Kessinger, PI)

Investigating the modulation of inflammation in the preconditioning, development, and maintenance of post-traumatic stress disorder
Posttraumatic stress disorder (PTSD) is a chronic and devastating psychological disorder and has an increased risk of chronic disease. PTSD urgently requires improved and efficacious prophylactic and therapeutic agents. The main goal of this proposal is to innovate and validate novel noninvasive longitudinal imaging strategies related to inflammatory biomarkers in the background of PTSD development and maintenance in experimental animals. Importantly, reliance on qualitative assessment will still be standard in monitoring PTSD. Still, the shift towards multimodal methods will allow for the determination of quantitative PTSD biomarkers that are predictive of qualitative criteria used to assess PTSD prevalence.

American Heart Association Transformational Project Award
07/01/23 – 06/30/26 · $38,500/year
(Namakkal-Soorappan, PI; Kontaridis, Co-Inv.)

Atrial Remodeling Precedes Ventricular Dysfunction in Proteotoxic Cardiac Disease
Cardiovascular disease (CVD) is the number one cause of death globally. Estimated deaths due to CVD is ~19 million in 2020, representing >30% of all global deaths. Accumulating evidence suggests that atrial fibrillation (AF) is causally linked to various forms of heart failure (HF). Over 2.7 million Americans have AF, with higher prevalence in people over 65 years of age. More importantly, the AHA has predicted that 25% of adults over 40 years of age will develop AF by the year 2050. However, the molecular "cause and effect" mechanisms for atrial abnormalities and HF have not been elucidated thoroughly. Therefore, it is vital to understand whether the onset of atrial remodeling precedes pathological changes in the ventricle and leads to HF.

American Heart Association Innovative Project Award
07/01/23 – 06/30/25 · $100,000/year
(Tucker, PI)

“Protein truncating” variation in Titin: Testing the resiliency of the transcriptional machinery to avoid cardiomyopathy
Known genetic causes of cardiovascular disease (CVD) include variants in a well curated series of genes that are regularly screened in those afflicted with a subset of severe, and/or early-onset, CVDs. The most severe genetic mutations found in these genes are protein truncating variants (PTVs) confered through frameshift or stop-gain mutations. Unlike amino acid substitutions which may have subtle effects of protein function, these truncating variants are typically classified as being impactful by their nature alone.

National Institute of Health R01 Research Grant
08/01/23 – 06/30/28 · $776,234/year
(Tucker, PI; Margulies, Co-Inv.; Auerbach, Co-Inv.)

From Variants to Mechanisms for Cardiac Arrythmias
Cardiac arrhythmias reduce the quality of life and increase the risk of death for millions of Americans, yet current treatments are inadequate to the scope of the problem. While there are clear genetic factors that contribute to the risk of arrhythmias, the mechanisms through which genetics confer risk remain unclear. The goal of this project is to address this gap in knowledge with the goal of facilitating new therapeutic development.

Lupus and Allied Diseases Association, Inc.
08/01/23 - 7/31/24 · $50,000
(Kontaridis, PI)

Use of cardiosphere-derived human exosomes as therapeutic agents in SLE
The project will highlight the importance of EVs in treatment of SLE and will identify exosomes as a potential new therapeutic approach to treating lupus patients.

Lupus and Allied Diseases Association, Inc.
08/01/23 - 7/31/24 · $50,000
08/01/24 - 7/31/25 · $50,000
(Kontaridis, PI)

Gain-of-function mutations in SHP2 enhance inflammatory macrophage (Mo) activation in SLE
This project will determine whether SHP2 differentially regulates the pathogenesis of SLE through its regulation of the JAK-STAT and PI3K-AKT signaling pathways, inducing activation of Mφ and mediating production of cytotoxic cytokines, respectively.

Lupus and Allied Diseases Association, Inc.
08/01/23 - 7/31/24 · $50,000
08/01/24 - 7/31/25 · $50,000
(McCarthy, PI)

Cell-Specific Inhibition of the RhoA Pathway as a Target in Lupus Nephritis
In this proposal, we will utilize advanced materials engineering concepts to generate targeted drug delivery vehicles for the cell-specific modulation of the RhoA pathway in lupus nephritis (LN). These nanomaterials will deliver either classical small molecule inhibitors of downstream targets of this protein, or cutting-edge oligonucleotide-based drugs, capable of selectively increasing or decreasing protein production (antisense oligonucleotides, ASOs, or modified RNA, modRNA), directly to injured podocytes, epithelial cells, or fibroblasts within the kidney. This will provide for the manipulation of this pathway in a cell-based manner within a diseased animal, affording insight into the contribution of RhoA in each cell type to the progression of LN.

Lupus and Allied Diseases Association, Inc.
08/01/23 - 7/31/24 · $50,000
08/01/24 - 7/31/25 · $50,000
(Kessinger, PI)

Effects of T and B lymphocytes on Venous Thromboembolism in Systemic Lupus Erythematosus
Thrombosis is a well-recognized life-threatening clinical complication in patients with systemic lupus erythematosus (SLE), and venous thromboembolism events occur in SLE patients 3 to 6 times more than the general population, and even greater incidence rate in SLE patients with antiphospholipid syndrome (APS) and/or active disease. Many clinical studies have highlighted these differences; however, the mechanisms and outright differences in VTE etiology in these patients have yet to be elucidated. This proposal aims to study T and B lymphocyte overactivation in SLE and its effect on thrombus burden in experimental DVT models.

National Institute of Health R01 Research Grant
12/01/23 – 11/30/25 · $29,396/year
(Feinberg, PI; McCarthy, Co-Inv.)

miR-130b, angiogenesis, and diabetic critical limb ischemia
To explore the pathobiology and mechanisms underlying key aspects of the angiogenesis in the context of diabetic limb ischemia, using nanoagent scaffolds for the delivery of therapeutic oligonucleotides in experimental models in mice.

Halfond-Weil Postdoctoral Fellowship
01/01/24 - 12/31/24 · $50,000
(Le Sommer, PI)

SHP2 functions as a controller of myeloid cell fate via a STA T3 dependent mechanism

Wildermuth Memorial Foundation
01/01/24 - 12/31/24 · $16,690
(Kontaridis, PI, Santos, PI)

Identification of a novel gene involved in the development of severe Autism (ASD) and congenital heart defects (CHD)
Cilia are organelles that comprise microtubules extending from the cell surface. Their unique lipid and receptor composition enables them to detect changes in the extracellular environment, thereby eliciting downstream signals that control cellular processes involved in development and tissue homeostasis. Consequently, mutations that lead to the aberrant function or formation of cilia can give rise to a group of disorders termed “ciliopathies,” which can cause a range of anomalies including neurocognitive disorders and congenital heart defects (CHD).

National Institute of Health R01 Research Grant
7/01/24 – 6/30/28 · $171,199/year
(Menick, PI; McCarthy, PI)

Biomimetic nanomaterials for the immunomodulation of the cardiosplenic axis post myocardial infarction
The healing response within the myocardium after a myocardial infarction (MI) is complex and involves both temporal and regional changes including inflammation, cardiac scar formation, and tissue remodeling. Over the last decade the importance of the spleen has been highlighted as a reservoir for the majority of monocytes trafficking to the heart in response to ischemic damage. In this proposal, we will utilize advanced nanomaterials as tools to localize inhibitors to the spleen to dissect the mechanisms by which HDACs modulate the cardiac inflammatory affect after MI.

National Institute of Health R01 Research Grant
7/01/24 – 3/31/27 · $286,422/year
(Carll, PI; Nystoriak, PI)

Systematic Identification of Cardiotoxic E-cigarette Flavorants
Electronic cigarettes (e-cigs) aerosolize a mixture of chemical solvents, flavor additives and nicotine, and inhalation of the resultant aerosol by e-cigarette users has unknown effects on the heart. In this project, we will examine how specific flavoring chemicals that are inhaled during e-cigarette use impact the function of mouse and human heart cells and tissues. Ultimately, this study will advance knowledge of the toxicity of e-cigarettes, which will direct new regulation of e-liquid

constituents based on their potential for adverse effects on the heart.

Lupus and Allied Diseases Association, Inc.

08/01/24 - 7/31/25 · $50,000
(Kontaridis, PI)

Identification of Novel Genes Involved in Development of Lupus Nephritis
Genetic variations and molecular signatures in the population of Barranquilla, Colombia, predispose individuals to an increased incidence of SLE-associated LN by enhancing proinflammatory and immunological activities of resident kidney cells, including glomerular mesangial cells, podocytes, tubular epithelial cells, and endothelial cells, thereby exacerbating immune complex deposition and subsequent organ damage. With this information, we hope to gain knowledge about universal causes of LN, to identify novel targets for the treatment of SLE-associated LN.

National Institute of Health R01 Research Grant

9/15/24 – 6/30/29 · $739,737/year
(Kessinger, PI; McCarthy, Co-Inv.; Tucker, Co-Inv.)

Molecular and morphometric imaging of coagulation and inflammation in pulmonary embolism pathogenesis
Pulmonary embolism (PE) is the third leading cause of cardiovascular death, with post-PE complications leading to drastic reductions in quality of life and chronic functional limitations, as well as an increased risk of recurrent PE. This proposal will utilize a novel murine model of PE, single nucleus molecular profiling, and longitudinal multiplexed molecular imaging to noninvasively access the contribution of PE size and age on the resultant inflammatory and pulmonary fibrotic response while also quantifying the salutatory effects of fibrinolysis therapy. These findings aim to elucidate novel targets and molecular imaging agents to aid in better diagnosis and stratification of patients with PE.

National Institute of Health R01 Research Grant

9/15/24 – 8/31/29 · $239,982/year
(Hill, PI; Nystoriak, PI)

Metabolic regulation of myocardial perfusion in the aging heart
Advanced age is the leading risk factor for all chronic diseases. Although many hallmarks of aging have been identified, a key physiological feature of aging is decreased blood flow and an inability to match blood flow to organ requirements. This project will elucidate the metabolic mechanisms by which aging impairs blood flow in the heart and identify interventions to improve blood flow, heart function, and exercise tolerance over the lifespan.

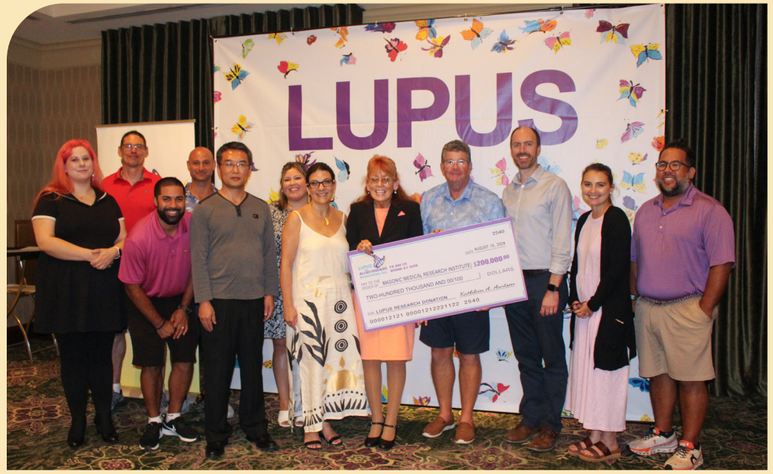
MMRI Awarded $200,000 by Lupus and Allied Diseases Association, Inc. (LADA)

On Thursday, August 14, 2024, officials from MMRI received a surprise announcement by LADA's president and CEO, Kathleen Arntsen, that its three previously supported systemic lupus erythematosus (SLE) research projects would each receive an additional $50,000 this year to continue research.

In addition, LADA announced it would also award a $50,000 grant in support of one additional project focused on lupus. This brings their total support for 2024-2025 to $200,000.

The check was presented at LADA's 24th Lupus Charity Golf Classic, located at Shenendoah Golf Course at Turning Stone Resort Casino, Verona, New York. MMRI scientists aim to 1. understand how specific enzyme activities influence SLE progression. 2. create new therapeutic agents for SLE. 3. investigate the role of immune cell activity in causing venous thromboembolism.

All MMRI research funded by LADA is focused on preventing and treating SLE, a devastating autoimmune disease that causes the immune system to attack a person's own tissue, causing inflammation in the skin, joints, blood, heart, lungs, brain and kidneys, and leading to extreme exhaustion, fevers, skin rashes, hair loss, and anemia.



"As a national patient-led organization, we have chosen to support the MMRI's lupus research program because research is extremely important to us," said Arntsen "We are honored to continue funding their pioneering lupus projects this year, which brings our overall grant total to MMRI to $615,000."

"We are deeply grateful to LADA for their commitment, partnership, and support of our work, allowing us to push the boundaries of lupus research," said Maria Kontaridis, Ph.D., executive director at MMRI. "Every dollar invested brings us one step closer to understanding this complex disease, finding better treatments, and ultimately improving the lives of those affected by lupus. Their support is truly a beacon of hope for thousands affected by this devastating illness"

2024 Scientific Conferences

January 2024 **Maria I. Kontaridis, Ph.D.**
Albany College of Pharmacy and Health Sciences (virtual)

Monthly Seminar Series Invited Speaker: *"The Importance of Signaling Modulations in Obesity, Heart Disease, and Fibrosis"*

February 2024 **Maria I. Kontaridis, Ph.D.**
University of Hawaii Cancer Center, Honolulu, HI

7th Annual International Hawaii Cardiovascular Symposium, John A. Burns School of Medicine
Invited Speaker: *"Myeloid-specific Regulation of RhoA in Cardiac Fibrosis"*

March 2024 **Maria I. Kontaridis, Ph.D.**
The Ohio State University Columbus, OH

Research in Progress Seminar Series The Dorothy M. Davis Heart & Lung Research Institute Invited Speaker: *"The importance of signaling modulations in obesity, heart disease and fibrosis"*

April 2024 **Zhiqiang Lin, Ph.D.**
Sonesta Resort, Hilton Head, SC

Metabolic Physiology Meeting Poster Presentation

April 2024 **Chase Kessinger, Ph.D.** Chicago, IL

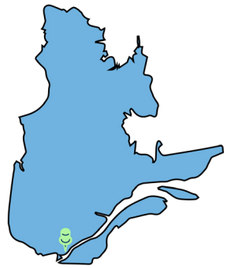
Vascular Discovery: From Genes to Medicine - Scientific Sessions

April 2024 **Maria I. Kontaridis, Ph.D.**
San Francisco, CA

American Heart Association Scientific Sessions
Chair of the Meeting: Provided Opening and Closing Remarks; Introduced Opening Address Speaker and Keynote Speaker.

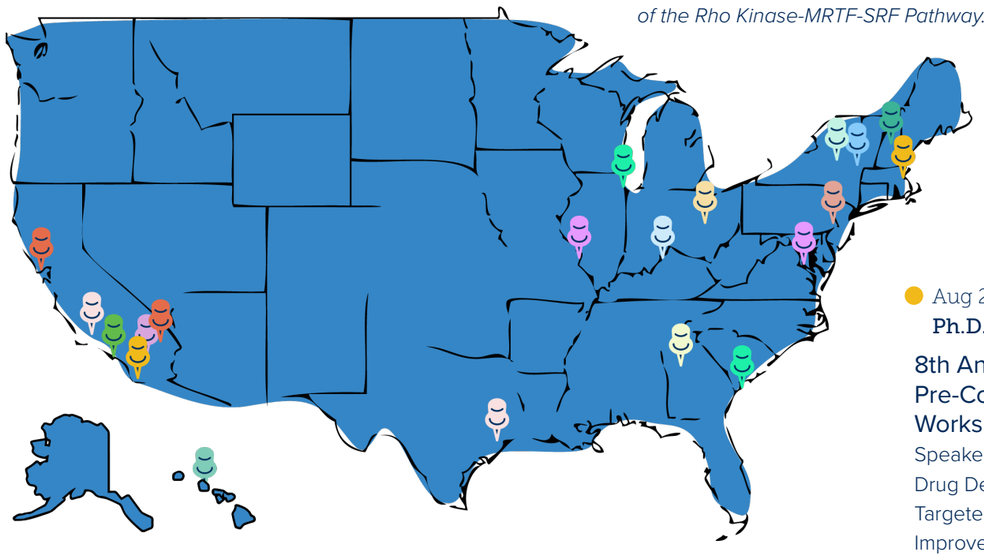
April 2024 **Maria I. Kontaridis, Ph.D.**
Utica University, Utica, NY

Asa Gray Biological Seminar Series Cardiovascular Sciences Invited Speaker: *"Cardiomyocyte-specific deletion of PTP1B protects against high-fat diet induced cardiac dysfunction and obesity"*



May 2024 **Tongbin Wu, Ph.D.**
Hotel Bonaventure Montreal, QC, Canada

Weinstein Cardiovascular Development and Regeneration Conference



May 2024 **Zhiqiang Lin, Ph.D.** Utica, NY

Unleashing the Power of Cell & Gene Therapy
Panelist

June 2024 **Maria I. Kontaridis, Ph.D.**
Colby Sawyer College, New London, NH

2024 Gordon Research Conference on Cardiac Regulatory Mechanisms Discussion Leader and Moderator: *"Inter-organ Communication"*

July 2024 **Maria I. Kontaridis, Ph.D., Tongbin Wu, Ph.D.** Chicago, IL

American Heart Association (AHA), Basic Cardiovascular Sciences (BCVS Invited Speaker: *"Session 7: Pathophysiologic Axes Beyond the Heart"*

August 2024 **Maria I. Kontaridis, Ph.D., Zhiqiang Lin, Ph.D.** Long Beach, CA

43rd International Society for Heart Research (ISHR) North American Section (NAS) 2024 Society Conference Invited Plenary Speaker and Moderator: *"Myeloid-specific Regulation of RhoA in Cardiac Fibrosis"*

August 2024 **Zhiqiang Lin, Ph.D.**
Los Angeles, C.A.

ISHR Meeting Invited Speaker: *"YAP-VGLL4 antagonism controls postnatal heart growth."*

Aug 2024 **Jason McCarthy, Ph.D.** Boston, M.A.

8th Annual IPF Summit 2024 Invited Speaker: *"Myofibroblast-Specific Drug Delivery for the Modulation of the Rho Kinase-MRTF-SRF Pathway."*

Aug 2024 **Jason McCarthy, Ph.D.** Boston, M.A.

8th Annual IPF Summit Pre-Conference Workshop 2024 Invited Speaker: "Examining Novel Drug Delivery Systems for Targeted Lung Delivery to Improve Bioavailability & Minimize Off Target Effects."

Sept 2024 **Maria I. Kontaridis, Ph.D.** Texas A&M Institute of Biosciences and Technology, Houston, TX

Kelsey Lecture Seminar Series Invited Speaker: *"The Importance of signaling modulations in obesity, heart disease and fibrosis"*

Sept 2024 **Maria I. Kontaridis, Ph.D.**
Emory University School of Medicine, Atlanta, GA

Cardiovascular Biology Seminar Series Invited Speaker: *"The Importance of signaling modulations in obesity, heart disease and fibrosis"*

Oct 2024 **Maria I. Kontaridis, Ph.D.**
Center for Cardiovascular Research at Washington University School of Medicine, St. Louis, MO

Center for Cardiovascular Research (CCR) Seminar Series Invited Speaker: *"The Importance of signaling modulations in obesity, heart disease and fibrosis"*

Nov 2024 **Chase Kessinger, Ph.D.** The Walter E. Washington Convention Center Washington, D.C.

The ACR Convergence 2024

Nov 2024 **Maria I. Kontaridis, Ph.D.** Beijing, China

International Sessions in Basic Cardiovascular Research (BCVS) 35th Great Wall International Congress of Cardiology (GW-ICC) 2024 and Asian Heart Society Congress 2024. Panel Discussant, Judge BCVS Mentored Fellowship Competition. Invited Speaker: *"Cardiomyocyte-specific Deletion of PTP1B Protects Against High-fat Diet Induced Cardiac Dysfunction and Obesity"*

Dec 2024 **Maria I. Kontaridis, Ph.D.**
Rancho Mirage, C.A.

International Sessions in Basic Cardiovascular Research (BCVS) 35th Great Wall International Congress of Cardiology (GW-ICC) 2024 and Asian Heart Society Congress 2024. Panel Discussant, Judge BCVS Mentored Fellowship Competition. Invited Speaker: *"Myeloid-specific Regulation of RhoA in Cardiac Fibrosis."*

Dec 2024 **Samantha Le Sommer, Ph.D.**
Rancho Mirage, C.A.

Federation of American Societies for Experimental Biology (FASEB) 17th Protein Phosphatases Science Research Conference
Invited Speaker: *"T cell specific SHP2 in the pathogensis of SLE"*

Dec 2024 **Abhishek Mishra, Ph.D.**
Rancho Mirage, C.A.

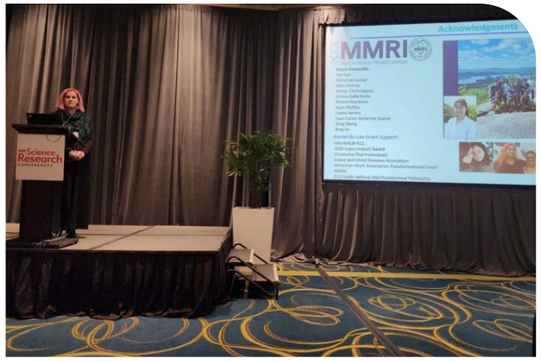
Federation of American Societies for Experimental Biology (FASEB) 17th Protein Phosphatases Science Research Conference Invited Speaker: *"Cardiomyocyte-Specific Deletion of PTP1B Protects Against HFD-Induced Cardiomyopathy Through Direct Regulation of Cardiac Metabolic Signaling."*

Postdoctoral Fellows Give Prestigious Presentations

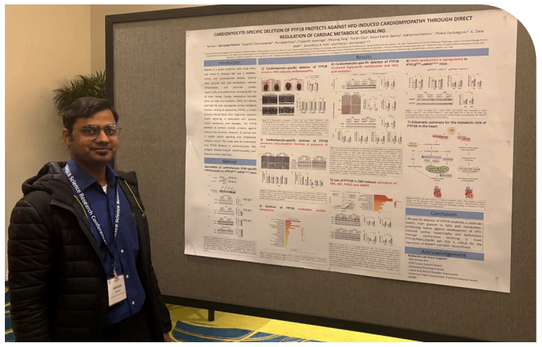
MMRI Postdoctoral Fellows Samantha Le Sommer, Ph.D. and Abhishek Mishra, Ph.D., of the Kontaridis lab had the opportunity to participate in the FASEB Protein Phosphatase Conference held in Rancho Mirage, California, from Sunday, December 8, 2024, to Thursday, December 12, 2024.

Dr. Le Sommer gave the Rising Star Keynote at the 2024 FASEB Protein Phosphatase Conference. Her keynote presentation titled "T cell-specific SHP2 in the pathogenesis of SLE," focused on an enzyme called SHP2 and the role it plays in the development of the autoimmune disease lupus.

Her talk focused on special white blood cells, called T cells, found in lupus patients, that attack their own tissues and damage them. Le Sommer, with the Kontaridis lab, found that SHP2 is important in lupus research more SHP2 activity means more T cell activation. Le Sommer also showed that inhibiting or deleting SHP2 from T cells reduces T cell activation, and as a result, patients are affected less by the disease.



Samantha Le Sommer, Ph.D., giving her keynote presentation on T cell specific SHP2 in the pathogenisis of SLE



Abhishek Mishra, Ph.D., standing beside his award winning poster presentation.

"This conference provided an excellent platform to share insights, engage in discussions with leading experts in the field, and gain valuable feedback that will help shape the future directions of our study," said Dr. Mishra.

As part of this prestigious event, Dr. Mishra was selected to deliver a short talk, where he presented his research on the impact of PTP1B inhibition in cardiac metabolism. His presentation, titled "Cardiomyocyte-Specific Deletion of PTP1B Protects Against HFD-Induced Cardiomyopathy Through Direct Regulation of Cardiac Metabolic Signaling," highlighted the lab's findings on how targeting PTP1B can mitigate the detrimental effects of a high-fat diet on cardiac function.

Additionally, Mishra participated in the poster competition, where he showcased his work in more detail. Mishra received first place in the poster presentation, earning a $250 prize in recognition of the Kontaridis lab's research contributions.

Maria Kontaridis, Ph.D., Receives New York State Senate Commendation Award

On Friday, October 25, 2024, at a special ceremony held at Munson, in Utica, New York, New York State Senator Joseph Griffo, R-C-Rome, presented Dr. Maria Kontaridis, along with 12 other recipients, the New York State Senate Commendation Award.

Commendations are one of the highest honors that the Senate can use to recognize individuals who have served and made lasting contributions to their community and the state throughout their careers and lives.

Dr. Kontaridis was recognized for her contribution not only to medical research in the Mohawk Valley area but for her community service and drive to make Utica a better place to live as well. Senator Griffo recognized her commitment to multiple non-profit organizations and charities in which she serves on boards, including the American Heart Association, Kelberman Center, and MV EDGE.

Honorees received a personalized plaque and commendation coin as part of the ceremony.

2024 Summer Fellowship Program and Graduation

During the summer of 2024, MMRI welcomed 19 undergraduate students to its highly acclaimed Summer Fellowship Program. Over ten weeks, each fellow collaborated closely with MMRI's principal investigators (PI), acquiring invaluable scientific expertise and knowledge through the conduct of an individualized research project. The fellows also partook in educational events aimed at increasing their awareness of scientific techniques, post-graduate educational opportunities and networking, further preparing them for futures in science and medicine.

Rebecca Caruso

Richard Chen

Dmytro Davydenko

Mariah Foster

Gianna Frank

Hope Garramone

Zhijie Han

Emily Hemstrought

Alinur Jaboldinov

Afomiya Kassie

Houze Li

Nay Linn

Julia Sassower

Reaghan Sassower

Alexander Seeley

Owen Trela

Alexandra Volo

Raegan Weems

Anna Zamperetti

"We were delighted to welcome our largest class to date into MMRI's coveted Summer Fellowship Program," said Maria I. Kontaridis, Ph.D. "The halls of MMRI were bustling, and we enjoyed the culmination of their research experiences at the end of the program. The program is a testament to our mission, including our commitment to training future generations of science and medicine."

Celebrating our Summer Fellows

To commemorate the Summer Fellows' time in the program, each student presented a summary of their work and shared about their experience with their families, friends, and MMRI staff. Following their presentations, Summer Fellows engaged in a luncheon with family and peers as a celebratory conclusion to their time at the laboratory.

Thank you to all the generous sponsors of the program including:

- Alera Group
- Drs. Atul and Amita Butala
- Burrows Foundation
- Slocum-Dickson Foundation
- Mr. Gary T. Forrest
- The Give Back to Utica Fund/ Steven H. Oram
- Ronald and Cecelia Gouse
- RW Walter R. Leong
- The Mele Family Fund
- M&T Bank/Partners Trust Bank Charitable Fund of The Community Foundation of Herkimer and Oneida Counties
- Shakespeare Lodge #750 F. & A.M.
- Sixth Masonic District Association of Manhattan, Inc.
- UpMobility Foundation
- Utica Lodge #47 F. & A.M.

MMRI Employee of the Year Awarded to Two Talented Employees

MMRI held its annual holiday staff party on Friday, December 13, 2024. Dr. Maria Kontaridis, executive director, had the pleasure of announcing that this year's "Employees of the Year" titles belong to Colleen LeFever, MBA, public relations and marketing associate, for the administrative category and Chase Kessinger, Ph.D., assistant professor of biomedical research and translational medicine, for the scientific category.

"This year, I was thrilled to honor not one, but two extraordinary individuals as our 2024 Employees of the Year," said Maria Kontaridis, Ph.D. "Colleen and Chase have demonstrated unwavering dedication and teamwork through their work and they exemplify the values that make our organization thrive."

Dedicated, confident, prompt, and willing to go the distance are just a few of the attributions fellow co-workers associate with Kessinger and LeFever.

"Winning employee of the year is not just an individual achievement, but a reflection of the support, collaboration, and shared vision of MMRI and the marketing team," said LeFever. "It's a reminder that success is built on the contributions of many and I'm grateful to be part of such an amazing group of people who recognized my contributions."

"I am deeply honored to be recognized as the Scientific Employee of the Year at MMRI," said Kessinger. "This achievement reflects the collaborative efforts of our incredible team and inspires me to continue advancing research that makes a difference."

Congratulations to MMRI's 2024 Employees of the Year!

MMRI in the Community

Go Red for Women Luncheon

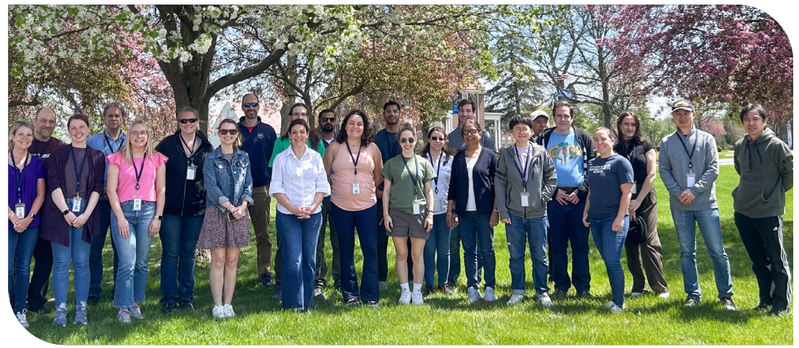
THURSDAY, MAY 2, 2024

MMRI was honored to be a part of this year's American Heart Association Mohawk Valley Go Red for Women luncheon. Dr. Kontaridis, alongside panel members Dr. Antilus, OB/GYN, and survivor Stephanie Mazloom Hammond, had the privilege of inspiring and educating others.

Walk to Support Autism

FRIDAY, MAY 3, 2024

MMRI staff gathered for a two-mile walk around the Masonic Care Community Campus to show support for MMRI's friends at the Kelberman Center and to promote autism acceptance! Everyone at MMRI is grateful for this partnership.



Boilermaker Road Race and Expo

SUNDAY, JULY 14, 2024

Congratulations to our corporate cup team for placing third and all runners that represented MMRI: Robert Gardner, Ph.D., Crystal Jadwick, Victoria Ogrodnik, Josh Macera, Gary Aistrup Ph.D., Travis Thibodeaux, and Curt Fowler. (Not pictured: Michael Mayo, Matt Nystoriak, Ph.D., Owen Trela)

1958 Gala

SATURDAY, MARCH 23, 2024

On Saturday, March 23, 2024, MMRI held its first annual 1958 Gala at the Fort Schuyler Club in Utica, New York, to raise awareness and support for its groundbreaking medical research. The proceeds benefited the organization's innovative biomedical research in cardiovascular disease, neurocognitive disorders, and autoimmunity.

The 1958 Gala took guests through an immersive journey "into the future" of medical research, as event-goers received an inside look into MMRI's newest innovations in autism, lupus, non-alcoholic steatohepatitis (NASH), post-traumatic stress disorder (PTSD), and heart disease research.

Your Impact: Whether you celebrated with MMRI at the Fort Schuyler Club or supported from afar, thank you! MMRI's inaugural 1958 Gala, chaired by John and Jackie Romano, was a HUGE success! More than 200 people came together to celebrate and learn about the groundbreaking research being conducted at MMRI. The event raised more than $180,000 to benefit the organization's mission.

"MMRI is widely recognized worldwide by scientists for its groundbreaking research," said Jackie Romano, chair of the 1958 Gala. "Until now, few people in Utica were aware of MMRI's tremendous accomplishments and contributions to the Mohawk Valley. Not only is MMRI bringing expert scientists to live and work in our community, but it is also making life-changing medical discoveries right in our backyard. Thank you to all who came out to support MMRI. It was a night to remember."

MMRI would especially like to thank their top sponsors whose support made an immense impact.

Presenting Sponsors:
- The Fountainhead Group, Inc.
- The MMRI Board of Directors

Red Carpet Sponsor:
- Mohawk Valley Health System

Platinum Sponsors:
- The John Brown Team at Coldwell Banker Faith Properties
- Central New York Brain & Spine Neurosurgery
- Pacemaker Steel and Piping Company
- TangoSquared
- The Utica Comets

Gold Sponsors:
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- Nicole Condon-Shih
- Empower Business Strategies
- The Hayner Hoyt Corp.
- Kenneth C. Miller Mason Contractor
- Mandia International Trading Corp.
- Morehouse Appliances
- Steve Lennon and Co. Jewelers
- Volo's Auto Supply

Lupus Walk

SATURDAY, MAY 18, 2024

In partnership with the Lupus and Allied Diseases Association, Inc. (LADA), MMRI was thrilled to have held Utica's first Lupus Walk to support MMRI's lupus research on the Masonic Care Community Campus on Saturday, May 18, 2024. More than 350 participants from across the region joined MMRI to walk a one or three-mile course of their choice. The event began with a press conference featuring local elected officials and a ribbon-cutting ceremony, followed by a delightful barbecue fundraiser.

"We are delighted to have held Utica's first Lupus Walk to support our growing lupus research endeavors," said Maria Kontaridis, Ph.D. "My mother's 33-year-long battle with lupus motivated me to make lupus research a priority at MMRI. Our findings give great hope that one day soon there will be newer and better treatment options available for so many patients that suffer with this disease."

Second Annual Golf Classic Raises $87,000

On Monday, August 26, 2024, MMRI hosted its second annual charitable golf tournament at the Yahnundasis Golf Club, New Hartford, New York. The MMRI Golf Classic was held in honor of Sal Raspante, beloved supporter of MMRI who passed away from cardiovascular complications in December 2023. Twenty-four foursomes played 18 holes of golf, captain and crew style while competing for the best overall score, longest drive (mens, womens and seniors) and closest to the pin (mens and womens). Players also celebrated Raspante's life with members of "Sal's Riders" at hole 8 with Jimmy John's and a golf ball cannon!

With the help of its sponsors and players, $87,000 was raised for MMRI's groundbreaking medical research in heart disease.

Congratulations to The Fountainhead Group team for earning the first-place trophy for the second consecutive year!

"This is only our second year, but I'm astonished to see how much this tournament has grown and the support we have received from our community," said Maria Kontaridis, Ph.D., executive director at MMRI. "We are privileged to dedicate our tournament in honor of Sal Raspante for the next five years."

MMRI expresses a special thank you to the family of Sal Raspante and The Fountainhead Group for their unwavering support of MMRI and for allowing the institute to celebrate Sal's life at the 2024 event.

Sal Raspante at the 2023 MMRI Golf Classic

Team Fountainhead Group

Sal's Riders

Family of Sal Raspante

MMRI would like to thank its many sponsors including:

Lead Sponsor
MMRI Board of Directors

Thank you for your dedication and support of MMRI. Your commitment on and off the course to our fundraising events allows our scientists to continue their groundbreaking medical research.

Team MCC

Team Spiro

Team Grogran

Team MCC Trustee

Reception Sponsor
Central New York Cardiology

Golf Cart Sponsors
The Fountainhead Group
Mandia International Trading Corporation

Par-tee Sponsor
Sal Raspante's Family
Live your life like SAL!
Keep playing!
In our hearts forever!

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Tim Giarrusso
Russell Grogan
Planet Fitness Oneida
Masonic Care Community of New York
Save of the Day Foundation
Trustees of the Masonic Hall & Home

In-Kind Donations
Aly's Sweet Treats
Baby's Debut 3D/4D Imaging
Broadway Theatre League of Utica
The Brownie Company
Cafe CaNole Bakery & Restaurant
Chobani
Colleen Winschel Photography
Crayola Experience
Feast & Festivities by O'Connors Hannaford, New Hartford Location
MMRI Leadership Team
MMRI Marketing & Communications Team
New York Giants
New York Knicks
Oriental Trading Company
Paul's Pub
Price Chopper
Rosario's Pizzeria
Seabreeze Amusement Park
Tailor and the Cook
The Sweet Life
Utica Zoo

Additional Philanthropic Highlights

UpMobility Supports Future Scientists

MMRI is deeply grateful to the UpMobility Foundation for their $32,500 donation to our research efforts in 2024. Their total philanthropic support to date is over $50,000, which includes a $20,000 contribution towards our Summer Fellowship Program—a 10-week hands-on scientific training for undergraduate and graduate students. The UpMobility Foundation's vision closely aligns with MMRI's, and their support enables us to continue offering educational opportunities, fostering teamwork and collaboration, and improving the health and quality of life for all humankind.

Team Slocum Dickson at the 2024 MMRI Golf Classic

Slocum Dickson Foundation and Slocum Dickson Medical Group Supports Summer Fellowship Program and Research

Thank you to Slocum Dickson Foundation for their generous gift of $19,500 in support of MMRI's 2024 Summer Fellowship Program.

In addition, the Slocum Dickson Medical Group donated an additional $2,500 to MMRI's Golf Classic, which benefits research in cardiovascular disease. Their support of MMRI has enabled it to continue its mission toward advancements in scientific research.

Deloris Kile and Robert A. Good Jr.'s Generous Contribution Fuels Advancements in MMRI Research

Since 2018, Deloris Kile and Robert A. Good Jr.'s generous donations to MMRI have made a significant impact on our medical research. Their support of $18,000 in 2024, provided through Qualified Charitable IRA Contributions and a Charitable Gift Annuity, has helped advance our efforts in groundbreaking studies. We are deeply grateful for their commitment to improving healthcare and furthering scientific discovery.

Marjorie Chase Honors Friends

In 2024, Marjorie Chase supported MMRI's research endeavors through gifts made in honor of past friends and family, both in the Masonic and non-masonic communities. Her donation in 2024 of $10,050 brought her support of MMRI to over $65,000 since 2014! Thank you for your ongoing generosity.

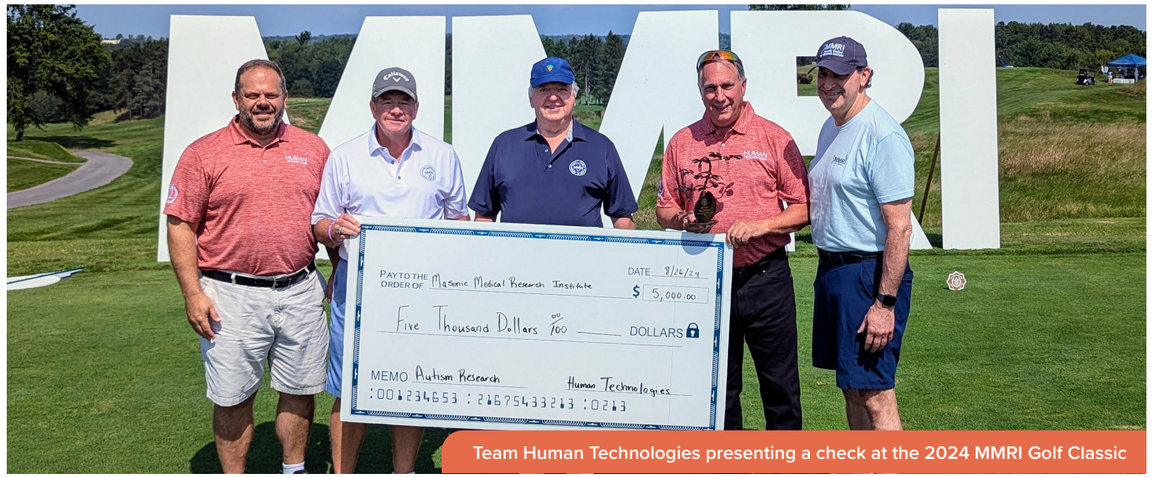
Ongoing Support Drives Excellence in MMRI Research

Eleanor Wagner has been a dedicated supporter of MMRI since 2018. In 2024, her donation of $10,000 brought her philanthropic contributions to over $50,000. Her contributions allow MMRI to continue its high-quality basic biomedical and clinical research effects.

MVHS Joins Community in Generous Support of MMRI

In 2024, Mohawk Valley Health Systems donated $10,000 to MMRI as a Red Carpet Sponsor for the 1958 Gala. This was MVHS's first donation towards MMRI's scientific medical breakthroughs. MMRI is excited about its continued collaboration with medical communities in Utica and with MVHS.


MVHS Supports MMRI 1958 Gala in 2024



Team Human Technologies presenting a check at the 2024 MMRI Golf Classic

Human Technologies Supports Autism Research

Thank you to Human Technologies and past president and CEO Timothy Giarrusso for their support. Human Technologies has been an avid supporter of MMRI for the last four years. In 2024, they donated $5,000 bringing their total contributions to over $10,000.

Tim Giarrusso, through an event sponsorship with Human Technologies to the MMRI Golf Classic, donated over $1,000. His continued support of MMRI through his business and personal life has enabled us to continue our mission toward advancements in autism research.

Adirondack Bank Contributes to MMRI Research

MMRI expresses a heartfelt thank you to Adirondack Bank for donating $1,500 in 2024. Their contribution helps support MMRI to continue its studies in heart disease, autism, PTSD, lupus, and more. Adirondack Bank has been supporting MMRI since 2023 bringing their total donations to $6,500.

"We strongly believe that their scientific innovations will change the future of healthcare and leave a life-changing mark on us and our future generations."

- John Romano

Romano Family Supports Year-Round Research

John and Jackie Romano have been major supporters of MMRI through both personal philanthropy and their business, The Fountainhead Group. Their unwavering dedication allows MMRI's scientists to conduct cutting-edge research into some of the world's most devastating diseases.

In 2024, The Fountainhead Group donated over $20,000 to MMRI through its fundraising events in support of heart disease, lupus, and autism research. Their participation in MMRI's inaugural 1958 Gala, inaugural Lupus Walk, and second annual MMRI Golf Classic showed year-round commitment.

John and Jackie were a vital part of the success of MMRI's 1958 Gala. Serving as chairs of the event, the Romano's helped MMRI raise over $180,000. MMRI is thankful for their commitment and support of MMRI's mission. We couldn't have done it without them.

John and Jackie are also valued members and serve as co-vice chairs of MMRI's Community Advisory Committee. Their support has been instrumental in making MMRI a recognized name in the Mohawk Valley area.

MMRI & the Masonic Tradition

Steven Carr's Lasting Legacy: A Gift for Medical Innovation

In 2024, Bro. Steven Carr, a New York Mason, left a generous legacy gift of $1,482,000 to MMRI, supporting the Institute's continued dedication to groundbreaking scientific research. Carr's philanthropic spirit will provide future generations with the opportunity to benefit from the Institute's vital work, leaving behind a legacy of hope. MMRI is saddened by his passing, but grateful for his support. This generous gift brings Carr's lifelong donations to over $1.5M.

Seventh District Foundation Continues Support

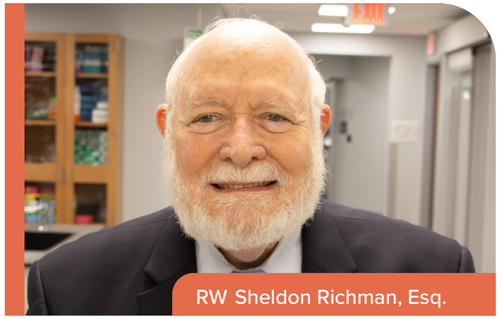
The Seventh District Foundation continued their philanthropic support in 2024 with a donation of $11,914 to help with MMRI's acquisition of critical equipment. This year it supported the purchase of a CODA High-Throughput Noninvasive Blood Pressure System. This donation brought The Seventh District Foundation's total donations to MMRI to $115,000 since 2019.

Royal Arch Masons Medical Research Foundation Supports MMRI

In 2024, MMRI's research on post-traumatic stress disorder (PTSD) continued to benefit from the generous support of the Royal Arch Masons (RAM) Medical Research Foundation. Their charitable gift of over $90,000 emanates from:

1. A contribution from RAM's Medical Relief Fund under the leadership of ME Steven Shearer
2. A contribution from RAM's Medical Research Foundation made in honor of RAM's Past Grand High Priest, ME Larry N. Barnard
3. A contribution from Central City Riverside Chapter #70 in honor of Past Grand Master, MW Richard J. Kessler.

MMRI is grateful for RAM's ongoing commitment to advancing groundbreaking medical research at MMRI.



RW Sheldon Richman, Esq.

Remarkable Year End Gift to Advance Medical Research

Thank you to MMRI board member RW Sheldon Richman, Esq., for his generous year-end contribution of $20,000 to MMRI, bringing his total donations to $60,000 since 2017. Richman's dedication to our mission through individual donations and as part of our Cornerstone Society continues to shape the future of our medical research programs.

MMRI Board of Directors

Thank You MMRI Board Members

MMRI thanks each and every one of our Board of Directors for their unwavering commitment to our mission. Your time, dedication, and generous support of MMRI's research and fundraising events have made a huge impact. In 2024, through individual and group donations, MMRI's board donated over $50,000, enabling MMRI to continue pioneering medical research.

Second Kings Charities Fund Inc.
Donation Presentation

Grand Secretary Golf & Second Kings Charities

Board member, RW Paul A. Guerrero, MS, CMR, received a check on behalf of MMRI at the Grand Secretary's Golf Classic on Monday, September 23, 2024. The generous donation from the Second Kings Charities Fund Inc. was presented by Walter J. Wasnieski III, totaling $7,500.

Since 2020, the Second Kings Charities Fund Inc., has donated over $35,000 to MMRI's research endeavors, specifically to the MMRI autism research programs.

MMRI Honors Grayce Shultz

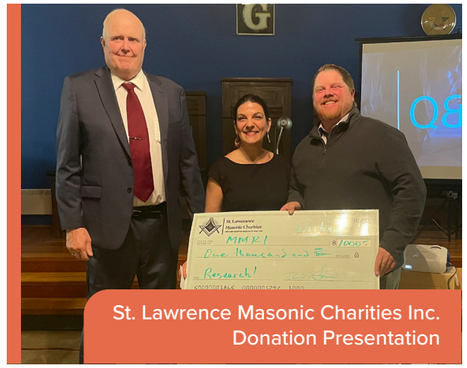
MMRI board of directors presented a Vine of Life in memory of Grayce Shultz, the beloved wife of RW Richard Shultz, grand secretary of the Grand Lodge of the State of New York. Mrs. Shultz will be deeply missed, and MMRI's thoughts and prayers are with RW Shultz and his family.

MMRI Receives Autism Fund Donation

A special donation was made to MMRI's autism fund from W Nicholas Isabella, who donated the funds entrusted to him by Gregory R. Stahura. The Francis Lewis Lodge was presented with a Vine of Life in memory of Gregory R. Stahura.

Mariner's Lodge No. 67 Recognized for Continued Support of MMRI

Masons from Mariner's Lodge No. 67 of Manhattan, New York, were recognized over St. John's weekend for their continued support of MMRI. Dr. Maria Kontaridis and MMRI board members, RW Paul G. Huck, Esq., RW Alvaro Quiroga-Sanchez, RW Robert A. Hewson, DPM, and RW James Swan Jr. presented the Golden Heart certificate for their generous donation of $2,500.



St. Lawrence Masonic Charities Inc.
Donation Presentation

St. Lawrence Masonic Charities, Inc.

On Friday, November 22, 2024, Dr. Maria Kontaridis visited the St. Lawrence Masonic Charities to discuss MMRI's progress in disease research. While there, Dr. Kontaridis received donations totaling $1,000 from DePeyster Lodge #573, High Falls Lodge #428, Black Lake Hammond Lodge #319, and St. Lawrence Masonic Charities Inc.

MMRI thanks St. Lawrence Masonic Charities Inc. for sharing our mission with their neighboring lodges.

Brotherhood Fund Supports MMRI's Mission

MMRI is supported by Masons from across the USA and around the world. As one of the crowning jewels of the Grand Lodge of Free & Accepted Masons of the State of New York, we are also proudly supported by the Masonic Brotherhood Foundation Inc., a charitable arm of the NY Grand Lodge. In 2024, MMRI received over $110,000 from Brothers, lodges, estates, and districts who chose MMRI for their generous donations. Thank you to MW Steven Adam Rubin, Grand Master, GLNY, for his continued dedication and support of MMRI, who recently wrote: "Since 1958, with the unwavering support of the Masonic community, MMRI has achieved groundbreaking advancements and made life-changing discoveries. I am confident that our New York Family, and world-wide Masonic Family, will continue to champion this vital work for generations to come."

Join MMRI's Cornerstone Society

What is the Cornerstone Society?
The MMRI Cornerstone Society allows you to be honored for any of your planned gifts now. We want the pleasure of honoring your legacy and thanking you for your generosity.

Why join this elite society?
Thoughtful planned gifts such as a bequest in a will or trust, retirement plan named beneficiaries, charitable gift annuities and others, demonstrate an outstanding commitment on the part of our supporters to the future of our scientific research. In addition, these gifts often provide significant tax advantages, while allowing MMRI to plan with confidence.

"Planned giving to MMRI through the Cornerstone Society gives you the assurance that your gift will be used to advance the groundbreaking work of our dedicated scientists into many of our complex diseases," said Williams. "For me, my planned contributions are a way of giving back to my community in a long-term plan so I know my donation will be used to benefit MMRI well into the future!"

-Frank R. Williams

The MMRI Cornerstone Society, is an opportunity to recognize and thank those that have made a personal, long-term commitment to the mission of MMRI. For more information or to discuss your planned giving options, contact us at development@mmri.edu.

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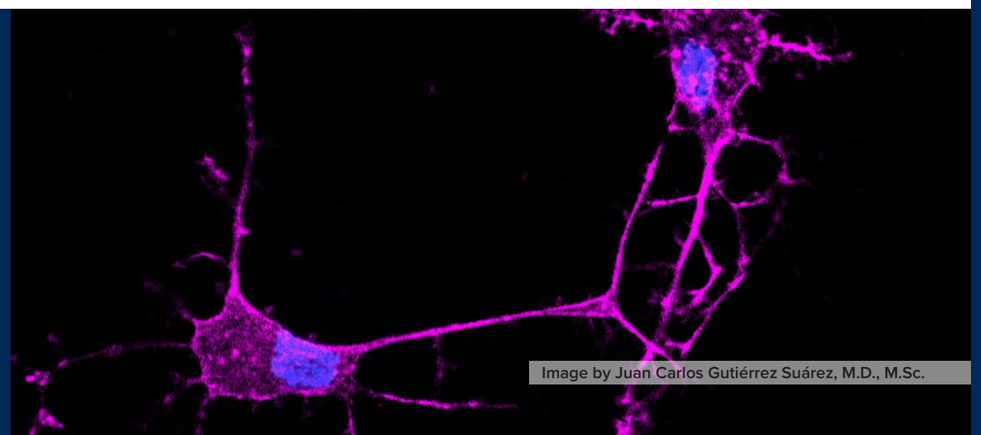
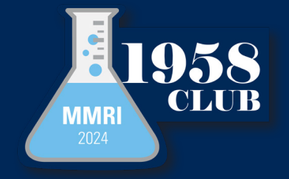


Image by Juan Carlos Gutiérrez Suárez, M.D., M.Sc.

1958 Club Membership Continues to Grow

MMRI's exclusive donor club!



1958 Club pin for 2024

MMRI was established in 1958, and since then, our research initiatives have expanded to cover areas such as cardiovascular disease, autoimmunity and neurocognitive health.

Become a part of the 1958 Club today to contribute to our mission and research efforts. Your generous monthly donation of $19.58 will assist MMRI scientists in making a lasting impact with innovative medical research. As a member of our exclusive donor club, you will be honored with this one-of-a-kind pin!

1958 Club pin for 2025

To become a member or to learn more, visit mmri.edu/1958-club.

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Thank you for your dedicated support!

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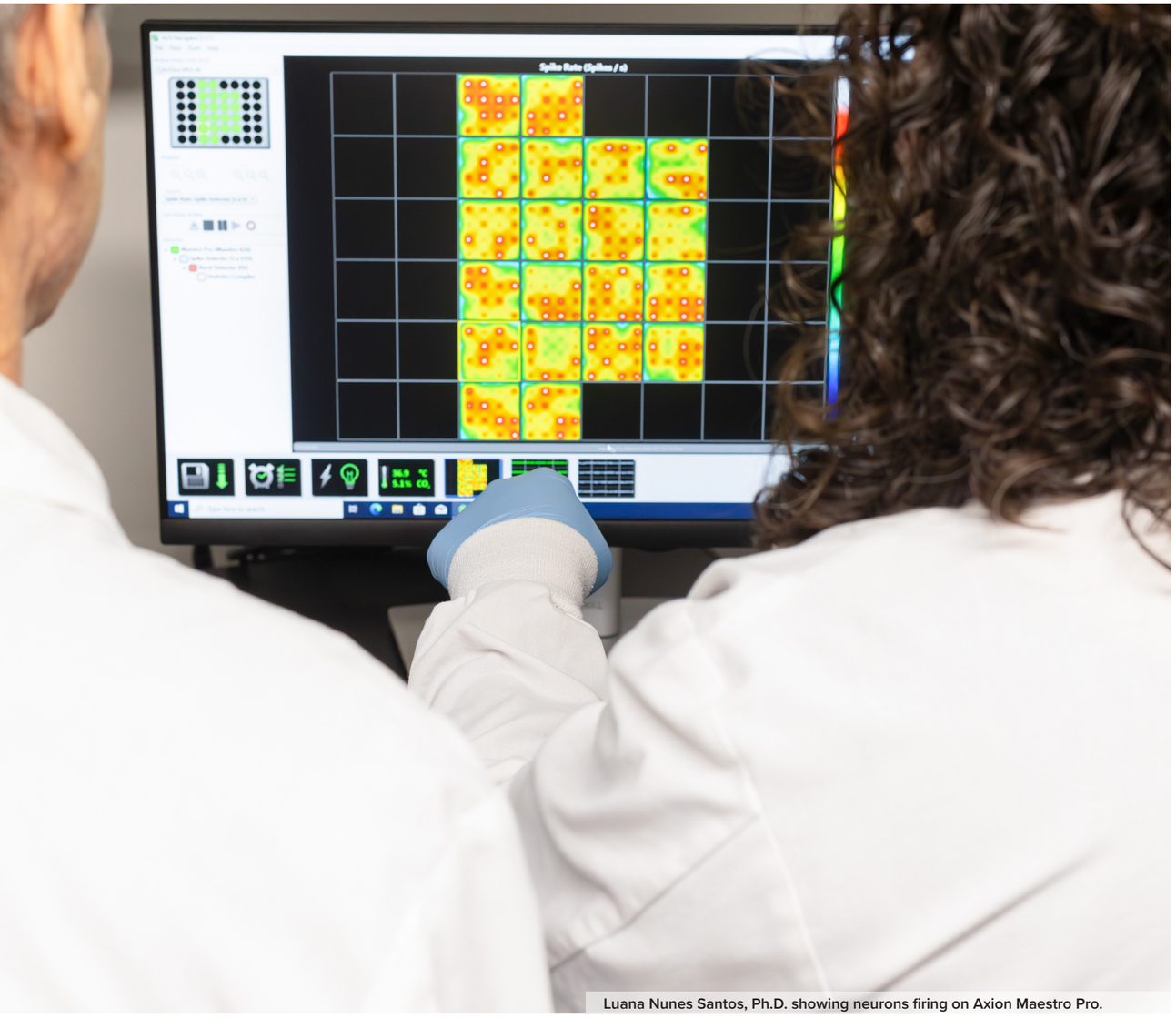

Luana Nunes Santos, Ph.D. showing neurons firing on Axion Maestro Pro.

Update From Our Finance Director

To the Grand Lodge:

The year 2024 marked another important chapter in MMRI's ongoing journey to establish itself as a widely acknowledged and financially independent research laboratory. While several initiatives launched in prior years came to fruition in 2024, many are still in the works and will continue to evolve through 2025 and the coming years. In alignment with our strategic plan, MMRI continued to invest in top-tier research talent in 2024, expanded our laboratory footprint, and increased research grant funding. Beyond the science, MMRI also continued to pursue long-term sustainability by developing for-profit ventures and widening our philanthropic endeavors, both locally and across the country.

While 2024 brought many successes, it was not without its challenges. Chief among them was balancing the financial demands of day-to-day operations with the capital needs of long-term projects and sustainability efforts. The for-profit arm of MMRI, Three Pillars Innovations, Inc. (TPI) - established in 2022 owns 50% of a quality assurance testing laboratory in Utica. Although revenue growth has fallen short of projections due to external regulatory hurdles, the testing facility has secured key contracts and is now operating at a break-even point. We remain confident that this venture will fulfill its long-term goal of financial sustainability.

As our name suggests, MMRI's overall focus is medical research. Dedicated to improving the health and quality of life for all humankind. The groundbreaking research done here is primarily made possible through the critical support of Federal and non-profit research grants. In 2024, we surpassed prior benchmarks by securing more grant funding than in any previous year. This achievement reflects our ongoing investment in exceptional talent, state-of-the-art equipment and robust educational support. Investments in these resources not only elevate our competitiveness for major grants but also enhance our capacity to attract and collaborate with leading minds in medical research. By year's end, MMRI has grown to six individual labs with 14 active research grants.

On the marketing and development front, 2024 was a vibrant and exciting year. We kicked spring off with the First Annual 1958 Gala, which welcomed 250 guests, from local business leaders to our very own researchers. The gala was followed by our inaugural Lupus Walk in May and the annual MMRI Golf Outing in August. These events were not only financially successful, but also instrumental in elevating MMRI's visibility in the community. In addition, the launch of our ambassador program marks a significant step forward in expanding our reach and fundraising capabilities beyond the local level. Long regarded as one of Utica's "hidden gems," MMRI is stepping confidently into the public spotlight – and with the efforts put forth in 2024, we will not stay hidden for long.

To conclude, 2024 was a year of realization and refinement for MMRI. If 2023 was our "springboard into the future," 2024 was a year of learning to navigate the new territory that we sprung into. It was a year of growth, resilience, and progress - driven by bold new initiatives, yet still firmly set on a solid foundation and cornerstone values that have guided us for the past 66 years. It's with these values of excellence, innovation and integrity that MMRI will continue building a healthier, brighter future for all.

Sincerely,

Michael Mayo, MBA
Controller

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INDEPENDENT AUDITORS' REPORT

The Board of Directors
Masonic Medical Research Laboratory,
dba Masonic Medical Research Institute

Report on the Audit of the Financial Statements

Opinion

We have audited the consolidated balance sheets of Masonic Medical Research Laboratory, dba Masonic Medical Research Institute (the Institute) as of December 31, 2024 and 2023, and the related consolidated statements of activities, functional expenses, and cash flows for the years then ended, and the related notes to the consolidated financial statements.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Institute as of December 31, 2024 and 2023, and the changes in its net assets and cash flows for the years then ended, in accordance with accounting principles generally accepted in the United States of America (GAAP).

Basis for Opinion

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS) and the standards applicable to financial audits contained in *Government Auditing Standards,* issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the Institute and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with GAAP, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Institute's ability to continue as a going concern for one year after the date the financial statements are issued.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS and *Government Auditing Standards*, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Institute's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the financial statements as a whole. The accompanying schedule of expenditures of federal awards, as required by Title 2 U.S. *Code of Federal Regulations* Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance) is presented for purposes of additional analysis and is not a required part of the financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the financial statements. The information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with GAAS. In our opinion, the schedule of expenditures of federal awards is fairly stated, in all material respects, in relation to the financial statements as a whole.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated March 19, 2025 on our consideration of the Institute's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, grant agreements, and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Institute's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Institute's internal control over financial reporting and compliance.

Lumsden & McCormick, LLP

March 19, 2025

Consolidated Balance Sheets

December 31,	2024	2023
Assets		
Current assets:		
Cash	**$ 491,534**	$ 495,444
Receivables (Note 2)	**2,200,507**	2,302,085
Prepaid expenses and other assets	**465,873**	328,566
	3,157,914	3,126,095
Investments (Note 3)	**14,249,748**	16,206,448
Split-interest agreements (Note 4)	**5,986,672**	5,855,313
Property and equipment, net (Note 5)	**14,284,641**	15,012,669
Cash value of life insurance	**1,075,508**	1,138,415
Interest in Analytical Testing Center of Central New York LLC (Note 6)	**1,845,936**	1,931,326
	$ 40,600,419	$ 43,270,266
Liabilities and Net Assets		
Current liabilities:		
Short-term borrowings (Note 7)	**$ 4,363,391**	$ 6,178,308
Accounts payable	**181,532**	366,642
Accrued expenses	**527,158**	378,403
Deferred revenue	**8,660**	5,000
	5,080,741	6,928,353
Charitable gift annuities (Note 4)	**132,364**	148,977
Long-term debt (Note 8)	**1,091,000**	-
Net assets:		
Without donor restrictions	**21,621,880**	22,582,566
With donor restrictions (Note 9)	**12,674,434**	13,610,370
	34,296,314	36,192,936
	$ 40,600,419	$ 43,270,266

See accompanying notes.

MASONIC MEDICAL RESEARCH INSTITUTE

Consolidated Statements of Activities

For the years ended December 31,	2024	2023
Net assets without donor restrictions:		
Revenues, gains and support:		
Contributions:		
Masonic Brotherhood Foundation, Inc.	$ 122,545	$ 77,070
Legacies and bequests	1,550,621	1,392,119
Grants	5,339,596	2,481,031
Other	338,761	470,321
Employee Retention Credits (Note 2)	-	831,717
Investment earnings, net	772,842	1,007,105
Analytical Testing Center of Central New York allocations	(485,098)	(609,081)
Gain on disposal of property and equipment	9,226	-
Other income	399,112	83,087
Net assets released from restrictions	2,256,773	1,367,629
Total revenues, gains, and support	10,304,378	7,100,998
Expenses:		
Program services - research and education	7,407,715	7,088,559
Management and general	2,405,607	2,198,224
Public relations and development	1,451,742	1,133,465
Total expenses	11,265,064	10,420,248
Change in net assets without donor restrictions	(960,686)	(3,319,250)
Net assets with donor restrictions:		
Contributions	357,266	375,239
Change in value of split-interest agreements	364,981	418,665
Investment earnings, net	598,590	876,434
Net assets released from restrictions	(2,256,773)	(1,367,629)
Change in net assets with donor restrictions	(935,936)	302,709
Change in net assets	(1,896,622)	(3,016,541)
Net assets - beginning	36,192,936	39,209,477
Net assets - ending	$ 34,296,314	$ 36,192,936

See accompanying notes.

RESEARCH INSTITUTE

ments of Functional Expenses

cember 31,	2024				2023		
	Program Services	Supporting Services			Program Services	Supporting Services	
	Research and Education	Management and General	Public Relations and Development	Total	Research and Education	Management and General	Public Relatio and Developm
	$ 3,031,484	$ 1,156,255	$ 706,153	$ 4,893,892	$ 2,686,492	$ 1,097,883	$ 519,3
e benefits	835,784	257,159	191,334	1,284,277	629,390	270,222	139,2
related expenses	3,867,268	1,413,414	897,487	6,178,169	3,315,882	1,368,105	658,6
	910,036	-	-	910,036	1,060,605	-	
operations	199,388	53,491	20,237	273,116	206,875	61,478	21,0
s	177,883	17,442	7,386	202,711	119,827	15,178	7,1
	103,450	93,828	83,276	280,554	111,833	85,885	80,7
d meals	84,245	40,081	52,314	176,640	81,073	58,080	69,3
outside services	57,320	346,848	44,351	448,519	6,071	303,532	3,6
nd sponsorships	2,826	4,112	218,591	225,529	645	14,676	162,9
	76,371	53,167	6,460	135,998	96,672	47,612	5,2
	1,609,453	305,571	63,118	1,978,142	1,582,849	132,937	64,5
	319,263	60,768	33,607	413,638	505,562	96,228	53,2
	212	16,885	24,915	42,012	665	14,513	6,9
	$ 7,407,715	$ 2,405,607	$ 1,451,742	$ 11,265,064	$ 7,088,559	$ 2,198,224	$ 1,133,4

Consolidated Statements of Cash Flows

For the years ended December 31,	2024	2023
Operating activities:		
Change in net assets	**$ (1,896,622)**	$ (3,016,541)
Adjustments to reconcile change in net assets to net cash flows from operating activities:		
Depreciation	**1,978,142**	1,780,340
Gain on disposal of property and equipment	**(9,226)**	-
Net realized and unrealized gains on investments	**(604,039)**	(1,220,230)
Gain on beneficial interest in split-interest agreements	**(147,972)**	(284,999)
(Increase) decrease in cash value of life insurance	**62,907**	(41,153)
Loss from interest in Analytical Testing Center of Central New York	**485,098**	609,081
Changes in other operating assets and liabilities:		
Receivables	**101,578**	(1,436,614)
Prepaid expenses and other assets	**(137,307)**	(67,415)
Accounts payable	**(185,110)**	198,043
Accrued expenses	**148,755**	45,471
Deferred revenue	**3,660**	4,904
Net operating activities	**(200,136)**	(3,429,113)
Investing activities:		
Property and equipment purchases	**(1,251,109)**	(371,681)
Proceeds from the sale of property and equipment	**10,221**	-
Proceeds from sales of investments	**9,918,239**	24,832,080
Purchases of investments	**(7,357,500)**	(13,199,663)
Member contributions to Analytical Testing Center of Central New York	**(399,708)**	(2,231,030)
Net investing activities	**920,143**	9,029,706
Financing activities:		
Proceeds from short-term borrowings	**-**	6,178,308
Payments on short-term borrowings	**(1,814,917)**	-
Proceeds from issuance of long-term debt	**1,091,000**	-
Payments on long term debt	**-**	(11,943,158)
Net financing activities	**(723,917)**	(5,764,850)
Net change in cash	**(3,910)**	(164,257)
Cash - beginning	**495,444**	659,701
Cash - ending	**$ 491,534**	$ 495,444

See accompanying notes.

Notes to Consolidated Financial Statements

1. Summary of Significant Accounting Policies:

Organization:

Masonic Medical Research Laboratory, dba Masonic Medical Research Institute (the Institute) is a nonprofit organization located in Utica, New York, dedicated to improving the health and quality of life for all humankind. The Institute's primary mission is to conduct high-quality, basic biomedical research aimed at generating knowledge and information necessary for development of the medical cures and treatments of tomorrow.

The accompanying financial statements include the accounts of the Institute and its controlled subsidiary Three Pillars Innovation, Inc. (TPI). All significant intercompany accounts and transactions have been eliminated in the accompanying financial statements.

TPI, a for-profit corporation, was established in 2022 as a holding company to invest in various entrepreneurial ventures with the goal of creating sustainable cash flow to the Institute.

Subsequent Events:

The Institute has evaluated events and transactions for potential recognition or disclosure through March 19, 2025, the date the financial statements were available to be issued.

Cash:

Cash in financial institutions may exceed insured limits at various times during the year and subject the Institute to concentrations of credit risk.

Investments:

Investments represent marketable securities stated at fair value on a recurring basis as determined by quoted prices in active markets. Investment securities are exposed to interest rate, market, and credit risks. Due to the level of risk associated with certain investment securities and the level of uncertainty related to changes in the value of investment securities, it is at least reasonably possible that changes in values in the near term could materially affect the amounts reported in the accompanying financial statements.

Split-Interest Agreements:

The Institute receives contributions in the form of split-interest agreements which consist primarily of charitable gift annuities, charitable remainder trusts, and beneficial interests in perpetual trusts. The assets are invested in marketable securities and are stated at fair value as determined by quoted prices in active markets. Distributions from the trusts are made periodically, and represent unrestricted investment income.

The Institute administers a charitable gift annuity plan whereby donors may contribute assets in exchange for the right to receive a fixed dollar annual return during their lifetimes. A portion of contributed assets is considered to be a charitable contribution for income tax purposes for the donor. The difference between the amount provided for the gift annuity and the liability for future payments, determined on an actuarial basis, is recognized as a contribution with donor restrictions at the date of the gift. Upon the death of the annuitant (or last joint annuitant), the remaining net assets are available for use by the Institute. State mandated reserves related to charitable gift annuity agreements are maintained at the required level.

The Institute is a remainder beneficiary in charitable trusts administered by other trustees. Pursuant to the agreements, assets are recorded at the present value of the estimated future benefits to be received based on the life expectancy of the income beneficiaries using appropriate discount rates. Subsequent changes in value are recorded as change in value of split-interest agreements in the statements of activities.

The Institute is a beneficiary of perpetual trusts administered by independent organizations. Under the terms of the trusts, the Institute has irrevocable rights to receive portions of the income earned on the trust assets in perpetuity.

Property and Equipment:

Property and equipment is stated at cost or fair market value at the date of donation, net of accumulated depreciation. Depreciation is computed by the straight-line method over estimated service lives.

Net Assets:

The Institute reports information regarding its financial position and activities according to two classes of net assets: net assets without donor restrictions and net assets with donor restrictions.

Net assets with donor restrictions include those whose use has been limited by donors to a specific time period, purpose, or those to be maintained in perpetuity by the Institute.

Contributions:

Contributions, including unconditional promises to give, are reported at fair value at the date the contribution is made. Contributions are recorded as restricted if they are received with donor stipulations that limit their use. When a donor restriction expires, net assets with donor restrictions are reclassified as net assets without donor restrictions and reported in the statements of activities as net assets released from restrictions. Donor restricted contributions whose restrictions are met within the same year as received are reported as contributions without donor restrictions in the accompanying statements of activities.

Unconditional promises to give that are expected to be collected within one year are recorded as contributions receivable at their net realizable value. Unconditional promises to give that are expected to be collected in future years are recorded at the present value of estimated future cash flows. The discounts on those amounts are computed using an appropriate interest rate applicable to the year in which the promise is received. Amortization of the discount is included in contribution revenue.

The Institute also receives grants from governments and nonprofit organizations. These conditional contributions are recognized as revenue when allowable expenditures are incurred or other grantor conditions are met. The grant awards and reimbursements are subject to various compliance and financial audits by the funding source. Management believes no significant adjustments to recognized amounts are necessary.

Functional Expense Allocation:

The Institute's costs of providing its various programs and activities have been summarized on a functional basis in the statements of functional expenses. Accordingly, certain costs have been allocated among the programs and supporting services benefited. Those costs include depreciation, which is allocated on an estimated square footage basis, and certain other expenses allocated based on employee time and effort.

Tax Status:

The Institute is a 501(c)(3) corporation generally exempt from income taxes under Section 501(a) of the Internal Revenue Code.

TPI is taxed as a C-corporation and files separate federal and state corporation tax returns. TPI has estimated net operating loss carryforwards of approximately $1,099,000. No tax benefits have been reported in the financial statements, since management believes the carryforwards will not be used. Accordingly, the estimated cumulative deferred tax benefit of the loss carryforwards have been offset by a valuation allowance of the same amount.

Use of Estimates:

The preparation of financial statements in accordance with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

2. Receivables:

	2024	2023
Contributions:		
Grants	$ 610,955	$ 649,908
Others	589,625	749,960
Employee Retention Credits	831,717	831,717
Other receivables	168,210	70,500
	$ 2,200,507	$ 2,302,085

During 2023, the Institute determined it qualified for federal government assistance of $831,717 through Employee Retention Credit (ERC) provisions under the Consolidated Appropriation Act of 2021. Although management believes all ERC eligibility requirements have been met, the Institute's payroll tax returns which claimed the ERCs, are subject to audit for a period of five years.

3. Investments:

	2024	2023
Cash and cash equivalents	$ 202,909	$ 74,802
Mutual funds	3,899,954	2,617,544
Equity securities	6,780,694	9,378,076
U.S. government securities	3,366,191	4,136,026
	$ 14,249,748	$ 16,206,448

The following summarizes investment return and its classification in the statements of activities for the years ended December 31, 2024 and 2023:

	2024	
	Without Donor Restrictions	With Donor Restrictions
Dividends and interest	$ 387,358	$ 280,076
Net realized gains	652,481	824,970
Net unrealized losses	(366,956)	(506,456)
Distributions from other perpetual trust assets	99,959	-
	$ 772,842	$ 598,590

	2023	
	Without Donor Restrictions	With Donor Restrictions
Dividends and interest	$ 333,294	$ 228,575
Net realized gains	1,213,443	507,171
Net unrealized gains (losses)	(641,072)	140,688
Distributions from other perpetual trust assets	101,440	-
	$ 1,007,105	$ 876,434

4. Split-Interest Agreements:

	2024	2023
Charitable gift annuities	$ 334,080	$ 332,777
Beneficial interest in charitable remainder trusts	3,767,985	3,646,556
Other perpetual trust assets	1,884,607	1,804,907
Pooled income funds	-	71,073
	$ 5,986,672	$ 5,855,313

Liabilities associated with the above charitable gift annuity assets totaled $132,364 and $148,977 at December 31, 2024 and 2023. Distributions received from the agreements totaled $263,811 and $265,806 in 2024 and 2023.

5. Property and Equipment:

	2024	2023
Land	$ 8,500	$ -
Buildings and improvements	18,704,294	18,699,499
Equipment	9,594,290	8,362,027
Furniture and fixtures	189,832	189,832
Vehicles	20,271	43,326
	28,517,187	27,294,684
Less accumulated depreciation	14,232,546	12,282,015
	$ 14,284,641	$ 15,012,669

6. Interest in Analytical Testing Center of Central New York LLC:

TPI is a 50% member of Analytical Testing Center of Central New York LLC (ATCCNY), a limited liability company operating a cannabis testing laboratory in New York State. TPI's membership in ATCCNY is accounted for on the equity method.

Financial position and results of operations of ATCCNY for the year ended December 31, 2024 and 2023 is summarized below:

	2024	2023
Total assets	$ 1,096,875	$ 1,400,721
Total liabilities	$ 378,923	$ 112,280
Total equity	$ 717,952	$ 1,288,441
Total revenue	$ 699,935	$ 20,615
Total expenses	$ 1,670,132	$ 1,238,776
Excess of expenses over revenue	$ (970,197)	$ (1,218,161)
Member contributions	$ 399,708	$ 2,231,030

7. Short-Term Borrowings:

The Institute has available a margin priority investment line of credit, with maximum borrowings based on advance rate maximum loan percentages, security types, and market values, as defined in the agreement. Interest on this line is payable at the Wall Street Journal Broker Call rate less 50 basis points (5.75% and 6.75% at December 31, 2024 and 2023), and the line is secured by pledged investments totaling $6,813,572 and $8,109,029 at December 31, 2024 and 2023. Amounts outstanding at December 31, 2024 and 2023 totaled $4,363,391 and $6,178,308.

8. Long-Term Debt:

In 2024, the Institute obtained life insurance policy loans totaling $1,091,000. The loans carry interest rates ranging from 4.78% to 6.50%, require interest only payments, and are secured by the related insurance policies.

Through 2023, the Institute had available a $12,000,000 bank revolving line note to finance renovations of its building completed in 2020. The note carried interest at 1% below prime and was secured by specific Institute investments. During 2023, the Institute repaid all outstanding amounts and the line was closed.

9. Net Assets with Donor Restrictions:

Net assets with donor restrictions are for the following purposes or periods:

	2024	2023
Subject to expenditure for research or other purposes	**$ 1,876,156**	$ 3,224,570
Subject to the passage of time	**3,991,701**	3,946,529
Other perpetual trust assets	**1,884,607**	1,804,907
Subject to the Institute's spending policy and appropriation:		
Investment in perpetuity (including amounts above the original gift value of $3,067,271), which, once appropriated, is expendable to support research (see Note 10)	**4,921,970**	4,634,364
Total net assets with donor restrictions	**$ 12,674,434**	$ 13,610,370

10. Endowment Assets:

The Institute's restricted endowment assets arise from donor-restricted endowments invested in perpetuity. The Institute has adopted investment and spending policies for endowment assets that attempt to provide returns sufficient to address the purposes of the assets over the long-term. The Institute seeks to distribute up to 5% of total endowment market value annually, while maintaining the purchasing power of the endowment assets over the long-term.

The Institute has interpreted the New York Prudent Management of Institutional Funds Act (NYPMIFA) as requiring the preservation of the fair value of the original donor restricted endowment gift as of the gift date, absent explicit donor stipulations to the contrary. As a result of this interpretation, the Institute classifies as perpetual endowment (a) the original value of gifts donated to the perpetual endowment, (b) the original value of subsequent gifts to the perpetual endowment, and (c) accumulations to the perpetual endowment made in accordance with the direction of a donor gift instrument at the time the accumulation is added to the fund.

Investment earnings of non-trusteed perpetual endowment funds are monitored and appropriated for expenditure by the Institute in a manner consistent with the standard of prudence prescribed by NYPMIFA. In accordance with NYPMIFA, the Institute considers the following factors to appropriate or accumulate donor-restricted endowment funds:

- Duration and preservation of the fund
- Purposes of the Institute and the fund
- General economic conditions
- Possible effects of inflation and deflation
- Expected total return from income and appreciation of investments
- Other Institute resources
- When circumstances would otherwise warrant, alternatives to expenditure of the endowment fund, giving due consideration to the effect that such alternatives may have on the Institute
- Investment policy of the Institute

Investment gains related to the donor-restricted endowment are reported as increases to net assets with donor restrictions until appropriated and expended in accordance with the Institute's spending policy. The Institute's restricted endowment assets activity for the years ended December 31, 2024 and 2023 is as follows:

	2024	2023
Endowment assets – beginning balance	**$ 4,634,364**	$ 4,703,319
Investment gains, net of custodian fees	**469,238**	430,686
Transfers	**-**	60,000
Appropriated	**(181,632)**	(559,641)
Endowment assets – ending balance	**$ 4,921,970**	$ 4,634,364

11. Retirement Plan:

The Institute sponsors a defined-contribution retirement plan covering substantially all full-time employees. The plan allows for discretionary employer matching contributions of up to 10% of salaries. The Institute's contributions to the plan totaled $314,054 and $277,236 in 2024 and 2023.

12. Related Party Transactions:

The Institute receives voluntary contributions from New York State Masons through Masonic Brotherhood Foundation, Inc. (the Foundation). In addition, other Masonic organizations throughout New York State contribute directly to the Institute. During the years ended December 31, 2024 and 2023, the Institute received contributions of $122,545 and $77,070 for operations through the Foundation.

In addition, at December 31, 2024 and 2023, the Foundation held in a custodial account $919,166 and $799,425 of bequests on behalf of the Institute. Pursuant to accounting guidance, the investments remain as part of the Foundation's net assets with all investment income disbursed to the Institute for its operations. Accordingly, such bequests are not recorded in the Institute's financial statements. Disbursements of investment income made to the Institute for 2024 and 2023 totaled $33,443 and $29,601.

The Institute is party to an agreement with Grand Lodge of Free and Accepted Masons of the State of New York (the Grand Lodge). The Grand Lodge provides services to promote the Institute's fundraising objectives for an annual fee of $1 per Grand Lodge member through December 31, 2024. Annual expenses totaling $5,000 and $35,696 were incurred for the years ended December 31, 2024 and 2023. The Grand Lodge also manages contributions (including estate gifts) received by the Foundation to benefit the Institute and assesses a fee for processing such items. Fees charged in 2024 and 2023 totaled $12,251 and $43,859 and are included in publicity, promotion and sponsorships on the accompanying statements of functional expenses.

The Institute's facilities are located on land owned by Masonic Care Community (MCC). The Institute pays a $1 annual fee to the trustees of MCC for use of this land. Utilities and ground maintenance expenses related to the facilities are charged by MCC and totaled $211,341 and $167,436 for 2024 and 2023 and amounts totaling $17,390 and $49,728 are included in accounts payable on the accompanying balance sheets at December 31, 2024 and 2023.

13. Cash Flows Information:

Net cash flows from operating activities reflect cash payments for interest totaling $413,638 and $655,007 for the years ended December 31, 2024 and 2023.

14. Financial Assets Available for Operations:

The Institute obtains financial assets generally through grants, contributions and fundraising efforts. The financial assets are acquired throughout the year to help meet the Institute's cash needs for general expenditures. The Institute's financial assets available within one year of the balance sheet date to meet cash needs for general expenditures consist of the following at December 31, 2024 and 2023:

	2024	2023
Cash	**$ 491,534**	$ 495,444
Receivables	**2,200,507**	2,302,085
Investments	**14,249,748**	16,206,448
Less: investments restricted to expenditure for research or other purposes	**(1,876,156)**	(3,224,570)
Less: investments subject to the Institute's spending policy and appropriation	**(4,921,970)**	(4,634,364)
Less: investments held as collateral for debt	**(6,813,572)**	(8,109,029)
	$ 3,330,091	$ 3,036,014

15. Risks and Uncertainties:

The Institute is involved in legal proceedings which, in the opinion of management, will not have a material adverse impact upon the financial position of the Institute.

Supplementary Information
Schedule of Expenditures of Federal Awards

For the year ended December 31, 2024

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Grantor Number	Expenditures
Research and Development Cluster:			
U.S. Department of Defense:			
Direct award:			
Military Medical Research and Development	12.420	LR200032	$ 265,455 [1]
U.S. Department of Health and Human Services:			
Passed through University of Louisville Research Foundation, Inc.:			
Family Smoking Prevention and Tobacco Control Act Regulatory Research	93.077	163818	105,382
Direct award:			
Cardiovascular Diseases Research	93.837	146810	715,590
Passed through The Brigham and Women's Hospital, Inc.:			
Cardiovascular Diseases Research	93.837	167905	38,188
Passed through Medical University of South Carolina:			
Cardiovascular Diseases Research	93.837	170060	41,774
Direct award:			
Lung Diseases Research	93.838	158816	142,148
Direct awards:			
Arthritis, Musculoskeletal and Skin Diseases Research	93.846	079085	183,789 [2]
Arthritis, Musculoskeletal and Skin Diseases Research	93.846	801535	190,028
			373,817
Passed through Vanderbilt University Medical Center:			
Arthritis, Musculoskeletal and Skin Diseases Research	93.846	0809014	34,604
Direct award:			
Allergy and Infectious Diseases Research	93.855	170051	395,537 [3]
Passed through University of Florida:			
Allergy and Infectious Diseases Research	93.855	170075	49,901
Passed through Northwestern University:			
Allergy and Infectious Diseases Research	93.855	170075	162,904
Passed through Vanderbilt University Medical Center:			
Biomedical Research and Research Training	93.859	126062	3,360
Passed through University of Louisville Research Foundation, Inc.:			
Aging Research	93.866	084688	81,259
Total Expenditures of Federal Awards			$ 2,409,919

[1] *Includes subrecipient award of $26,267*
[2] *Includes subrecipient award of $80,932*
[3] *Includes subrecipient award of $55,472*

Notes to Schedule of Expenditures of Federal Awards

1. Summary of Significant Accounting Policies:

Basis of Presentation:

The accompanying schedule of expenditures of federal awards (SEFA) presents the activity of all federal award programs administered by Masonic Medical Research Laboratory, dba Masonic Medical Research Institute (the Institute), an entity defined in Note 1 to the Institute's basic consolidated financial statements. Federal awards received directly from federal agencies, as well as federal awards passed through from other governmental agencies and nonprofit organizations, are included on the SEFA.

Expenditures are calculated as required by the Uniform Guidance or the applicable program and do not constitute actual program disbursements.

Basis of Accounting:

The Institute uses the accrual basis of accounting for each federal program, consistent with the consolidated financial statements.

The amounts reported as federal expenditures generally were obtained from the appropriate federal financial reports for the applicable programs and periods. The amounts reported in these federal financial reports are prepared from records maintained for each program, which are periodically reconciled with the Institute's financial reporting system.

Indirect Costs:

The Institute has elected not to use the 10% de minimis indirect cost rate as allowed under the Uniform Guidance. Rather, the Institute applies an indirect cost rate as permitted by the grant agreements.

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INDEPENDENT AUDITORS' REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING AND ON COMPLIANCE AND OTHER MATTERS BASED ON AN AUDIT OF FINANCIAL STATEMENTS PERFORMED IN ACCORDANCE WITH *GOVERNMENT AUDITING STANDARDS*

The Board of Directors
Masonic Medical Research Laboratory,
dba Masonic Medical Research Institute

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the consolidated financial statements of Masonic Medical Research Laboratory, dba Masonic Medical Research Institute (the Institute), which comprise the consolidated balance sheet as of December 31, 2024, and the related consolidated statements of activities, functional expenses, and cash flows, for the year then ended, and the related notes to the consolidated financial statements and have issued our report thereon dated March 19, 2025.

Report on Internal Control over Financial Reporting

In planning and performing our audit of the financial statements, we considered the Institute's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control. Accordingly, we do not express an opinion on the effectiveness of the Institute's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A material weakness is a deficiency, or a combination of deficiencies, in internal control such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis. A significant deficiency is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses or significant deficiencies may exist that have not been identified.

Report on Compliance and Other Matters

As part of obtaining reasonable assurance about whether the Institute's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the financial statements. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Institute's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Institute's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Lumsden & McCormick, LLP

March 19, 2025

Lumsden McCormick LLP
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INDEPENDENT AUDITORS' REPORT ON COMPLIANCE FOR EACH MAJOR FEDERAL PROGRAM AND ON INTERNAL CONTROL OVER COMPLIANCE REQUIRED BY THE UNIFORM GUIDANCE

The Board of Directors
Masonic Medical Research Laboratory,
dba Masonic Medical Research Institute

Report on Compliance for Each Major Federal Program

Opinion on Each Major Federal Program

We have audited the compliance of Masonic Medical Research Laboratory, dba Masonic Medical Research Institute (the Institute) with the types of compliance requirements described in the OMB *Compliance Supplement* that could have a direct and material effect on each of the Institute's major federal programs for the year ended December 31, 2024. The Institute's major federal programs are identified in the summary of auditors' results section of the accompanying schedule of findings and questioned costs.

In our opinion, the Institute complied, in all material respects, with the compliance requirements referred to above that could have a direct and material effect on each of its major federal programs for the year ended December 31, 2024.

Basis for Opinion on Each Major Federal Program

We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America (GAAS); the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States; and the audit requirements of Title 2 U.S. *Code of Federal Regulations* Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance). Our responsibilities under those standards and the Uniform Guidance are further described in the Auditors' Responsibilities for the Audit of Compliance section of our report.

We are required to be independent of the Institute and to meet our other ethical responsibilities, in accordance with relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion on compliance for each major federal program. Our audit does not provide a legal determination of the Institute's compliance with the compliance requirements referred to above.

Responsibilities of Management for Compliance

Management is responsible for compliance with the requirements referred to above and for the design, implementation, and maintenance of effective internal control over compliance with the requirements of laws, statutes, regulations, rules and provisions of contracts or grant agreements applicable to the Institute's federal programs.

Auditors' Responsibilities for the Audit of Compliance

Our objectives are to obtain reasonable assurance about whether material noncompliance with the compliance requirements referred to above occurred, whether due to fraud or error, and express an opinion on the Institute's compliance based on our audit. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS, *Government Auditing Standards*, and the Uniform Guidance will always detect material noncompliance when it exists. The risk of not detecting material noncompliance resulting from fraud is higher than for that resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Noncompliance with the compliance requirements referred to above is considered material, if there is a substantial likelihood that, individually or in the aggregate, it would influence the judgment made by a reasonable user of the report on compliance about the Institute's compliance with the requirements of each major federal program as a whole.

In performing an audit in accordance with GAAS, *Government Auditing Standards*, and the Uniform Guidance, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material noncompliance, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the Institute's compliance with the compliance requirements referred to above and performing such other procedures as we considered necessary in the circumstances.
- Obtain an understanding of the Institute's internal control over compliance relevant to the audit in order to design audit procedures that are appropriate in the circumstances and to test and report on internal control over compliance in accordance with the Uniform Guidance, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control over compliance. Accordingly, no such opinion is expressed.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and any significant deficiencies and material weaknesses in internal control over compliance that we identified during the audit.

Report on Internal Control Over Compliance

A deficiency in internal control over compliance exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. A material weakness in internal control over compliance is a deficiency, or a combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis. A significant deficiency in internal control over compliance is a deficiency, or a combination of deficiencies, in internal control over compliance with a type of compliance requirement of a federal program that is less severe than a material weakness in internal control over compliance, yet important enough to merit attention by those charged with governance.

Our consideration of internal control over compliance was for the limited purpose described in the Auditors' Responsibilities for the Audit of Compliance section above and was not designed to identify all deficiencies in internal control over compliance that might be material weaknesses or significant deficiencies in internal control over compliance. Given these limitations, during our audit we did not identify any deficiencies in internal control over compliance that we consider to be material weaknesses, as defined above. However, material weaknesses or significant deficiencies in internal control over compliance may exist that were not identified.

Our audit was not designed for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, no such opinion is expressed.

The purpose of this report on internal control over compliance is solely to describe the scope of our testing of internal control over compliance and the results of that testing based on the requirements of the Uniform Guidance. Accordingly, this report is not suitable for any other purpose.

Swenson & McCormick, LLP

March 19, 2025

MASONIC MEDICAL RESEARCH INSTITUTE

Schedule of Findings and Questioned Costs

For the year ended December 31, 2024

Section I. Summary of Auditors' Results

Financial Statements

Type of auditors' report issued:	*Unmodified*
Internal control over financial reporting:	
• Material weakness(es) identified?	No
• Significant deficiency(ies) identified?	None reported
Noncompliance material to financial statements noted?	No

Federal Awards

Internal control over major programs:	
• Material weakness(es) identified?	No
• Significant deficiency(ies) identified?	None reported
Type of auditors' report issued on compliance for major programs:	*Unmodified*
Any audit findings disclosed that are required to be reported in accordance with 2 CFR 200.516(a)?	No

Identification of major programs:

Name of Federal Program or Cluster	Amount
Research and Development Cluster	$ 2,409,919

Dollar threshold used to distinguish between type A and type B programs:	$750,000
Auditee qualified as low-risk auditee?	Yes

Section II. Financial Statement Findings

No findings were reported.

Section III. Federal Award Findings and Questioned Costs

No findings were reported.

Nikon AXR Confocal Microscope Images

The institute was able to enhance its capabilities this year by investing in a Nikon AXR Confocal Microscope. MMRI would like to thank its donors who helped make this purchase possible.

Machines like the Nikon AXR confocal microscope are integral to research at MMRI. Its speed and resolution facilitate more data collection that enables a deeper understanding of the experiment and the matter under investigation. In addition, the Nikon AXR confocal microscope, with its cutting-edge technology, will be a powerful tool to attract new talent to the Institute while assisting all MMRI researchers in pursuing scientific breakthroughs and reinforcing MMRI's position as a leader in medical research.

Image by Abhishek Mishra, Ph.D.

Cardiomyocytes with lipid droplets: heart muscle cells in blue; body of the cell in red; oil droplets in green.

The cardiomyocytes use fatty acids as fuel and if not in use, the cell will store it creating failure at the end.

Image by Zhiqiang Lin, Ph.D.

Two mouse heart muscle cells mingling

Heart muscle cells in mice, or cardiomyocytes, commonly have more than one nucleus (shown in blue) while healthy human cardiomyocytes will only have one.

Image by Juan Carlos Gutiérrez Suárez, M.D., MSc.

Neuron Progenilar Cell: Brain early born neuron blue is showing the nudei

Early born neurons will divide and form fully mature neurons that are the main cell of the brain.

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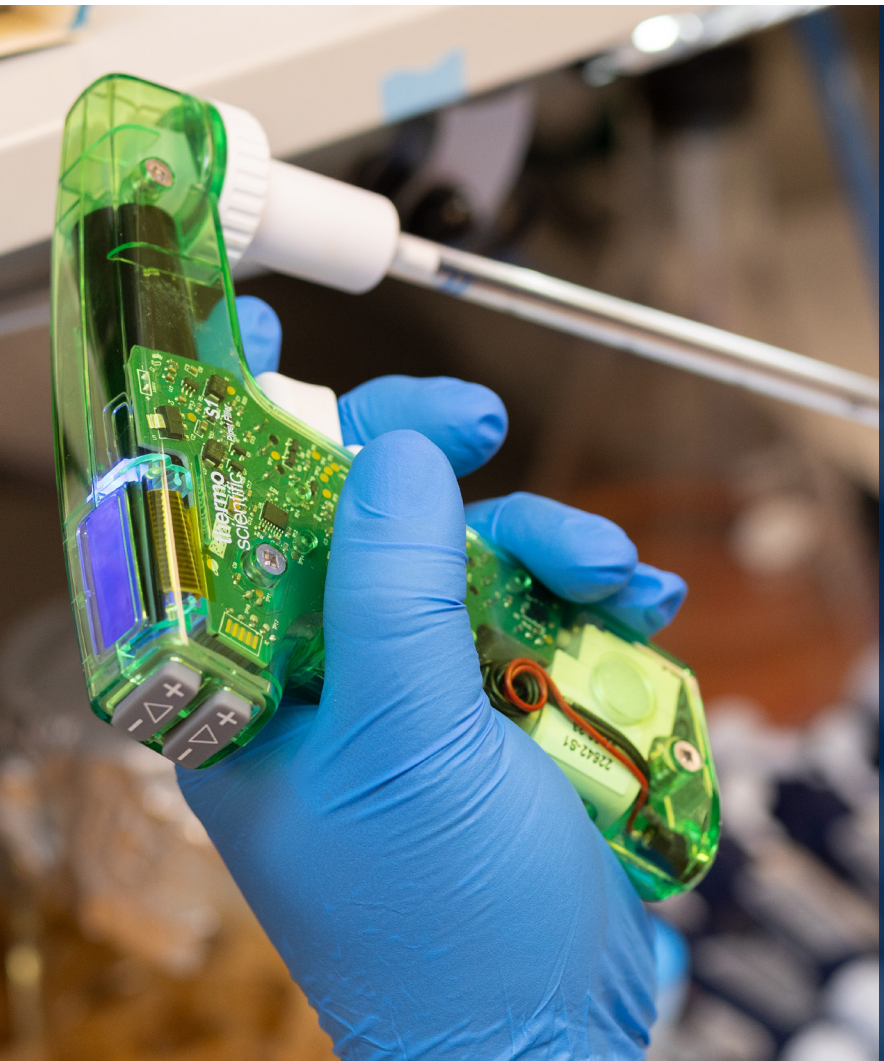

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Now, more than ever, we need your support. Any amount, large or small, helps further our mission to improve the health and quality of life for all humankind.

Visit mmri.edu/donate
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