TAUBMAN INSTITUTE
MICHIGAN MEDICINE

BUILDING BREAKTHROUGHS

2018 ANNUAL REPORT

TAUBMAN INSTITUTE
MICHIGAN MEDICINE

FROM THE DIRECTOR

THE TAUBMAN INSTITUTE launched its second decade this year with some exciting changes to our grants programs, the kickoff of a monthly "Taubman Tech Talks" series, a new Executive Committee and increased support for the physician-researchers of tomorrow through our student mentoring outreach.

We've awarded Taubman Scholar and Taubman Emerging Scholar grants to several deserving investigators, and we've identified many more qualified candidates from among U-M's best and brightest medical school faculty.

It's been an exhilarating first year for me as director of the institute, collaborating with fellow researchers, meeting with our supporters and brainstorming new opportunities to catalyze scientific discovery at U-M and beyond.

Thanks very much for your interest in the activities of the Taubman Institute and the discoveries of its investigators. Together, we are making a difference.

Sincerely,

CHARLES F. BURANT, MD, PHD
Professor of Internal Medicine and Molecular and Integrative Physiology
Robert C. and Veronica Atkins Professor of Metabolism
Director, Taubman Institute

ABOUT THE TAUBMAN INSTITUTE

Created to support medical doctors who also perform laboratory research in the quest for new treatments and cures, the institute was founded in 2007 by leading entrepreneur and philanthropist, the late A. Alfred Taubman.

Mr. Taubman's vision was to advance the "high-risk, high-reward" ideas of the University of Michigan's most brilliant medical minds, allowing them to pursue novel avenues not supported by traditional funding – thereby accelerating the delivery of new therapies to patients.

Thanks to these unrestricted grants, more than 40 Taubman Scholars have implemented more than 80 human clinical trials of new drugs, devices and other therapies; published more than 2,000 peer-reviewed papers on their findings, earned more than 100 patents and started 14 biomedical firms.

Patients with conditions ranging from bone marrow transplants to muscular dystrophy to ALS to cancer already are benefiting from the new discoveries made possible through the Taubman Institute, with many more innovative and audacious ideas in the pipeline.

NEW SCHOLARS APPOINTED IN 2018

MICHELLE KAHLENBERG, MD, PHD
Assistant Professor, Internal Medicine
(Rheumatology)
Parfet Emerging Scholar

DONNA MARTIN, MD, PHD
Donita B. Sullivan Research Professor in Pediatrics
Professor of Pediatrics
Professor of Human Genetics
Taubman Scholar

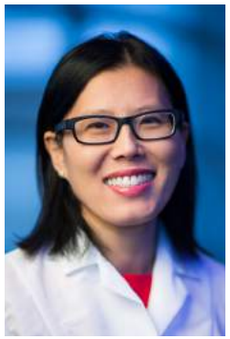
KAREN MCLEAN MD, PHD
Assistant Professor, Gynecologic Oncology
Faculty, Translational Oncology Program
Eisenberg Emerging Scholar

SRIRAM VENNETI, MD, PHD
Assistant Professor, Neuropathology
Julie Reyes Taubman Emerging Scholar

EXECUTIVE COMMITTEE

The executive committee is comprised of Taubman Scholars and Emerging Scholars who assist the director with recommendations about the institute's programs and policies.

Members include:



SUNG WON CHOI, MD

- *Edith S. Briskin and Shirley K. Schlafer Foundation Research Professor*
- *Associate Professor, Pediatrics*

Dr. Choi treats children with cancer. Her research focus is in the prevention and treatment of graft versus host disease (GVHD), the major complication of the bone marrow transplants that some cancer patients receive. With collaborators, she has conducted a novel clinical trial of GVHD prevention using the anti-cancer drug, vorinostat.

KATHLEEN COLLINS, MD, PHD

- *Professor, Internal Medicine*
- *Taubman Scholar*

Dr. Collins has focused her career on understanding how viruses establish infections in human and animal cells, with a special focus on human immunodeficiency virus, the virus that causes AIDS. She has helped discover how HIV evades detection by the body's immune system, specifically the "killer T cells" that normally destroy virus-infected cells.

DONNA MARTIN, MD, PHD

- *Donita B. Sullivan Research Professor in Pediatrics*
- *Interim Chair of the Department of Pediatrics and Communicable Diseases*
- *Professor, Human Genetics*
- *Taubman Scholar*

Dr. Martin, the Donita B. Sullivan Research Professor in Pediatrics, is a professor of pediatrics and of human genetics. Her research focuses on the genetic basis of neural development and disorders of human development.

DAVID PINSKY, MD

- *J. Griswold Ruth, MD & Margery Hopkins Ruth Professor of Internal Medicine*
- *Professor, Molecular & Integrative Physiology*
- *Chief, Cardiovascular Medicine*
- *Director, Cardiovascular Center*
- *Founding Taubman Scholar*

Dr. Pinsky is the division chief of Cardiovascular Medicine at U-M, as well as the scientific director of the U-M Cardiovascular Center. As a result of his groundbreaking research, Dr. Pinsky is known as a foremost expert in understanding the relationship between blood flow and heart and brain diseases.

SRIJAN SEN, MD, PHD

- *Frances and Kenneth Eisenberg Professor of Depression and Neurosciences*
- *Associate Chair for Research and Research Faculty Development*
- *Frances and Kenneth Eisenberg Emerging Scholar*

Dr. Sen's research focuses on the interactions between genes and the environment and their effect on stress, anxiety, and depression. He also has a particular interest in medical education, and leads a large multi-institution study that uses medical internship as a model of stress.

BY THE NUMBERS

TAUBMAN SCHOLARS AND EMERGING SCHOLARS ARE AMONG U-M'S MOST PRODUCTIVE SCIENTISTS.

100+
clinical trials

100+
federal and foundation grants

400
peer-reviewed publications in the past year

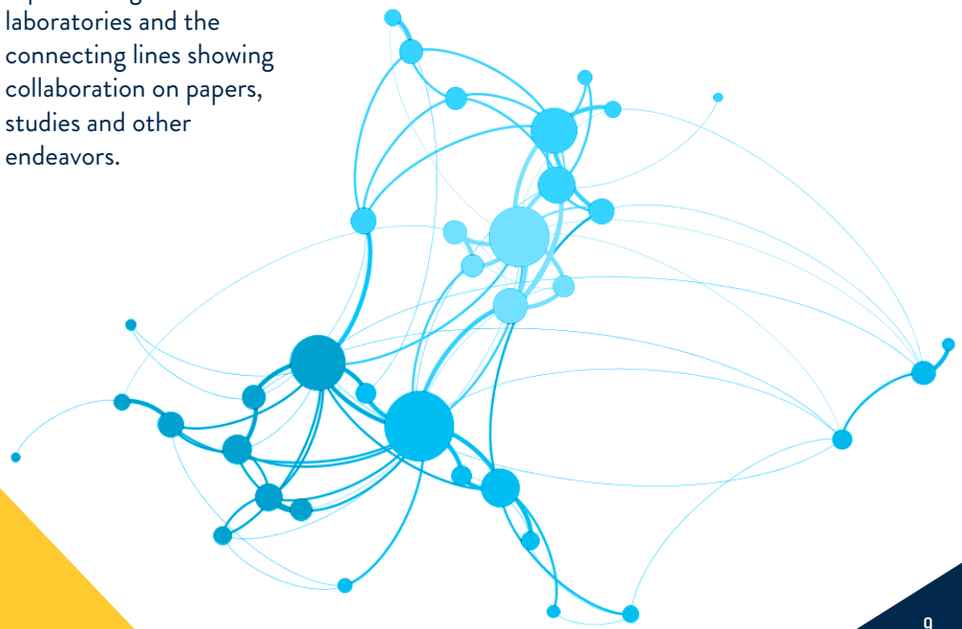
A COMMUNITY OF TAUBMAN SCHOLARS

Currently the Taubman Institute is funding 19 Taubman Scholars (senior medical school faculty) and 25 Emerging Scholars (mid-career faculty), all of whom inhabit the dual role of physician and investigative scientist.

Most scholars hold leadership positions at U-M and in professional societies, and many are noted speakers and authors. Collectively, they are a formidable community of advanced thinkers in their respective fields. The Taubman Institute serves as a catalyst for mentoring, communication and collaboration among these scientific innovators, through monthly chalk talks, visiting professorships, symposia and other programs.

This unique synergy has led to research collaborations between scholars who might otherwise not have crossed paths – connecting, for example, an eye surgeon and an oncologist who now are investigating ways to halt a deadly cancer of the retina.

The diagram below depicts the complex intersection of Taubman Scholar research as it has developed over just a few short years, with circles representing their laboratories and the connecting lines showing collaboration on papers, studies and other endeavors.



TAUBMAN INSTITUTE INNOVATION PROJECTS

FINDING THE 'HOLY GRAIL' OF IMMUNE SUPPRESSION

Drugs that suppress the immune system keep the body from rejecting the donated organ, but they also lower the patient's ability to fight off infections. Immune suppression can increase the risk of certain cancers, as the normal immune system is responsible for vigilantly removing such cells.

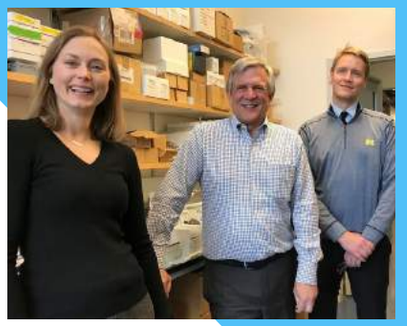
Finding the right balance for individual patients is the aim of a TIIP-supported study to refine the use of immunosuppressants in individuals undergoing heart, kidney, liver or lung transplantation. It's headed by Daniel Goldstein, MD, a physician and professor at Michigan Medicine, and will be supported by a multidisciplinary team including experts in immune monitoring, bioinformatics and statistics.

Blood and organ tissue samples from Michigan Medicine patients who join the study will be analyzed using a new immune phenotyping process called mass cytometry, which can examine up to 40 different immune function-related parameters on a single cell.

"We will be taking patient samples in the early stage of transplantation and surveying their immune system at a level not done before in transplantation studies," said Goldstein.

Tissue collected from patients also will be used to create a central biorepository for use by other researchers.

In studying all solid organ transplant patients, no matter what organ is being replaced, the team will be able to gain information more quickly about the adverse effects of suppression drugs, said Burant. "Finding a better way to optimize the dosage of immune suppressive drugs takes us further in the direction of the personalized patient care that truly is the future of medicine."



A PERSONALIZED APPROACH TO AUTOIMMUNE DISORDERS

A team of U-M researchers has launched a new Taubman-funded study to understand autoimmune skin diseases and why some people respond better than others to treatment. They aim to derive new knowledge about the immune response that could lead to more targeted, personalized therapies for a wider array of disorders.

Dubbed PerMIPA, the study is the first to be funded as a Taubman Institute Innovation Project (TIIP), as part of the institute's new grant's program that promotes research in patient clinics.

About 40 research teams applied for the first round of innovation grants, and the inaugural TIIPs award went to Taubman Emerging Scholars Michelle Kahlenberg, MD, PhD and Johann Gudjonsson, MD, PhD, U-M faculty who specialize in autoimmune disorders.

Hundreds of patients being seen at U-M clinics for lupus and psoriasis will be invited to join the study by providing tissue and blood samples, and detailed medical histories.

"This incredible support by the Taubman Institute will allow us to take steps towards addressing how factors such as age, genetics, gender and race affect the immune system," Gudjonsson.

"It will establish and accelerate a foundation for a personalized approach for the treatment of autoimmune disorders, and revolutionize our capabilities to manage patients with these devastating and frequently challenging diseases."

TAUBMAN GRAND CHALLENGE AWARDS

In keeping with its mission to support bold and forward-looking biomedical research, the Taubman Institute recently made several "Grand Challenge" awards to teams of researchers at Michigan Medicine. The funded projects address some of today's greatest medical challenge, and include:

INTUITIVE NEUROPROSTHETICS TO CURE PARALYSIS AND LIMB LOSS

Losing the use of one's hand—whether from stroke, spinal-cord injury, amputation, or neurodegenerative disease—is one of the most devastating disabilities to experience.

Existing alternatives to provide hand function to patients are limited, and have changed little in three decades. Intuitive neuroprosthetics to cure paralysis and limb loss, restoring upper-extremity function with robust, naturalistic sensation and motor control, would be transformational—improving thousands of lives and revolutionizing the field.

This project aims to initiate a human trial of an intuitive, fully integrated upper-extremity neuroprosthetic device within five years, and to position the University of Michigan as the recognized world-leader in neural-interface neuroprosthetics.

CURING CANCER THROUGH THE THERAPEUTIC TARGETING OF CANCER STEMNESS

Cancer stem cells can arise from reprogramming of cells carrying gene mutations or dysregulation of normal tissue stem cells, with the stemness characteristics enabling the cells to evade traditional therapeutics.

The long-term goal of this project is to develop therapies that target the "stemness" of cancer stems cells, while sparing adult stem cells, and to translate these findings to clinical trials.

MODULATION OF THE INTERGENERATIONAL RISK OF OBESITY

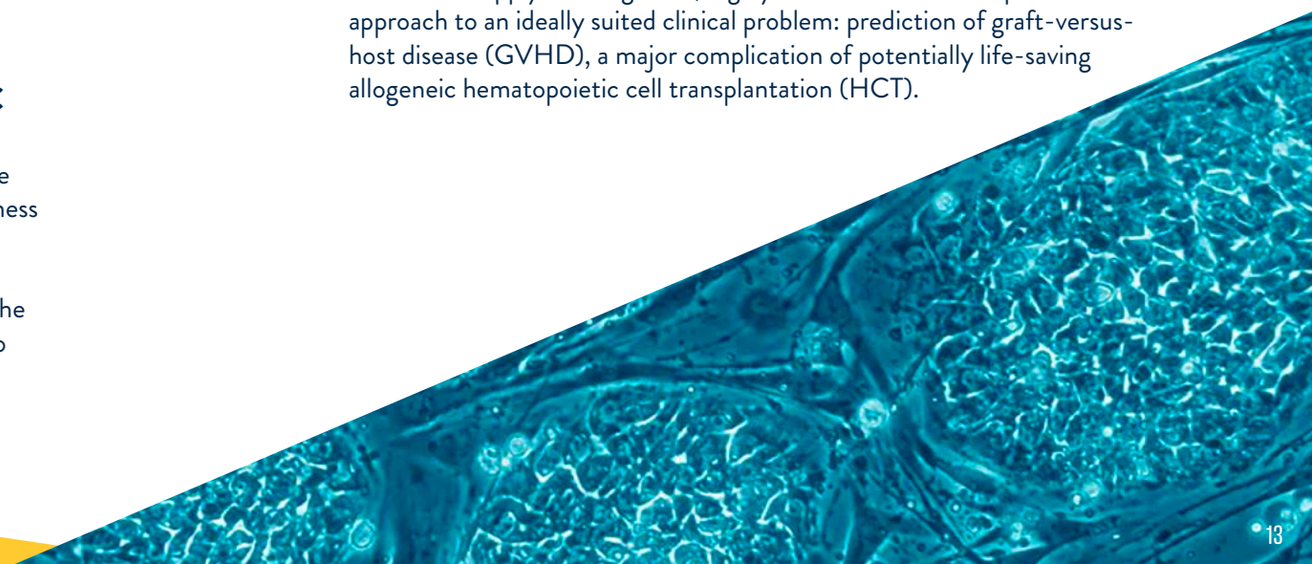
In humans, there is clear evidence that obese mothers, via a nutrient-rich, hormonally imbalanced in utero environment, introduce significant epigenetic reprogramming of their fetuses, contributing to long-term metabolic disturbances in the children. For example, maternal obesity is associated with increased body fat in offspring at birth and at three years. This study will follow lean and obese patients from pre-conception counseling for two years; the primary goal of this project is to identify a cost-effective pre-conception intervention that will mitigate the intergenerational risk of obesity and attendant risks such as type 2 diabetes and cardiovascular disease.

INDIVIDUALIZED PREDICTION OF DISEASE

Individualized disease prediction is a major unmet challenge, yet is essential for realizing the full potential of precision health.

Underlying the prediction problem is the fact that disease processes, and in the persons in which they occur, represent complex dynamical systems comprised of large numbers of components that interact in non-linear ways over time.

In this precision health project, we have assembled a multi-disciplinary team of investigators spanning biomarker biology, genomics, computational biology, data science, microfluidics/biomedical engineering and clinical medicine to apply an integrative, highly time-resolved multi-parameter approach to an ideally suited clinical problem: prediction of graft-versus-host disease (GVHD), a major complication of potentially life-saving allogeneic hematopoietic cell transplantation (HCT).



OUTREACH

At the Taubman Institute, we believe in nurturing the physician-scientists of the future! Through mentoring, funding and other support, we've supported learners from middle-school through U-M's prestigious MD/PhD program.

BRAINSRULE! The institute provided financial support for this annual program, which brings about 300 middle school students to U-M for a day of fun hands-on learning activities that focus on the brain and behavior. Organizing BrainsRule! is a tradition of the U-M Medical School's Neuroscience Graduate Program, and is funded entirely via donations.

MD/PHD MENTORING. Students in this rigorous six-year program graduate as both clinicians and laboratory researchers – the Taubman Scholars of tomorrow, perhaps. Today's scholars host mentoring dinners and networking events to share advice in informal settings.

TAUBMAN TECHNOLOGY TALKS. The institute is organizing and hosting monthly talks, open to the entire U-M community, on the latest technologies and their applications in medical research, from mass cytometry to bioinformatics to metabolomics.

VISITING PROFESSOR PROGRAM. In conjunction with medical school departments, the Taubman Institute underwrites campus visits by eminent biomedical research specialists, for lectures, seminars, grand rounds and other learning opportunities, bringing thought leaders to Ann Arbor for the benefit of our faculty and staff.

TEDXUOFM. The Taubman Institute has contributed as an Amplifier sponsor of the 2019 TEDxUofM event, scheduled for February 22. Organized by students, the event builds on the world-renowned TED conference to create a visionary experience where members of the U-M community can learn, share and connect on array of disciplines.

"As a junior person, it is interesting to see how successful senior scientists think. Before joining the TI, I was mostly surrounded by colleagues working on similar problems in similar organ systems. It has been very educational to hear about the approaches and techniques that people in different fields are utilizing."

SCOTT VISOVATTI, MD, MA
Assistant Professor, Internal Medicine
Thomas G. Ruth Emerging Scholar

"The Taubman community has allowed me to build bridges with physician-scientists throughout campus, and created a network of like-minded colleagues with whom to discuss my research."

KAREN MCLEAN, MD, PHD
Assistant Professor, Obstetrics and Gynecology
Frances and Kenneth Eisenberg Emerging Scholar

"The Taubman community has helped me form new collaborations and interactions with senior faculty who are experts in their fields. In addition, I have formed a new group of peers who are Emerging Scholars. The experience of directly interacting with a donor is quite a unique opportunity and is highly motivating for my laboratory."

DURGA SINGER, MD
Assistant Professor, Pediatric Endocrinology
Edith Briskin / SKS Foundation Emerging Scholar

SCHOLARS IN THE NEWS

TAUBMAN SCHOLAR ARUL CHINNAIYAN, MD, PHD, HAS RECEIVED AN OUTSTANDING INVESTIGATOR AWARD FROM THE NATIONAL CANCER INSTITUTE, WHICH PROVIDES $6.5 MILLION IN FUNDING OVER SEVEN YEARS.

TAUBMAN EMERGING SCHOLAR DURGA SINGER, MD, RECEIVED MICHIGAN MEDICINE'S DIVERSITY, EQUITY AND INCLUSION FACULTY AWARD FOR HER INITIATIVE IN PROMOTING CHANGES AND POLICIES TO FURTHER PROMOTE THE ADVANCEMENT OF WOMEN AND UNDER-REPRESENTED MINORITIES IN ACADEMIC MEDICINE.

TAUBMAN SCHOLAR JOHN M. CARETHERS, MD, MACP, BEGAN HIS TERM AS PRESIDENT OF THE ASSOCIATION OF AMERICAN PHYSICIANS, A PROFESSIONAL ASSOCIATION FOUNDED IN 1885.

EMERGING SCHOLAR PARAG PATIL, MD, PHD, GAVE AN INVITED TALK ON DEEP BRAIN STIMULATION FOR MOVEMENT DISORDERS AT THE 4TH INTERNATIONAL CONFERENCE OF THE RUSSIAN SOCIETY OF FUNCTIONAL NEUROSURGEONS IN MOSCOW.

TAUBMAN SCHOLAR DONNA MARTIN, MD, PHD, WAS APPOINTED AS INTERIM CHAIR OF THE DEPARTMENT OF PEDIATRICS AND COMMUNICABLE DISEASES.

TAUBMAN EMERGING SCHOLAR KAREN MCLEAN, MD, PHD, LED THE IMPLEMENTATION OF A PROGRAM TO PERFORM GENETIC COUNSELING FOR WOMEN WITH OVARIAN CANCER OVER THE TELEPHONE – BOOSTING THE PERCENTAGE OF WOMEN UNDERGOING BOTH GENETIC COUNSELING AND TESTING AT MICHIGAN MEDICINE.

FOUNDING TAUBMAN SCHOLAR EVA L. FELDMAN, MD, PHD, RECEIVED GRANTS OF $2.9 MILLION FROM THE NATIONAL INSTITUTES OF HEALTH TO PURSUE HOW OBESITY AND DIABETES ADVERSELY AFFECT THE NERVOUS SYSTEM.

TAUBMAN INSTITUTE EMERGING SCHOLAR MICHELLE KAHLENBERG, MD, PHD, WAS NAMED THE EDMUND L. DUBOIS MEMORIAL LECTURER AT THE AMERICAN COLLEGE OF RHEUMATOLOGY MEETING IN SAN DIEGO.

TAUBMAN SCHOLAR JACK PARENT, MD, PRESENTED A LECTURE AT THE 2018 FRONTIERS IN NEUROSCIENCE PLENARY SESSION AT THE AMERICAN ACADEMY OF NEUROLOGY ANNUAL MEETING IN LOS ANGELES.

TAUBMAN SCHOLAR BEN SEGAL, MD, RECEIVED A $1.5 MILLION NATIONAL INSTITUTES OF HEALTH AWARD FOR HIS PROJECT ENTITLED "A NOVEL INFLAMMATORY CELL WITH NEUROPROTECTIVE AND NEUROREGENERATIVE PROPERTIES."

A SAMPLING OF TAUBMAN SCHOLAR ACTIVITIES AND HONORS IN 2018

TAUBMAN PRIZE

The Taubman Prize was established in 2012 to recognize outstanding translational medical research beyond the University of Michigan. It includes a $100,000 award and is presented each year to the non-U-M clinician-scientist who has done the most to transform laboratory discoveries into clinical applications for patients suffering from challenging conditions. The 2019 Taubman Prize recipient will be announced in June.

Prize recipients are invited to Ann Arbor to present their research and to meet with Taubman Scholars and other members of the U-M science community.

PREVIOUS TAUBMAN PRIZE RECIPIENTS ARE:

2017: Stephen L. Hauser, MD, PhD, director of the UCSF Weill Institute for Neurosciences and professor and chair of the Department of Neurology at the University of California, San Francisco, for his paradigm-changing discoveries that paved the way for a highly effective drug in the treatment of MS.


2016: Suzanne L. Topalian, MD, of the Johns Hopkins University School of Medicine, and Jedd D. Wolchok, MD, PhD, of the Weill Medical College of Cornell University, for of their contributions to immunotherapy as a new paradigm in the treatment of advanced cancers.

2015: Mahlon DeLong, MD, of Emory University, for his contributions to the treatment of Parkinson's disease.

2014: Carl June, MD, of the Perelman School of Medicine at the University of Pennsylvania, for discoveries related to immunotherapy for leukemia using patients' own T cells.


2013: Brian Druker, MD, of the Oregon Health & Science University, and Charles Sawyers, MD, of Memorial Sloan Kettering Cancer Center, for their discoveries related to chronic myeloid leukemia.

2012: Hal Dietz, MD, of Johns Hopkins University, for his discoveries related to connective tissue disease.

THEIR GENIUS. YOUR GENEROSITY.

The Emerging Scholars Program, the Taubman Institute Innovation Projects and other programs of the institute are supported through gifts from donors who want their contributions to make a direct impact on medical research.

Monetary contributions are credited directly to the laboratory accounts of the scholar or TIIP team selected by the donor, with no deductions for administrative or other costs. Your dollars go directly to finance the equipment, skilled staff, computer time, supplies and the other building blocks of tomorrow's medical breakthroughs.

In addition, our scholars welcome the interest of donors with progress reports, lab tours, campus visits and other interaction. Supporters of the Taubman Institute truly become our partners in the conduct of medical research and the fulfillment of our mission:

TO EMPOWER MEDICAL SCIENTISTS TO EXPAND THE BOUNDARIES OF DISCOVERY, TO DEVELOP NEW THERAPIES FOR DISEASE AND TO ALLEVIATE HUMAN SUFFERING.

Together, we truly
are making a difference.
To learn more about how you
can support the work of the Taubman
Scholars with a tax-deductible gift, please
call Allyson Vernier at 734.763.7080
or e-mail adoan@med.umich.edu

TAUBMAN INSTITUTE
MICHIGAN MEDICINE

TAUBMANINSTITUTE.ORG
6300 BREHM TOWER
1000 WALL STREET
ANN ARBOR MI 48105
734-615-7282
@TAUBMANINSTITUT