Research at the University of Michigan Medical School

research.medicine.umich.edu
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Developing the Next Generation of Innovators, 
**Breaking New Ground**, and Improving Patient Health

Greetings,

Research at the University of Michigan Medical School continues to play an integral, ground-breaking role across the campus, state, and beyond.

In planning for the future, our premier biomedical research enterprise is bolstered by a robust research strategy, FastForward to Tomorrow’s Cures, that is based on the tenets that discovery of the right mechanisms via basic research leads to the discovery of the right targets through translational research, resulting in the right therapy for our patients. Our strategy capitalizes on the intersections of our traditional research strengths to create new science at the boundary of old, leveraging our expertise in basic, translational, clinical, and outcomes research to impact our patients and improve population health. These efforts are directed by our Research Board of Directors, comprised of Departmental Chairs and leadership from the Medical School’s Deans Office, who support ongoing investments in infrastructure as well as aid in recruiting, developing, and retaining the world’s top research talent.

The Office of Research at the University of Michigan Medical School is committed to innovative health research and pursuing major medical breakthroughs. We are constantly striving to enhance the research enterprise, including maintaining an investigator-focused infrastructure, facilitating and diversifying investigators’ avenues for funding, providing unique mentoring activities, and streamlining administrative and regulatory processes.

From the enabling technologies of the Biomedical Research Core Facilities to proposal review by the Grant Review & Analysis Office to clinical study development by the Michigan Institute for Clinical & Health Research, the Office of Research comprises over a dozen units offering a wide range of support to the research community. Across the investigative spectrum, our team’s primary focus is on our research faculty and staff with the objective to create for them the best place to do research in the world. Thus, fostering an environment of innovation and efficiency that serves our collective research community and, ultimately, contributes to positive benefits for our patients and society.

Sincerely,
Steve

Steven L. Kunkel, Ph.D.
Senior Associate Dean for Research
Endowed Professor of Pathology Research
MEDICAL SCHOOL FISCAL YEAR 2017

- **Total Awards**: $601M
- **NIH Awards**: $329.8M
- **NIH Ranking**: #12
- **Industry-Sponsored Awards**: $100M
- **Expenditures**: $486M

- **Faculty**: 3,578
- **Publications**: 6,346
- **Active Clinical Trials**: 1,736
- **Invention Reports**: 175
- **SQ FT Laboratory Space**: 1.6M+
A Depth of Research Expertise
With a Long Track Record of Innovation

From trials of the first safe polio vaccine to the latest breakthroughs in treatments for neurological diseases, the University of Michigan continues to be at the forefront of pioneering research that significantly impacts human health.

At $1.4+ billion, the University of Michigan is among the top public universities in research spending in the United States, and the Medical School is responsible for nearly half of those research expenditures. Consistently ranked among the U.S. News & World Report’s top medical research schools, our faculty are members of the National Academies of Sciences and Medicine and the Howard Hughes Medical Institute. The U-M Medical School, part of Michigan Medicine, is one of the nation’s powerhouses in biomedical research.

As a significant research and economic engine in the region, our research spending has an estimated economic impact of more than $1 billion. Our premier facilities, strong research funding, and preeminent scientists allow us to remain at the leading edge of understanding, detecting, and treating a broad array of human diseases and improving health and health care delivery.

- 3 hospitals and more than 150 clinics
- 2.1 million outpatients annually
- $601 million in sponsored awards to support research in 2017
- 1.6+ million square feet of state-of-the-art laboratory space
- 13 of our 29 Medical School departments rank in the top 12 in the country for NIH funding
- Medical school research accounts for one-third of U-M’s patentable discoveries, and nearly half of its agreements with industry
- Tens of thousands of volunteers participate in our research studies each year

We are a community of 3,578 faculty, 1,088 medical residents, 601 post-doctoral fellows, 708 medical students, 588 graduate students, and 3,825 professional staff. Together, we are creating the future of health care through discovery.

While facts like these are impressive, they only hint at what goes on behind the scenes. One of our greatest assets is our collegial, collaborative culture, an atmosphere where faculty, fellows, students, and staff thrive in the shared pursuit of innovative science and improving patient care.
We Focus on You, So You Can Focus on **Great Science**

The **Medical School Office of Research** supports our internationally recognized research enterprise, working to foster an environment of innovation and efficiency.

As the Office of Research units work to facilitate and impact key research functions and processes at the Medical School, team members strive to:

- Enhance investigators’ competitiveness and research impact.
- Accelerate and enhance research through strategic partnership and innovative education to improve health.
- Streamline research processes to reduce faculty administrative burden and increase research team satisfaction.
- Build and sustain coordinated infrastructure to support high-quality cutting-edge research.

The Medical School Office of Research is also leading the implementation of the multimillion dollar Strategic Research Initiative, where our entire research enterprise is working to fast forward to tomorrow’s cures. Across the investigative spectrum, the Medical School Office of Research’s primary mission is to support a culture of innovation and efficiency that serves the Medical School research community and, ultimately, contributes to positive patient impact.
Medical School Office of Research Leadership

Bishr Omary, M.D., Ph.D.
Bishr Omary, M.D., Ph.D., is Michigan Medicine’s new Chief Scientific Officer (CSO) and Executive Vice Dean for Research. He works closely with key stakeholders to develop and implement a robust strategy to foster excellence in biomedical research and clinical translation to improve disease prevention and treatment, in addition to promoting fundamental basic science research. Since 2008, Dr. Omary has served as Chair of the Department of Molecular and Integrative Physiology, where he led the department to become the highest-ranked National Institutes of Health-funded physiology department in the nation. He also helped the department grow its educational and training platforms and was instrumental in recruiting half of the department’s current faculty. Dr. Omary is also the H. Marvin Pollard Professor of Gastroenterology in the Department of Internal Medicine.

Steven L. Kunkel, Ph.D.
Steven L. Kunkel, Ph.D., is the Endowed Professor of Pathology Research and the Senior Associate Dean for Research in the Medical School. In this latter capacity, he provides direction for the school’s research mission, including setting goals for developing a national and international presence for the Medical School’s research enterprise. He is responsible for overseeing the spectrum of research activities from basic investigations to translational, clinical trials, and health outcomes research. Dr. Kunkel and his team created and implemented the Medical School’s “FastForward to Tomorrow’s Cures” research strategy, which is directed at supporting science, increasing infrastructure, and engaging broad leadership participation in guiding the Medical School’s research initiatives. Dr. Kunkel is an internationally recognized immunologist and maintains an active, NIH-funded laboratory.

Sachin Kheterpal, M.D., M.B.A.
As Associate Dean for Research Information Technology, Dr. Kheterpal is recognized as a national leader in perioperative large dataset clinical research. Using innovative techniques to integrate administrative, electronic health records, and registry data across institutions, Dr. Kheterpal leads the Multicenter Perioperative Outcomes Group (MPOG). The group has accumulated more than 6 million patient records with risk adjusted outcomes and detailed clinical intervention data spanning more than 30 health systems across the US and Europe for outcomes research and quality improvement. Dr. Kheterpal also serves as the director for the Anesthesiology Performance Improvement and Reporting Exchange (ASPIRE) Collaborative Quality Initiative, is a member of the advisory panel for the NIH’s Precision Medicine Initiative Cohort Program, and was recently appointed to the NIH’s Council of Councils.

Samuel M. Silver, M.D., Ph.D.
Assistant Dean for Research, Dr. Silver is a professor of Internal Medicine at the University of Michigan Medical School specializing in malignant and benign hematology. He is a former director of the University of Michigan Cancer Center Network and former medical director of the Bone Marrow Transplant Program at the University of Michigan. He has been a member of the faculty since 1986, and in April 2008, he was appointed Assistant Dean for Research. Dr. Silver received his medical degree from Cornell University Medical College and his Ph.D. in virology from the Rockefeller University. He completed his residency at the University of California-San Francisco and was a fellow in hematology and oncology at the University of Pennsylvania.

George A. Mashour, M.D., Ph.D.
George A. Mashour, M.D., Ph.D., was appointed Associate Dean for Clinical and Translational Research and Director of the Michigan Institute for Clinical & Health Research (MICHR), home of U-M’s NIH Clinical Translational Science Award, in October 2015. He is the Bert N. La Du Professor of Anesthesiology Research, with additional faculty appointments in the Department of Neurosurgery and the Neuroscience Graduate Program. In his capacity as associate dean, Dr. Mashour guides the translational research efforts of the Medical School in close partnership with the Senior Associate Dean for Research and Medical School departments to enhance the quality and quantity of externally sponsored translational research.

Anna Lok, M.D.
Anna Lok, M.D. is the Alice Lohrman Andrews Research Professor in Hepatology in the Department of Internal Medicine and the Assistant Dean for Clinical Research. Dr. Lok is responsible for leading and implementing the transformation of the clinical trials enterprise at Michigan Medicine. She provides leadership, management, and oversight for the trans-department network of Clinical Trials Support Units and key aspects of the supporting central infrastructure. Dr. Lok obtained her medical degree from the University of Hong Kong and her hepatology training under the late Dame Sheila Sherlock at the Royal Free Hospital in London, UK. She joined the faculty of the University of Michigan Medical School in 1995.
Achieving **Impact** with Funding And Research Development Support

The Medical School Office of Research offers a variety of resources tailored to help investigators successfully secure extramural funding. The **Michigan Institute for Clinical & Health Research (MICHR)**—home to U-M’s NIH Clinical Translational Science Award—and the Office of Research’s **Research Development Team** offer many programs and services, such as:

- **Mentored Research Academy**, also referred to as R01 Boot Camp, is designed to help early-career faculty receive their first NIH R01 grants through a structured proposal development experience under the mentorship of an experienced senior investigator.
- **MICHR Research Development Core** offers free expert consultations on study aims, design, and biostatistics as well as provides grant editing assistance and matching with funding sources.
- **Grant Proposal Sampler** provides Medical School faculty access to examples of successfully funded proposals for various types of grant mechanisms.
- **Competition Space** provides a single portal for faculty to find internal pilot grant programs and limited submissions.
- **Biomedical Research Council** solicits applications for bridging support for investigators between grants.
- Numerous training opportunities are offered throughout the year, including research methodology seminars, team science workshops, study team education and training, and much more.

With these resources and more, we provide pre-proposal support that encompasses a strategic, proactive approach to increasing faculty success in extramural research funding.

Did you know we are a CTSA institution?

The University of Michigan recently renewed, with high marks, the multi-million dollar NIH Clinical and Translational Science Award (CTSA). These grant funds for research, training, and collaboration are channeled to the biomedical research community across campus through the Michigan Institute for Clinical & Health Research, home of U-M’s CTSA. To learn more, go to [www.michr.umich.edu](http://www.michr.umich.edu).

$106M
New Funding
From R01 Boot Camp

$20M
Pilot Grants
MICHR

RESULTING IN

$216M
Extramural Funding
MICHR
State-of-the-Art Technology and Expertise

The Medical School Office of Research is committed to offering state-of-the-art technology and expertise through centralized cores and services that adapt to the ever-changing research landscape. Our objective is to enable research at the frontier by providing investigators access to the latest, high-end technologies and resources that are otherwise beyond the means of individual investigators.

There are over 100 different cores supporting research across the University of Michigan. At the Medical School, our Biomedical Research Core Facilities offer state-of-the-art instruments, resources, and expertise to investigators at the U-M and beyond, and represent nearly $18 million in total funding for 2017. Many of our biomedical cores are recognized nationally and internationally for enabling new research and developing novel techniques for their respective scientific fields. The Biomedical Research Core Facilities include:

- **Bioinformatics Core** – offers custom support in computational methods and algorithm development
- **Biomedical Research Store** – researchers can purchase thousands of products for their projects
- **DNA Sequencing Core** – the largest sequencing facility in the Midwest
- **Epigenomics Core** – prepares samples for analysis in epigenetic regulation
- **Flow Cytometry Core** – offers instrumentation, phenotypic analysis, and cell sorting
- **Metabolomics Core** – offers state-of-the-art in-house metabolomics analysis tools
- **Microscopy & Image Analysis Laboratory** – offers high resolution microscopy, instruments, and services
- **Proteomics & Peptide Synthesis Core** – provides custom sample prep and data interpretation
- **Sample Preservation Freezer Facility** – archival access to irreplaceable specimens
- **Transgenic Animal Model Core** – internationally recognized expertise in mouse models
- **Vector Core** – in-house viral and plasmid stocks are ready the next business day

The University of Michigan Medical School provides a depth of infrastructure and shared services that is unparalleled. Our Office of Research units and cores, along with other research support organizations across campus, provide resources and technology that my lab often utilizes. And when applying for grants, I have no doubt that support from these organizations gives us a competitive edge.

Nicholas Lukacs, Ph.D.
Professor, Pathology
CENTRALIZED CORES & SERVICES — CONTINUED —

Our College of American Pathologist-accredited Central Biorepository provides a world-class, standardized, safe, and monitored environment for the processing, storage, and distribution of high-quality biospecimens annotated with detailed clinical and laboratory data.

Offering a menu of resources to assist with compliant, secure access to patient health data, our Data Office for Clinical and Translational Research offers investigators easy access, through a self-serve tool or custom data pulls, to records from 3.9+ million patients.

MiChart, Michigan Medicine’s electronic health record system, is supported by our MiChart Research Team. This team can assist investigators with setting up recruitment alerts, order set development, study and reporting needs, and other ways to maximize patient records for research.

The Health Information Technology & Services department supports the IT needs of our research enterprise. In addition to oversight of enterprise-wide services such as MiChart, the IT team provides lab support, informatics, and high-end computing and data storage to help investigators leverage technology and data in ways that make meaningful contributions to research.

One of the nation’s oldest and most recognized programs training laboratory animal veterinarians, our Unit for Laboratory Animal Medicine provides veterinary care and services for all animals used in research at the University of Michigan, plus education and academic teaching programs.

Together, our centralized cores and resources are key to the foundation of an internationally recognized infrastructure that benefits the entire research enterprise—all leveraged resources that support investigator-driven science and increased competitiveness of U-M faculty.
An Innovation Ecosystem That Nurtures Entrepreneurship

The University of Michigan Medical School nurtures commercialization and entrepreneurship at all levels—from medical students to fellows to veteran faculty researchers. Through the Office of Research’s Fast Forward Medical Innovation program, we offer funding, education, and business development resources for innovators to demystify and de-risk the commercialization process, including:

- Program Accelerating Commercialization Education (PACE) provides dozens of different courses and entrepreneurship training opportunities, including fastPACE, our four-week early technology development program modeled on NSF’s I-Corps.
- Internal and external funding channels like our Michigan Translational Research and Commercialization (MTRAC) for Life Sciences Innovation Hub, a $4 million program in partnership the Michigan Economic Development Corporation. These initiatives offer mentoring and funding for translational research projects at the U-M and across the state of Michigan.
- Integrated Business Development team driving external relationships with companies and investors, including collaboration management, agreement execution, and implementation.

From our entrepreneurial programs on campus to our partnerships in Michigan and across the globe, increasing the innovation pipeline is a top priority for the U-M Medical School. Our integrated approach to commercialization education, programs, and funding offers a faster, easier path to market for U-M biomedical research and, ultimately, translates to a positive impact for patients and their families. To learn more, go to innovation.medicine.umich.edu.
Clinical Research
Advancing Health Care

Michigan Medicine is home to one of the largest health care complexes in the world and has been the site of many groundbreaking medical and technological advancements since the Medical School first opened in 1850. Routinely ranked among the best hospitals in the State of Michigan and United States, we are committed to improving clinical care, value, and health outcomes through successfully executing high-quality clinical trials.

The Clinical Trials Support Office, a unit of the Medical School Office of Research, supports a diverse portfolio of more than 1,700 clinical trials through a network of seven Clinical Trial Support Units (CTSUs) that are trans-departmental and focus on specific thematic areas of research:

- Acute, Critical Care, Surgery & Transplant
- Ambulatory & Chronic Disease
- Behavior, Function, & Pain
- Children’s
- Heart, Vessel, Blood
- Neurosciences & Sensory
- Oncology

The CTSUs provide comprehensive support accessible to all investigators and study teams, offering thorough and efficient services for a broad mix of clinical trials. The services provided by the CTSUs are supported by our enterprise-wide clinical trials management system, OnCore. Linked to our health system’s electronic medical record system, MiChart, OnCore provides seamless integration for administration, regulatory, financial, and participant management of trials.

The Michigan Medicine’s holistic approach to clinical trials, with our Clinical Trials Support Office and its CTSUs, provides common infrastructure founded on enterprise-wide standards, policies, systems, and expert personnel. To learn more, go to clinicaltrials.med.umich.edu.

Collaboration through the Fast Forward initiative takes research into new and exciting directions, and here at the University of Michigan, our team science approach leverages expertise across multiple disciplines and diseases. Innovations that once seemed impossible for researchers working in isolation are now on the path to helping patients and their families.

Henry Paulson, Ph.D.
Professor, Neurology

1,746
Active Clinical Trials

33,000+
Registered Volunteers
In Health Research
umhealthresearch.org
Fostering a Culture Of Responsible Research

At the University of Michigan Medical School, we appreciate that the public has entrusted us to uphold the highest levels of excellence and integrity in research and in clinical care, and we take this role very seriously.

Commitment to excellence begins at the very inception of a proposal with our Grant Review and Analysis Office reviewing over 3,000 proposals each year to ensure that the Medical School remains consistent with federal guidelines and best practices in sponsored research.

As part of U-M’s Human Research Protection Program, the Medical School’s five Institutional Review Boards are responsible for monitoring compliance with federal and state laws, university policies, and ethical principles governing human subjects research in order to protect the rights and welfare of all participants in research studies conducted throughout Michigan Medicine.

Through partnerships that span Michigan Medicine and beyond, the Calendar Review and Analysis Office maintains quality assurance processes in clinical research billing by confirming that the items and services study teams intend to bill to Medicare and other third-party payers are consistent with federal regulations and institutional policies.

Using well-established procedures, similar to those protections for human subjects research, the Institutional Animal Care & Use Committee, along with veterinary staff specializing in laboratory animal medicine, review all projects proposed to include animals at the University to verify that the highest animal welfare standards are maintained in research studies.

As stewards of one of the nation’s leading biomedical academic research programs, we are dedicated to fostering a culture of responsible research that serves the success of the Medical School community, ensures the highest ethical standards of research, and supports the integrity of research data for the benefit of society through the creation of new knowledge.

Excellence in research doesn’t happen in a cultural vacuum. Different perspectives and an atmosphere of inclusion are key factors in our success at the University of Michigan, and for our ability to ultimately serve patients.

Amy Rothberg, M.D., Ph.D.
Professor, Internal Medicine
Centers & Institutes

A. Alfred Taubman Medical Research Institute
Addiction Research Center
Bone and Joint Injury Prevention and Rehabilitation Center
Center for Advanced Models for Translational Sciences and Therapeutics
Center for Arrhythmia Research
Center for Bioethics and Social Sciences in Medicine
Center for Computational Medicine and Bioinformatics
Center for Consciousness Science
Center for the History of Medicine
Center for Microbial Systems
Center for Reproductive Sciences
Center for Systems Biology
Child Health Evaluation and Research Unit
Chronic Pain and Fatigue Research Center
Clinical Simulation Center
Comprehensive Cancer Center
Depression Center
Frankel Cardiovascular Center
George M. O’Brien Kidney Translational Core Center
Geriatrics Center
Injury Center
Institute for Healthcare Policy and Innovation
International Center for Automotive Medicine
Kellogg Eye Center
Kresge Hearing Research Institute
Michigan Alzheimer’s Disease Research Center
Michigan Center for Integrative Research in Critical Care
Michigan Center for Translational Pathology
Michigan Diabetes Research and Training Center
Michigan Gastrointestinal Peptide Research Center
Michigan Human Embryonic Stem Cell Center
Michigan Institute for Clinical and Health Research
Michigan Metabolomics and Obesity Center
Michigan Nanotechnology Institute for Medicine and Biological Sciences
Molecular and Behavioral Neuroscience Institute
Rehabilitation Engineering Research Center
Sleep Disorders Center

Global Connections, Global Opportunities

With over 3,500 faculty involved in research, the University of Michigan Medical School is a rich environment for interdisciplinary researchers committed to our global health mission. We are dedicated to enhancing educational exchange, growing our network of researchers interested in global health issues, facilitating opportunities for visiting scholars, and promoting international research collaborations. To learn more, go to globalreach.med.umich.edu.
Up to 20% of Americans suffer from upper-airway obstruction while they sleep. U-M Medical School researchers are developing an oral drug that helps patients with obstructive sleep apnea, offering an alternative to the CPAP machine.
Medical School Executive Leadership

Marschall S. Runge, M.D., Ph.D.
Dean, U-M Medical School
Executive Vice President, Medical Affairs
CEO, Michigan Medicine

Bishr Omary, M.D., Ph.D.
Chief Scientific Officer
Executive Vice Dean for Research
H. Marvin Pollard Professor of Gastroenterology

Carol R. Bradford, M.D., M.S.
Executive Vice Dean for Academic Affairs
Charles J. Krause, M.D., Collegiate Professor of Otolaryngology

David A. Spahlinger, M.D.
Executive Vice Dean for Clinical Affairs
President, Clinical Enterprise
Clinical Professor of Internal Medicine

Regents of the University of Michigan

Michael J. Behm, Grand Blanc
Mark J. Bernstein, Ann Arbor
Shauna Ryder Diggs, Grosse Pointe
Denise Ilitch, Bingham Farms
Andrea Fischer Newman, Ann Arbor
Andrew C. Richner, Grosse Pointe Park
Ron Weiser, Ann Arbor
Katherine E. White, Ann Arbor
Mark S. Schlissel, ex officio

Non-Discrimination Policy Statement

The University of Michigan, as an equal opportunity/affirmative action employer, complies with all applicable federal and state laws regarding nondiscrimination and affirmative action. The University of Michigan is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status in employment, educational programs and activities, and admissions. Inquiries or complaints may be addressed to the Senior Director for Institutional Equity, and Title IX/Section 504/ADA Coordinator, Office for Institutional Equity, 2072 Administrative Services Building, Ann Arbor, Michigan 48109-1432, 734-763-0235, TTY 734-647-1388, institutional.equity@umich.edu. For other University of Michigan information call 734-764-1817.

Opportunities for All

The University of Michigan Medical School is committed to nurturing an environment of health, equity, and inclusion across the spectrum of our research community – faculty, clinicians, students, and patients and their families. To learn more, go to www.med.umich.edu/ohei.