



TAUBMAN INSTITUTE  
MICHIGAN MEDICINE

# TAUBMAN INSTITUTE

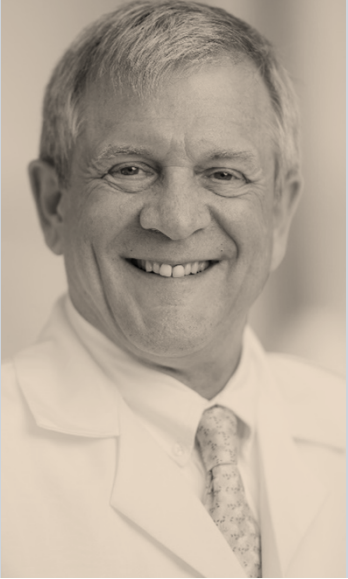
ANNUAL REPORT 2019





# FROM THE DIRECTOR

## CHARLES BURANT, MD, PHD



- Robert C. and Veronica Atkins Professor of Metabolism
- Professor of Internal Medicine & Molecular Integrative Physiology

**The Taubman Institute** is placing a high priority on fostering synergy among Michigan Medicine researchers.

**The Taubman Institute** is heading into the new decade with significant momentum. In 2019 we partnered with an outstanding scientist to begin exciting new scientific programs, bring outstanding scientist to campus and entered into new partnerships which will catalyze biomedical research at Michigan Medicine and beyond.

In the last year, the institute gave a boost to projects as diverse as a new biorepository for the study of genetic disorders in children, spurring research to provide better post-operative drug therapy for organ recipients and personalized treatment for people with autoimmune disorders.

Our scholars received funding to take risks to test new treatments for depression, identify new therapeutic targets for lethal brain tumors and to better understand the science of addiction. The Taubman Institute is placing a high priority on fostering synergy among Michigan Medicine researchers. We aim to bring together the best and brightest from a variety of disciplines who bring new perspectives to problems, asking new questions and planning novel experiments to increase our understanding of disease and potential paths to prevention and treatment. In 2019, our scholars generated more than 500 peer-reviewed publications, many in the very top journals in their field.

## ...FROM THE DIRECTOR

We've hosted experts at who have given lectures about the latest in research technologies which has spurred many to form additional collaborations using technology that they might not have thought to use. Our scholars have mentored students in the MD/PhD program to encourage the next generation of clinician-scientists. And hosted high school students, introducing them into the world of academic medicine.

We were also proud to host more than 100 physicians from around the world who shared their ideas about best practices in treating rare and life-threatening childhood vascular disorders. This conference spurred a new collaborative effort of the world's leading researchers and health care providers to work together to accelerate the identification of the underlying causes of vascular diseases in children and optimize the medical and surgical intervention that many of these children need. And in October, the distinguished obesity research **Professor Sir Stephen O'Rahilly, MD**, delivered a keynote to a packed auditorium after accepting the 2019 Taubman Prize.

What's ahead for 2020? The Taubman Institute is planning to launch additional programs into challenging conditions such as chronic lung disease COPD and ways to predict and treat side effects that arise from the latest cancer therapies. We are also expanding our portfolio to support the development of new biomedical devices and potential drugs for difficult to treat conditions.

I am excited for the future of biomedical research and am honored to be working with and supporting the research of some of the best minds in science. I hope you'll join us in celebrating the achievements and supporting our illustrious faculty in 2020.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. F. Burant', with a stylized, cursive script.

Charles F. Burant



# 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, 50 Taubman Scholars have implemented 100-plus human clinical trials of new drugs, devices and other therapies; published more than 4,736 peer-reviewed papers on their findings, earned more than 100 patents and launched 14 biomedical firms.

Patients with conditions ranging from diabetes to depression, bone marrow transplants to muscular dystrophy, cancer to ALS already are benefiting from the new discovery made possible through the Taubman Institute, with many more audacious and innovative projects under way.





SUNG  
WON CHOI, MD



KATHLEEN  
COLLINS, MD, PHD



DONNA  
MARTIN, MD, PHD



DAVID  
PINSKY, MD



SRIJAN  
SEN, MD, PHD

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

# EXECUTIVE COMMITTEE



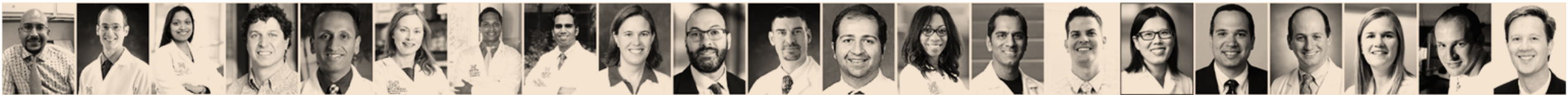
# SCIENCE



# NEW TAUBMAN EMERGING SCHOLARS APPOINTED

The **Taubman Emerging Scholars Program** was established in 2011 to support early-career clinician-scientists on the University of Michigan Medical School faculty, as they establish their research programs and develop the credentials to qualify for traditional government and foundation grants.

To date, 33 of these talented young physicians have received Emerging Scholar awards.



# EMERGING SCHOLARS APPOINTED IN 2019

## J. SCOTT VAN EPPS, MD, PhD



*Leslie and Abigail Wexner Emerging Scholar*

Dr. Van Epps is an assistant professor in Emergency Medicine, Biomedical Engineering, and Macromolecular Science and Engineering. He also serves as an investigator for the Biointerfaces Institute and an associate director at the Michigan Center for Integrative Research in Critical Care. He was appointed a Leslie and Abigail Wexner Emerging Scholar to pursue his research into life-threatening infections.

Dr. Van Epps' current projects include research into infections connected to implantable medical devices, rapid diagnostics for bloodstream infection, and novel treatment strategies including an assay to detect bacteria in whole blood without culture. He aims to partner with other researchers who are studying better methods for accelerating the diagnosis of sepsis.

## DANIEL WAHL, MD, PhD



*William U. Parfet Emerging Scholar*

Dr. Wahl is an assistant professor in the department of Radiation Oncology. He has been named a William Parfet Emerging Scholar for his work aimed at improving outcomes for patients with aggressive brain tumors.

Dr. Wahl and his research team believe that targeting metabolic abnormalities may be the key to overcoming glioblastoma (GBM) treatment resistance. They are developing new techniques to measure the activity of key metabolic pathways in GBM tumor patients. Dr. Wahl also is developing clinical trials to combine standard GBM therapies with drugs that inhibit the metabolic pathways that cause treatment resistance.





# BY THE NUMBERS

Taubman Scholars and Emerging Scholars are among U-M's most productive scientists



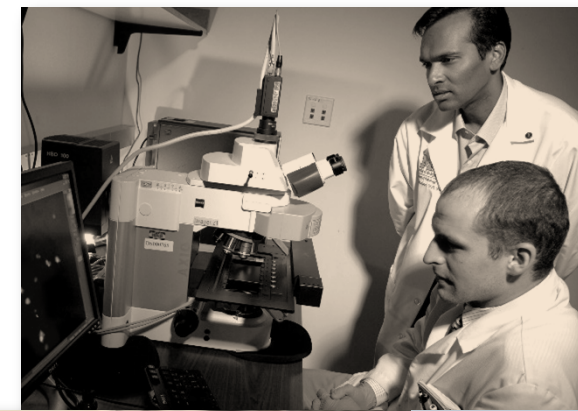
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Peer-reviewed publications in the past year

(4736 scientific papers since 2008)



100+  
clinical trials



100+  
federal & foundation grants



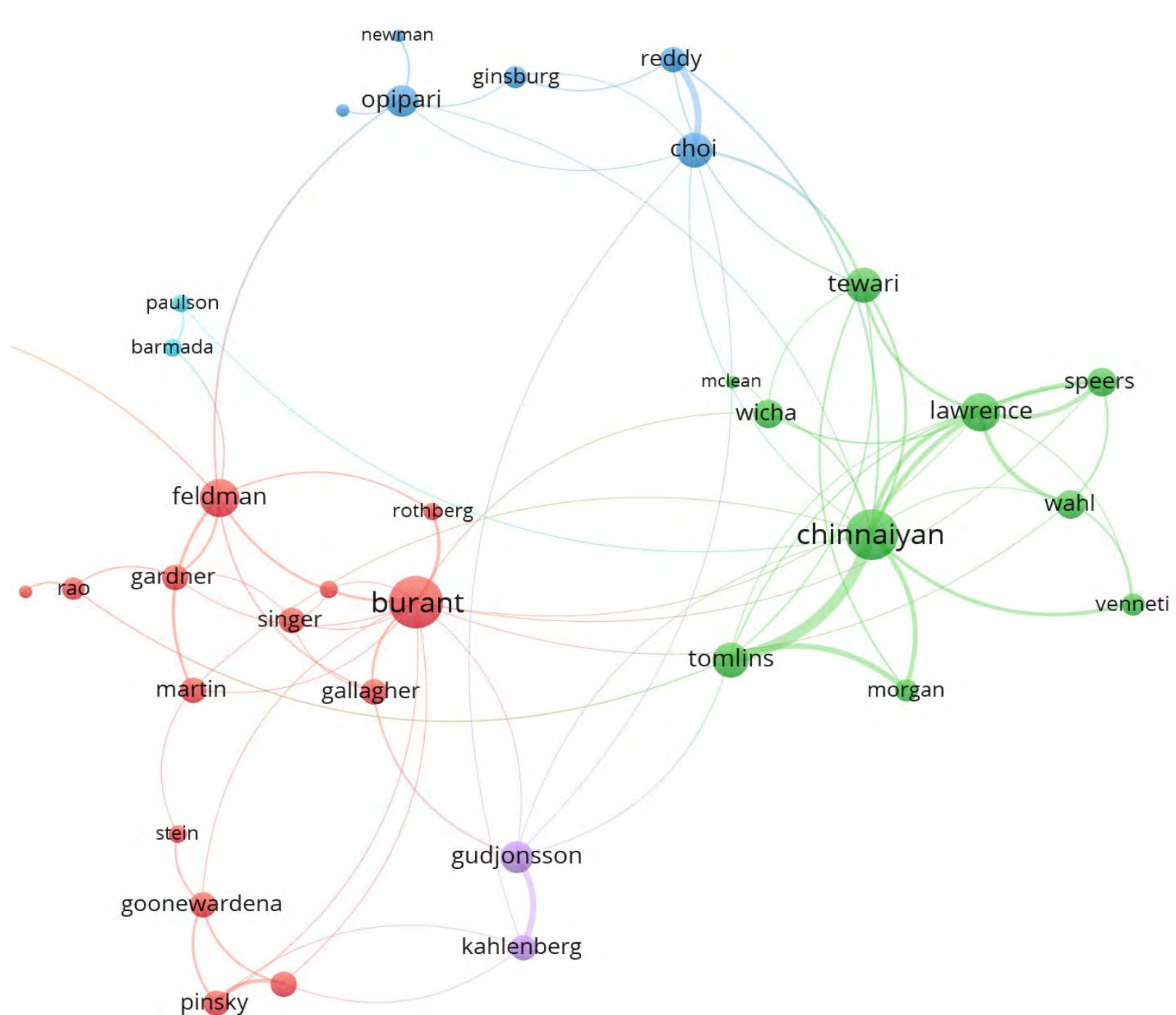
# A COMMUNITY OF SCHOLARS

The Taubman Institute has funded 50 Scholars, all of who hold the dual role of physician and investigative scientist. Collectively, they are a formidable community of advanced thinkers in their respective fields.

The institute serves as a catalyst for mentoring, communication and collaboration among these scientific innovators, through monthly chalk talks, visiting professorships, symposia and other programs.

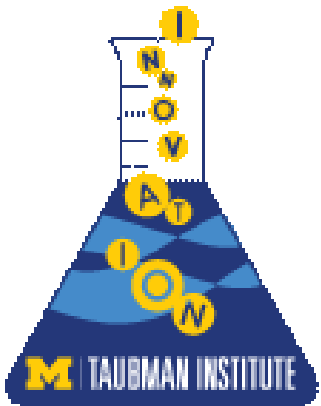
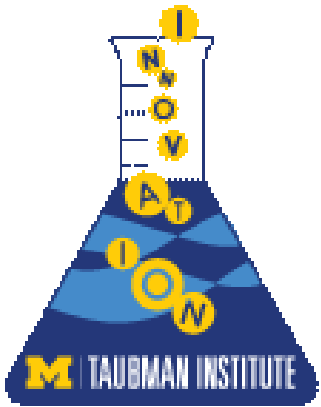
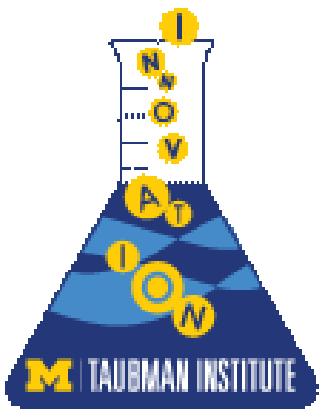
Synergy promoted by the Taubman Institute has led to research collaborations between scholars who might otherwise not have crossed paths.

This diagram depicts the complex intersections of Taubman Scholar research as it has developed. Circles represent scholars' laboratories and the connecting lines show collaboration on papers, studies and other endeavors.





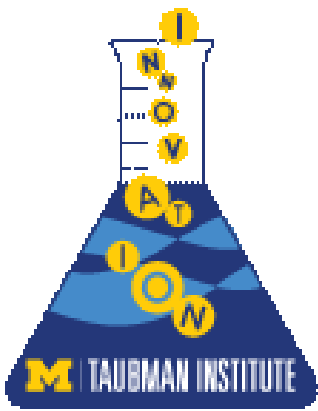
# TAUBMAN INSTITUTE INNOVATION PROJECTS



Launched in 2018, these new Taubman Institute grants support teams of U-M researchers who are using patient data and samples to delve deeply into the origin of diseases, to explain variances in treatment outcome and pave the way for truly personalized therapies.

In 2019, two additional TIIPs projects were funded, bringing the total to four, with more candidates in the 2020 pipeline

# 2019: DYSPLASIA-ASSOCIATED ARTERIAL DISEASE (DAAD)



Investigators: [Dawn Coleman, MD](#) and [Santhi Ganesh, MD](#)

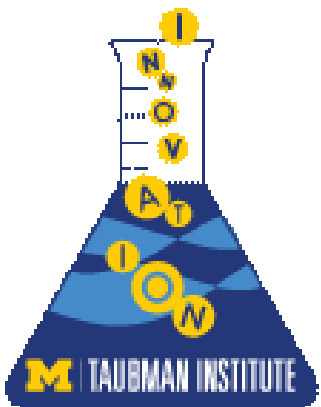
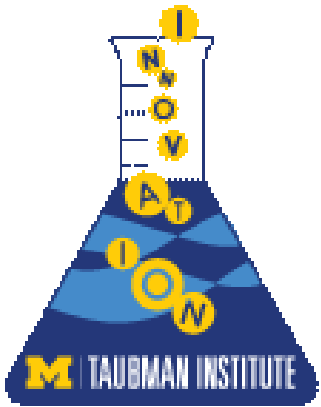
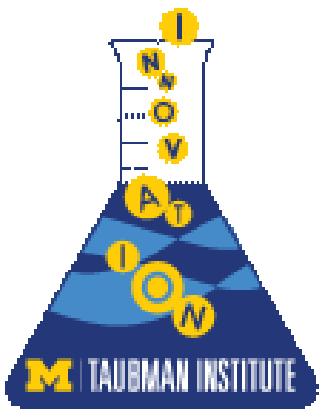
Non-inflammatory dysplasia of the arterial wall, as opposed to atherosclerosis due to cholesterol plaque, is increasingly recognized as a cause of arterial disease. Arteries may become dilated (as in aneurysm), blocked (as in stenosis), or fragile, leading to tears (as in dissection) – leading to issues such as stroke, heart attack, hypertension and rupture of arteries.

Dysplasia-associated arterial diseases afflict children and adults, occurring at a higher frequency in relatively young adult women, for unclear reasons. The causes of these diseases are poorly understood, and research is urgently needed to identify causal factors and possible treatment options targeting the arterial dysplasia process itself. This TIIP will study patients and their families, to identify genetic factors underlying arterial dysplasia, familial risk and markers of disease, with the aim of developing a precision-medicine approach to effective therapies.





# 2019: PEDIATRIC GENETICS BIOBANK



Investigator: **Donna Martin, MD, PhD**

Developmental disorders account for the majority of admissions to children's hospitals, and many adult diseases have their origins in childhood. In addition, one person in 10 has a genetic condition that affects their health.

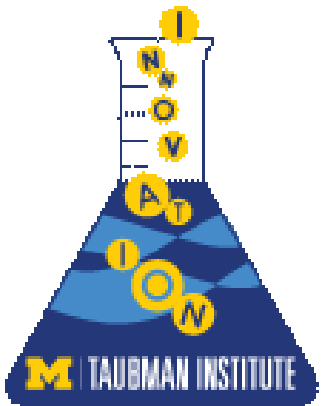
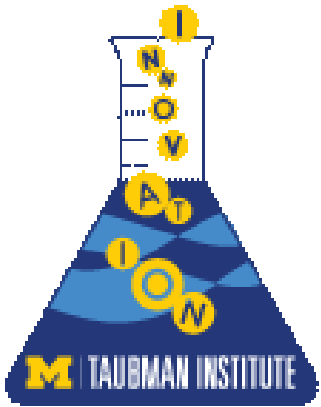
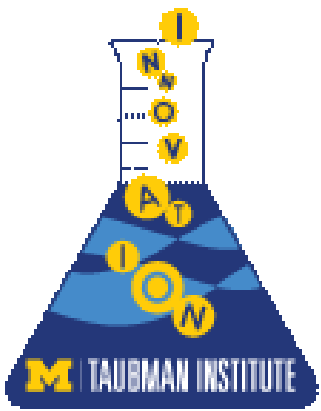
Unfortunately, many genetic disorders go undiagnosed, and disease relationships for over half of human genes are completely unknown.

To address this knowledge gap, the Taubman Institute is funding the establishment of a Pediatric Genetics Biobank at Michigan Medicine, where genetic data, DNA and tissue samples will be collected and stored for use by medical researchers.

Patients with known or suspected genetic conditions, structural birth defects, syndromes, and developmental disorders who seek genetic testing and counseling will be recruited to donate samples to the biobank. Their health will be followed through visits to the Genetics clinic, as new technologies are used to establish diagnoses and monitor treatment responses.



# UPDATE: 2018 TIIPs PROGRAMS REPORT PROGRESS – ImPrec



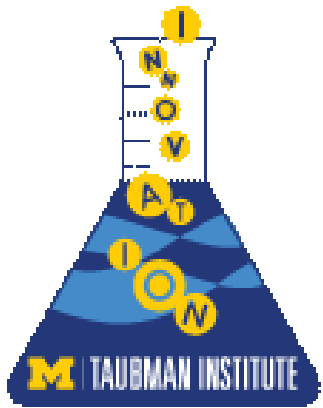
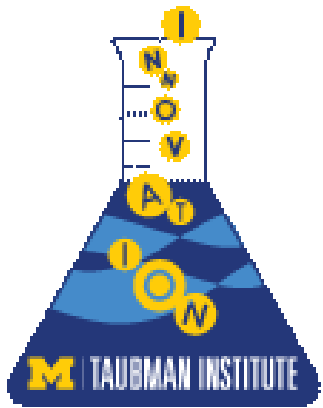
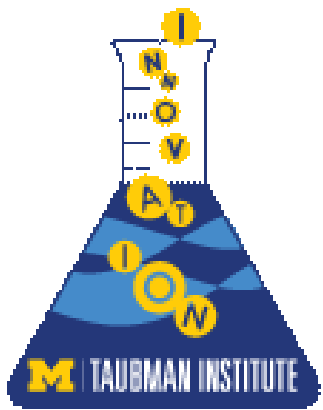
**ImPrec** aims to help solid organ transplant recipients through research that leads to more personalized anti-rejection therapy. Currently, such medication keeps patients' bodies from rejecting donor organs – but also places them at risk for cancer and other complications. By studying patient samples before adverse effects occur, as well as after, ImPrec investigators hope to fine-tune the approach to anti-rejection medication by better predicting an individual's risk of adverse side effects.



2019 milestones include:

- Regulatory approval received to recruit organ transplant patients
- Recruitment under way for scientific advisory board members
- Sample collection, processing and storage protocols being established with various Michigan Medicine units
- Methodology for analyzing samples is being tested and documented





# UPDATE: 2018 TIIPs PROGRAMS REPORT PROGRESS – PerMIPA

PerMIPA is collecting samples from patients with lupus and psoriasis, both autoimmune disorders, and studying the samples at the cellular and molecular level to discern differences in how patients respond to treatment based on age, gender, ethnicity and other factors – an approach that may lead to more personalized treatment for this and other immune disorders.

2019 milestones include:

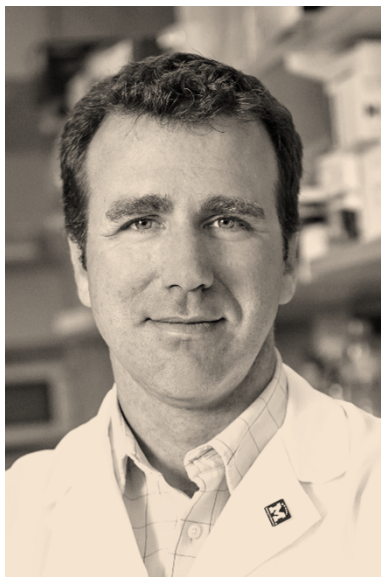
- All required regulatory approvals are in place
- Staffing, equipment and database requirements fulfilled
- 85 subjects enrolled in study, including patients and controls. Eventual goal is 500 of each
- Recruitment page established on [UMHealthResearch.org](https://UMHealthResearch.org)
- TIIPs support in establishing this infrastructure has enabled the investigators to apply for several other industry and NIH grants



# INSTITUTE FUNDS NEW PRECISION HEALTH PROJECT

The Taubman Institute co-sponsors a new DNA sequencing project that aims to expand knowledge of the human genome and its role in disease.

“Short Tandem Repeats in Precision Health and Human Disease” will be jointly supported by the institute and the Michigan Medicine Precision Health research initiative.



The genome project is led by Peter Todd, MD, PhD, Associate Professor of Neurology; Ryan E. Mills, PhD, Associate Professor of Computational Medicine and Bioinformatics and Human Genetics; Alan Boyle, PhD, Assistant Professor of Computational Medicine and Bioinformatics and Human Genetics

“About half of the human genome is made up of repetitive elements. For most of these repeats, however, we know almost nothing about whether they have normal roles in neurobiology or whether they contribute to human disease,” said Todd. The investigators have assembled an interdisciplinary, multi-departmental team: a physician scientist expert in neurological disease models, a bioinformatics expert on genome analysis, and a genetics expert who has designed tools to capture and sequence large pieces of DNA.

“Together, we have designed an innovative set of studies that will define variation in this ‘missing’ half of the genome and link it to Precision Health resources, to allow us to discover how repeat variation contributes to human disease,” said Todd.



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## Expertise tapped



ALS and dementia researcher and Taubman Emerging Scholar **Sami Barmada, MD, PhD**, has been invited to serve on advisory boards for two outstanding foundations — the Live Like Lou Foundation, and the Robert Packard Center for ALS Research — both dedicated to assisting those with ALS through science and compassion. Dr. Barmada’s laboratory blends technologies and disciplines including molecular biology, neuroscience, fluorescence microscopy, and computer science to visualize neuro-degeneration in real time and distinguish cause from effect.

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## NFL Society Research Award



The NFL Physicians Society (NFLPS) awarded the Arthur C. Rettig Award for Academic Excellence to Taubman Emerging Scholar **Asheesh Bedi, MD**. Dr. Bedi has been a Team Orthopedic Physician of the Detroit Lions for seven years, and also is Head Team Orthopedic Physician for the University of Michigan Athletic Department. The award is presented annually to an NFL team physician for academic excellence in research. Dr. Bedi presented his work: *“Blood Flow Restriction Training Does Not Improve Quadriceps Muscle Function after Anterior Ligament Reconstruction: A Randomized Controlled Trial”*.

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## Distinguished Speaker



Taubman Emerging Scholar **Katherine Gallagher, MD**, was invited to present her talk *“The Influence of Epigenetics on Macrophage-Mediated Inflammation in Normal and Pathologic Wound Healing”* at Sweden’s Karolinska Institutet, the birthplace of the Nobel Prize. Also in 2019, Dr. Gallagher was elected to the prestigious American Society for Clinical Investigation (ASCI) and awarded ‘Distinguished Fellow’ distinction for the Society of Vascular Surgery.

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## New insights for skin disorders



A study illuminating possible treatment options for the skin disorder lichen planus was published in the

journal *Science Translational Medicine* by Taubman Emerging Scholar **Johann Gudjonsson, MD, PhD**, in conjunction with Taubman Emerging Scholar **Michelle Kahlenberg, MD, PhD**. Dr.

Gudjonsson, a dermatologist who studies autoimmune disorders, also was elected to the prestigious American Society for Clinical Investigation (ASCI).

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## Presidential award



Taubman Emerging Scholar **Michelle Kahlenberg, MD, PhD**, has been named a recipient of the Presidential Early Career Award for

Scientists and Engineers (PECASE) by the White House. The PECASE is the highest honor bestowed by the United States Government to outstanding scientists and engineers who are beginning their independent research careers and who show exceptional promise for leadership in science and technology. Dr. Kahlenberg conducts research into autoimmune disorders, with a focus on lupus. She was nominated for the PECASE by the Department of Health and Human Services.

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## New professorship



Retina surgeon and Taubman Emerging Scholar **Rajesh Rao, MD**, was named the inaugural Leonard G.

Miller Professor of Ophthalmology and Visual Science. A formal installation ceremony and reception took place on June 11 at U-M's W.K. Kellogg Eye Center. Attendees included Dr. Rao's colleagues and family, in addition to Mr. Miller, the benefactor whose gift made the appointment possible. Dr. Rao's work seeks new therapies for blinding diseases such as age-related macular degeneration and eye cancers.

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## New breast cancer trial



Radiation oncologist **Corey Speers, MD, PhD**, is an investigator in a new Phase II study aimed at improving outcomes for women with triple-negative breast cancer. The trial will test the efficacy of a combination of radiation and the drug olaparib in 300 patients at U-M and other major medical centers. Dr. Speers has been invited to present this institute-funded research at professional conferences in Thailand, New York, San Francisco, San Antonio, Houston, and Omaha.

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## Working to defeat brain tumors



Taubman Emerging Scholar **Daniel Wahl, MD, PhD**, a radiation oncologist, published results of his study describing the first predictive biomarkers for radiation treatment response in glioblastoma, a deadly brain tumor. His team's work on purine metabolism and radiation resistance in brain tumors received a "Basic/Translational Science Award" and was named a "Best of ASTRO" abstract at the American Society for Radiation Oncology annual meeting. .

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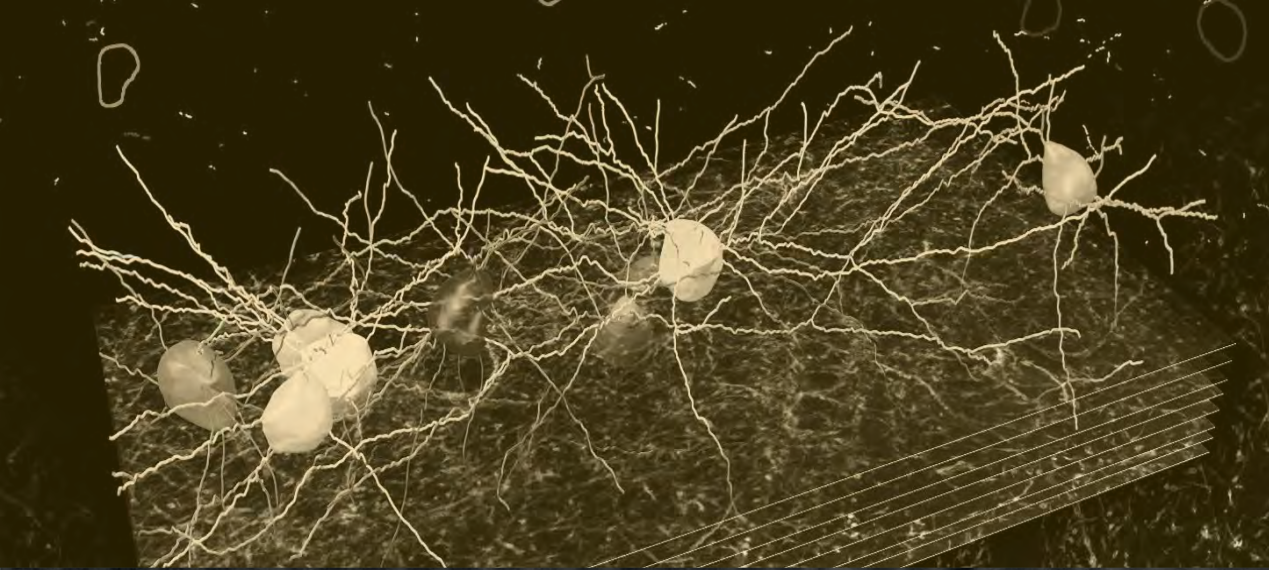
## Major depression clinical study



Psychiatrist and Taubman Emerging Scholar **Brendon Watson, MD, PhD**, is among the investigators in a multi-site clinical study that aims to predict which patients may respond to the drug ketamine for treatment of major depression. The Watson lab presented a poster on the study at the Society for Neuroscience Conference in October.

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# PROGRAMS





# 2019 TAUBMAN PRIZE FOR EXCELLENCE IN TRANSLATIONAL MEDICAL SCIENCE



Dr. Stephen O'Rahilly receives  
The Taubman Prize from  
Dr. Gayle Taubman Kalisman  
President, Taubman Family  
Foundation



**Professor Sir Stephen O'Rahilly, MD**, an endocrinologist and researcher at The University of Cambridge, was the 2019 recipient of the Taubman Prize in recognition of his paradigm-shifting work addressing the genetic causes of obesity and its adverse effect on metabolic health.

He delivered the keynote talk for the Taubman Symposium on October 22, 2019, and spent two days in Ann Arbor as a visiting professor, meeting with U-M faculty and biomedical researchers.



# FIRST INTERNATIONAL PEDIATRIC RENOVASCULAR HYPERTENSION SYMPOSIUM

November 11-12, 2019

Pediatric renovascular hypertension is a rare and life-threatening disorder in infants and children. It affects the blood vessels that support the kidneys, and is often difficult to diagnose and treat.

The Taubman Institute provided funding and logistical support to produce the first-of-its-kind conference on this challenging disorder.

Organized by Michigan Medicine physicians [Dawn Coleman, MD](#), and [Santhi Ganesh, MD](#), the two-day symposium brought together more than 100 international experts in the disease, to share knowledge, clinical observations and research.

Conference attendees also organized and launched writing groups that are documenting best practices and current scientific discovery related to pediatric renovascular hypertension. This addition to the existing medical literature in the field is aimed at promoting better patient care and outcomes.







Launched in 2016 with a grant from the Taubman Institute, the [Center for RNA Biomedicine](#) has become a collaborative hub for University of Michigan researchers campus-wide. More than 500 scientists from Michigan Medicine and from academic departments such as chemistry and biology participate in RNA Center activities, sharing and leveraging discovery about this basic building block of life, and its potential for guiding personalized approaches to disease therapies.

The center hosts bimonthly seminars and an annual symposium showcasing top RNA researchers at U-M and beyond.

2019 highlights include:

- Awarded a Tier I Scientific Initiative from the U-M Presidential Initiative on the Biosciences
- Hired the first RNA Faculty scholar into the department of Human Genetics
- Established four other faculty positions and initiated search
- Launched two open-access cores
- Developed collaborative resources for U-M RNA faculty including a searchable faculty database and RNA Skill Share, a directory of U-M researchers with RNA expertise.



## MStem Cell Laboratories

Established in 2011 with initial funding from the Taubman Institute, **MStem Cell Laboratories** is the leading academic institution in the United States in the production of disease-specific human embryonic stem cell (ds-hESC) lines and in submission and acceptance of lines to the National Institutes of Health (NIH). Its mission is to advance the use of stem cells in biomedical research and to foster education, collaboration and new discovery.

2018-2019 highlights include the registration of 13 new stem cell lines (four normal, nine disease-specific) with the NIH.

In total, MStem has registered 60 lines with the NIH, including 38 that are specific to diseases such as hemophilia and hypertrophic cardiomyopathy.



Director Gary D. Smith, PhD

Dr. Smith is a professor of obstetrics & gynecology, physiology and urology at the University of Michigan Medical School. He has served as director of MStem Cell Laboratories since the lab was founded in 2011.

[mstemcell.org](http://mstemcell.org)





# OUTREACH



# BrainsRule!

Each spring, the U-M Neuroscience Graduate Student Organization hosts **BrainsRule!**, an educational outreach program designed to instill a passion for science in local middle school students. Approximately 300 sixth- and seventh-grade students from the surrounding area come to the university for a day of fun hands-on learning activities that focus on the brain and behavior. As science proficiency continues to lag far behind other subjects in statewide K-12 standardized testing, we believe BrainsRule! is critical in engaging our local youth to become interested in science.



The Taubman Institute is a financial supporter of this worthy program.

# OUTREACH



The Taubman Institute has contributed as an Amplifier sponsor of **TEDxUofM** programs in 2019 and 2020. 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.



# SUMMER19

From social media posting to processing lab samples, two local high school students contributed to Taubman institute programs via "**Summer19**," a youth employment and mentoring partnership between U-M and local agencies.

**Emoria Kimball** and **Joshua Heningburg** were matched with the institute after a "speed interview" process and started their U-M stint in June.

As part of the institute team, the Summer19 employees joined meetings, training and enrichment activities such as campus tours.



As their centerpiece project, the duo designed the Taubman Institute's booth for Michigan Medicine's annual Researchpalooza event in August.



Emoria Kimball and Josh Heningburg greet guests at the Taubman Institute booth at this year's Researchpalooza

Emoria and Josh will graduate in June with both a high school diploma and associate's degree, through an accelerated program at Eastern Michigan University. Josh will head to engineering school at New York University, while Emoria will pursue a bachelor's degree in business at Eastern.



# MD/PHD MENTORING

Students in this rigorous six-year program graduate as both clinicians and laboratory researchers—the Taubman Scholars of tomorrow, perhaps. To nurture the candidates in this ambitious endeavor, today's scholars host mentoring dinners and networking events to share their advice in informal settings.

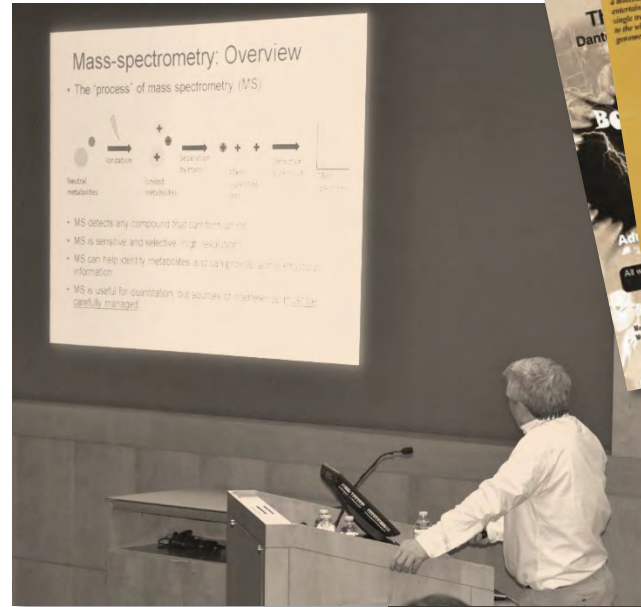


# OUTREACH



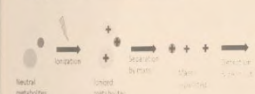


The institute hosts monthly talks, open to the entire U-M community, on the latest technologies and their applications in medical research, from mass cytometry to microscopy to 3D printing for therapeutic applications



#### Mass-spectrometry: Overview

• The 'process' of mass spectrometry (MS)

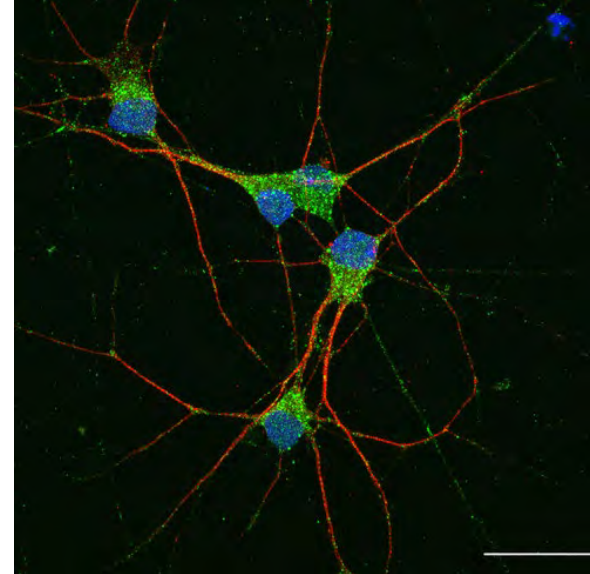


- MS detects any compound that can form an ion
- MS is sensitive and selective (high resolution)
- MS can help identify metabolites and various proteins and structural information
- MS is useful for quantitation, but sources of interference must be carefully managed



OUTREACH





Repeating last year's theme, "Their genius. Your generosity," for the **2019 Giving Blue Day** campaign, the institute featured the work of five talented and dedicated Taubman Emerging Scholars. Their areas of expertise vary but their quest is the same: to find new options for patients facing tough, treatment-resistant conditions such as depression, autoimmune disorders, cancer, dementia and more. At the end of the day, gifts surpassed 2018 giving and the institute was positioned in the Top Ten for most donors of all 94 MI Medicine funds.



# GIVING BLUE DAY 2019

# CONNECT

## TAUBMANINSTITUTE.ORG

Follow us on Twitter @TaubmanInstitut



To learn more about how you can support the work of the Taubman Scholars – or establish a new Taubman Emerging Scholar grant named for your family—with a tax-deductible gift, please contact **Allyson Mlynarek** via 734.763.7090 or [adoan@med.umich.edu](mailto:adoan@med.umich.edu)

MAKE A GIFT