IIT ANNUAL REPORT 2022

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The Michigan State University Institute for Integrative Toxicology (IIT) is a multidisciplinary academic unit that supports and coordinates research and graduate education activities for faculty interested in various aspects of toxicology. The Institute is a successor to the Institute for Environmental Toxicology and the Center for Environmental Toxicology, the latter founded in 1978. While the name of the unit has changed over the years to denote changes in the leadership and academic position, the mission has been the same. For over 40 years, toxicology at Michigan State has provided excellence in training graduate students, facilitating research, and providing service to the State of Michigan when needed. The successes generated in these endeavors have resulted in recognition of Michigan State as a leader in academic toxicology.

Several years after the founding of the Center for Environmental Toxicology, a dual-major Ph.D. program in environmental toxicology was offered in conjunction with several cooperating departments. The characteristics of the program were unique at that time as students were required to complete the Ph.D. requirements of a department of their choice in addition to the didactic requirements and toxicology research specified by the Center. The quality of this cross programmatic effort was recognized by the National Institutes of Health in 1989 with the award of a Training Grant from the National Institute for Environmental Health Sciences. This grant has been competitively renewed ever since, providing over 30 years of continuous funding. Graduates of MSU’s toxicology program number over 200 and can be found in academia, industry, and governmental positions.
The Institute for Integrative Toxicology has continued to thrive in education, research and collaboration over the past year. I am especially thrilled to share that we successfully competed for a five-year, $10.5 million Superfund Research Program (SRP) Center grant from NIEHS to conduct innovative and collaborative biomedical and remediation technology research. A large cadre of our faculty along with researchers from Emory University, Purdue University, Rutgers University and the Michigan Department of Health and Human Services will work on five research projects supported by five cores. A major goal of the MSU SRP Center is to develop new innovative tools that identify sensitive human sub-populations and reduce exposure through effective remediation of contaminated Superfund sites. The MSU SRP Center is working closely with local Michigan communities affected by dioxins.

This year, we are pleased to welcome Dr. Honglei Chen and Dr. Joseph Zagorski as IIT-affiliated faculty members. Dr. Chen is a MSU Foundation Professor in the Department of Epidemiology and Biostatistics and Dr. Zagorski joins us at the Center for Research on Ingredient Safety as an assistant professor. We are excited to welcome their expertise to our group of affiliated faculty whose chosen fields span twenty-eight different departments and programs across campus.

As for our students, the EITS graduate program continues to be one of the premier toxicology training programs in the U.S. Many of the EITS students received awards at the 2022 Annual Meeting of the Society of Toxicology. Students also traveled to a wide variety of other meetings across the globe this year. Four students graduated from the EITS program in 2022 and have moved on to pursue careers in academia and industry.

Our affiliated center under the IIT umbrella, the Center for Research on Ingredient Safety (CRIS), has had a productive 2022 as well. Also, I had the pleasure of continuing to broaden CRIS’ reach as an invited speaker at several international travel conferences in Brussels, Belgium; Edinburgh, Scotland; and Dubai, United Arab Emirates, where I spoke on a breadth of topics, including endocrine-disrupting chemicals, titanium dioxide, and microplastics.

Included in a very full 2022 was a CRIS Science Symposium where we heard from leaders in the areas of developmental immunology and immunotoxicology as well as on the effects of nanoplastics on human health. You can watch the symposium at https://go.msu.edu/92C5.

I look forward to seeing what 2023 brings for our institute.

Norbert E. Kaminski, Ph.D., IIT Director
The IIT was delighted to once again host the IIT Seminar Series this year with six exciting seminars.

The IIT hosted Dr. Brian S. Cummings from the Eugene Applebaum College of Pharmacy and Health Sciences at Wayne State University on January 18. He spoke on, “Novel Mechanisms of Toxicity of Brominated Flame Retardants.”

In February, the IIT hosted the EITS Student Spotlight seminars, an opportunity to feature some of the EITS students that would normally have been showcased during the EITS Research Evening, which was postponed in 2021. The three students who were featured this year were:

- **Dawn Kuszynski**, EITS graduate student in the Department of Pharmacology and Toxicology, spoke on, “Endothelial P2Y2-Mediated Vasoconstriction is Inhibited in Middle Cerebral Arteries of Rabbits Treated with Clopidogrel.” Dawn is mentored by Dr. Adam Lauver.

- **Isha Khan**, EITS graduate student in the Department of Pharmacology and Toxicology, spoke on, “Perturbation of Human Hematopoiesis by Persistent AHR Signaling: An Insight Using Single-Cell Transcriptomics.” Isha is mentored by Dr. Norbert Kaminski.

- **Diana Pacyga**, EITS graduate student in the Department of Food Science and Human Nutrition, spoke on, “Associations of Unique and Cumulative Phthalate and Replacement Biomarkers with Gestational Weight Gain through Late Pregnancy.” Diana is mentored by Dr. Rita Strakowski.

In September, the IIT hosted Dr. Lance Blevins, Assistant Professor, Institute for Integrative Toxicology, MSU, on September 20. He spoke on, “AHR Activation Suppresses Human CDS1 Innate-like B Cell IgM Secretion Via Enhancement of CD95 B Regulatory Cell Function.”

In October, the IIT hosted Dr. Katherine Hanson, Associate Director, PPD, Thermo Fisher Scientific on Tuesday, October 18. She spoke on, “Academia to Pharmaceutical Industry, My Pathway.”

The final seminar of the year featured Dr. Justin Colacino, Associate Professor, Department of Environmental Health Sciences and Department of Nutritional Sciences, University of Michigan on Tuesday, November 15. He spoke on, “Chemical Exposures, Dysregulated Stem Cell Biology, and Breast Cancer Disparities.”

In addition, to the annual seminar series, the IIT hosted the inaugural Jerry Hook Distinguished Lectureship in memory of Dr. Jerry Hook on May 17, 2022. The IIT welcomed Dr. Vishal S. Vaidya, the Senior Director of Head Clinical Biomarkers at Pfizer, who spoke on, “Biomarker Science to Understand Diseases and Advance Drug Development for Patient Care.”

The IIT is honored to host this annual lecture series in honor of Dr. Jerry Hook. Jerry was a very well-known and highly respected Pharmacologist and Toxicologist whose research spanned the areas of mechanisms of drug action on the kidney, to the ontogeny of renal transport systems, to mechanisms of renal toxicity. He was critical in advancing the field of toxicology by helping to drive it from observational to a mechanism-based science. Jerry published more than 250 papers, review articles, and book chapters.

Jerry was named Founding Director of MSU’s Center for Environmental Toxicology (CET) in 1981 and successfully developed multidisciplinary approaches aimed at resolving human and environmental toxicity issues. Jerry’s achievements were the foundation for the CET to develop into today’s Institute for Integrative Toxicology.

Jerry was regarded highly as a mentor and had a profound influence on graduate education in toxicology at MSU. The discipline of toxicology has been enhanced by Jerry’s pioneering contributions to our understanding of mechanisms underlying chemical-induced renal toxicity. The IIT looks forward to honoring Dr. Hook each year with this lectureship. This year, Dr. Zheng Dong, Augusta University, will give the 2nd Annual Jerry Hook Distinguished Lecture and speak on, “Save the Kidneys During Cisplatin Chemotherapy,” on May 23, 2023.
A multidisciplinary team of researchers at MSU has received a five-year, $10.5 million Superfund Research Program Center (SRP) grant from the National Institute of Environmental Health Sciences to conduct innovative and collaborative biomedical and remediation technology research.

In 2000, the US EPA identified high levels of dioxin-like compound contamination in the Tittabawassee River and adjacent floodplain near its confluence with the Saginaw River in the state of Michigan. Based on the potential for human health and environmental impact of this contamination, a highly innovative MSU SRP Center research team will investigate dioxin-like compounds in this area. The goal of the team is to develop innovative solutions for reducing these toxicants and better understand the health risks they cause.

The chemicals in the halogenated aromatic hydrocarbon (HAH) family are persistent environmental contaminants that accumulate in the food chain. The chemicals of greatest concern to human and environmental health bind with high affinity to a protein called the aryl hydrocarbon receptor (AhR) and are often described as “dioxin-like.” These chemicals, which include polychlorinated dibenzo-p-dioxins, dibenzofurans, biphenyls and polyaromatic hydrocarbons, are environmentally persistent, fat soluble contaminants that accumulate in the food chain leading to human and wildlife exposure. Although dioxin-like compounds have been studied widely, there does not yet exist a precise understanding of the relationship between alterations in specific biochemical processes and particular toxic responses observed in animals or humans. There is also limited understanding of how dioxin-like compounds interact with components of soil, which may act as a type of filter and help to limit their effects on living organisms. In addition, knowledge of the enzymes present in microorganisms within the environment capable of degrading dioxin-like compounds is currently limited.

Based on these crucial data gaps, three complementary and highly integrated biomedical research projects are the basis of the newly funded MSU SRP Center grant with the objective of linking biochemical processes induced by dioxin-like compounds to specific toxic responses produced in the liver, thyroid and the immune system. In addition, two environmental science and engineering projects will work to advance existing knowledge on dioxin-like compound bioavailability when adhered to soil components and to characterize environmental microbial organisms capable of degrading dioxin-like compounds, including the specific enzymes involved. “The MSU SRP Center provides a unique opportunity for cross disciplinary approaches and collaborations,” commented Principal Investigator Dr. Norbert Kaminski, “which is critical when addressing complex scientific problems.”

These research projects will be supported by five cores. The Computational Modeling Core will develop dynamic computational models of biological responses induced by AhR ligands. An Administrative Core will support research, training, community engagement, data management, and information and technology transfer. Within the Administrative Core, a research translation group will share research findings with target audiences in government, industry and academia. A Community Engagement Core will communicate with community stakeholders through engagement with county and city health officials in three new Michigan communities that have experienced contamination by dioxin-like compounds. A Data Management and Analysis Core will provide the technology, expertise, infrastructure and training necessary to curate datasets, metadata, processing and analyses needed to properly manage and share high quality reproducible data. Lastly, a Research Experience and Training Coordination Core (RETCC) will ensure cross-disciplinary training to pre- and postdoctoral trainees.

The MSU SRP Center research team includes 25 investigators from Michigan State University (20), Emory University (1), Purdue University (1), Rutgers University (2) and the Michigan Department of Health and Human Services (1). The grant is administered by the Institute for Integrative Toxicology (IIT) at MSU. Results from MSU SRP Center studies will be integrated using data science approaches to develop predictive computational models of adverse effects in support of risk assessment efforts. 

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IIT Successfully Competes for NIEHS Superfund Research Center
The Environmental and Integrative Toxicological Sciences (EITS) graduate program continues to be one of the premier toxicology training programs in the U.S. This MSU training program administered by the IIT is a “dual major” format that emphasizes excellent basic science training from one of our 16 partnering graduate programs coupled with didactic and research training in toxicology by MSU IIT-affiliated faculty. Currently, 30 doctoral students are enrolled in the EITS program, distributed among several of our partnering PhD programs. Twenty-three of these students are in the Biomedical Track, three in the Environmental Track, and four students are currently enrolled in the Food Toxicology and Ingredient Safety Track. Many of our current students received awards at the 2022 Annual Meeting of the Society of Toxicology (SOT) or from other organizations. Our students continue to demonstrate good citizenship by volunteering to serve on Society committees at the regional and national levels as well as within MSU. Students who graduated in the past year have accepted postdoctoral positions at various academic institutions in the U.S. and other countries or began careers at some of the largest corporations in the country.

The National Institute of Environmental Health Sciences (NIEHS) Training Grant, that the IIT has received with continuous funding since 1989, continued in 2022. The training grant offers stipend and tuition support for 7 predoctoral and 2 postdoctoral fellows each year. Universities compete nationally for training grant support from NIEHS. The longstanding support by NIH of the MSU-IIT is a testament to the excellence that the EITS program has maintained over three decades in training graduate students and postdoctoral fellows, many of whom have become leaders in the field of toxicology. 

EITS GRADUATES 2022

- **Janice Albers**
  Fisheries & Wildlife
  Mentor, Cheryl Murphy
  Effects of Neurotoxic Contaminants on Larval Fish from Genes and Behavior to Populations

- **Russell Fling**
  Microbiology & Molecular Genetics
  Mentor, Timothy Zacharewski
  Disruptions in Hepatic One Carbon Metabolism and the Gut Microbiome During the Progression of Non-alcoholic Fatty Liver Disease

- **Dawn Kuszynski**
  Pharmacology & Toxicology
  Mentor, Adam Lauver
  The Vascular Effects of Clopidogrel

- **Azam Ali Sher**
  Comparative Medicine & Integrative Biology
  Mentor, Linda Mansfield
  Transmission of Antibiotic Resistance Genes Encoded on a Broad Host Range RP4 Plasmid Among Members of the Human Gut Microbiota
IIT graduates are sought for careers in industry, government and academia. Below we feature one postdoctoral alumni and two EITS alumni and their paths after graduation.

**Peer Karmaus**  
*Staff Scientist, National Institute for Environmental Health Sciences (NIEHS)*  
*EITS Alumnus*

Driven by a curiosity for how things work, and an interest in disassembling but not reassembling things, Peer Karmaus knew a career in natural sciences research could be a good fit for his future. After earning his Bachelor of Science in Biochemistry from Lyman Briggs College at MSU, Karmaus continued on at MSU to earn his Ph.D. in Cell and Molecular Biology with a dual major in Environmental & Integrative Toxicological Sciences. Karmaus trained with Dr. Norbert Kaminski and completed his dissertation, “Role of the Cannabinoid Receptors 1 and 2 in the Immune Response to Influenza Virus,” in 2011.

Today, Karmaus is a Staff Scientist at the National Institute for Environmental Health Sciences. Karmaus’ research focuses on investigating how immune signaling and metabolism interact to form immunological responses. By manipulating cellular metabolism and/or signaling, Karmaus can affect immune outcomes, which could be used to boost (e.g., antitumor/virus, vaccine) or diminish (e.g., autoimmunity, inflammation) immune responses. Karmaus and his team are currently filing a patent based on their research, hoping to translate their findings to treatments of immune-related illnesses in humans.

For Karmaus, the most important training experience for him as an EITS student was the exposure to many research topics and areas while being in a collaborative research environment. “For both my postdoc and my current position, it has been very important to learn to assemble and function within a team of experts with a common goal in mind,” said Karmaus. “When I am invited to collaborate, I can usually understand and even contribute beyond my immediate area of expertise thanks to the exposure to diverse topics as an EITS student.”

At a glance:

**Department:** Cell & Molecular Biology  
**Mentor:** Norbert Kaminski  
**Dissertation:** “Role of the Cannabinoid Receptors 1 and 2 in the Immune Response to Influenza Virus”  
**Defended:** 2011

**Significant Achievements During Graduate School:**  
- SOT Immunotoxicology Specialty Section, 2nd place presentation Award, 2011  
- The Graduate School, MSU, Travel Award, 2010  
- College of Natural Science, MSU Travel Award, 2010
Lauren Poole (Hardy)
Assistant Professor, Department of Pharmacology, Rutgers University Postdoctoral Alumna

Lauren Poole’s interest in science as a career started in her high school biology class. Rather than memorizing diagrams in a textbook or performing experiments with a pre-determined outcome, her teacher, Janet Zeller, provided her class with basic materials and encouraged students to identify their own research questions and design experiments to test their own hypotheses. This experience made Poole realize, that as a scientist, she could dedicate her time to pursuing her own questions about the world. She became interested in pharmacology and toxicology as an undergraduate student, and was fascinated by the ability to use all of the subjects she was currently studying - biology, organic chemistry, genetics, and mathematics - and apply these to solving complex problems in human health. Being an academic scientist allows Poole to have a career that feels more like a hobby, while being able to train the next generation of scientists and inspire them as her mentors have inspired her.

After earning her Bachelor of Science in Biology (Subcellular Biology and Genetics) at University of Louisville, Poole continued on there earning her M.S. and Ph.D. in Pharmacology and Toxicology. Poole was a postdoctoral research associate at MSU from 2017 to 2022 in the Department of Pathobiology and Diagnostic Investigation and was supported by the IIT NIEHS Training Grant.

Today, Poole is an assistant professor in the Department of Pharmacology at Rutgers University Robert Wood Johnson Medical School. Her research interests seek to understand how activation of the blood clotting cascade drives tissue injury and inflammation. Specifically, Poole is working to identify blood clotting proteins that can be targeted to prevent or reverse the progression of hepatic fibrosis, also known as “scarring” of the liver.

With Poole’s lifelong career goal to become an independent academic researcher, her new position has been a dream-come-true. Since starting her new role in October 2022, Poole has set up her own laboratory, recruited team members, and begun initial studies. As her lab continues to get up and running, she is focused on developing a diverse and inclusive research environment that puts mentoring and education at the forefront. “As a postdoc, I was primarily focused on developing my research skills, and I am now learning to navigate the complex administrative environment of a large academic institution,” commented Poole. “I am fortunate to have unwavering support from the leadership at RWJMS, including my Department Chair, Dr. Nancy Walworth, my new colleagues in the Department of Pharmacology, and all of the support staff.”

As a postdoctoral fellow supported by the IIT NIEHS Training Grant, Poole gained invaluable skills and training. Her postdoctoral mentor, Dr. Jim Luyendyk, was always very supportive of her career goals and she was afforded substantial academic freedom to pursue her research interests during her time in his lab. This allowed Poole to prepare and submit a successful NIH K99/R00 Pathway to Independence Award and transition smoothly to a faculty position. “So many of the IIT faculty, especially Drs. Ganey, Roth, Bernard, Copple, Harkema, and Rockwell, went above and beyond to help prepare me for the academic job market, including preparing me for interviews and providing valuable feedback on my application materials,” said Poole. “Being part of the IIT allowed me to meet with toxicologists with many different career paths, allowing me to make an informed decision regarding which path would be best for me.”
FOLLOWING HER LOVE OF SCIENCE IN HIGH SCHOOL AND HER FASCINATION WITH HOW LIFE AND CELLS AND THE WORLD AROUND US WORKED, KATHERINE ROTH DECIDED TO PURSUE AN EDUCATION IN SCIENCE. AFTER EARNING HER BACHELOR OF ARTS IN MOLECULAR AND CELLULAR BIOLOGY (HONORS PROGRAM) AND EUROPEAN HISTORY FROM VANDERBILT UNIVERSITY, ROTH CAME TO MSU TO EARN HER PH.D. IN CELL AND MOLECULAR BIOLOGY WITH A DUAL MAJOR IN ENVIRONMENTAL TOXICOLOGY. ROTH TRAINED WITH DR. BRYAN COPPLE AND COMPLETED HER DISSERTATION, “REGULATION OF HEPATIC MACROPHAGE ACTIVATION FOLLOWING APAP-INDUCED ACUTE LIVER INJURY,” IN THE SUMMER OF 2019.

Today, Roth is a postdoctoral fellow at Wayne State University, working in the laboratory of Dr. Michael Petriello within the Center for Urban Responses to Environmental Stressors (CURES) Center. Her current research focuses on mechanisms linking exposure to environmental toxicants and human health and disease. More specifically, Roth's main area of research explores per- and polyfluoroalkyl substances (PFAS) and how exposure to PFAS leads to cardiometabolic disease. PFAS are a class of ubiquitous, synthesized chemicals used in a variety of industrial and consumer products, including cookware, food storage, clothing, carpets, and aqueous fire-fighting foams. PFAS accumulate in the environment, in water sources, in food sources, and even in the air. Humans are exposed to these PFAS chemicals in the environment, and PFAS can be detected in almost every American adult. They are everywhere. In our bodies, these chemicals have been linked to a variety of different diseases, including cardiovascular diseases and highly elevated cholesterol levels. Roth's work strives to understand the specific mechanisms linking these.

Roth believes her time as an EITS student provided a strong foundation for her current research and career goals. As a graduate student enrolled in the Cell and Molecular Biology program at MSU, but working within a pharmacology/toxicology lab, the EITS program helped her to bridge the gap between molecular biology and toxicology. “Some of the toxicology courses through the EITS have been invaluable as foundational knowledge,” commented Roth. “EITS also provided many more opportunities to practice presenting my research, which has helped immensely, as well as funding.”

Roth's long-term career goal is to transition to a position as an independent research faculty and project manager at an academic institution, focusing on research that investigates mechanisms linking toxicant exposure and human health and disease.
After spending summers enjoying nature in the upper peninsula with his family, Brian Johnson decided to pursue a college education at Michigan Tech University. Chemistry and biology courses in community college sparked his interest in science and so upon entering Michigan Tech, Johnson chose to study ecology to bridge his love of nature with his interest in science.

His first foray into toxicology happened while working in an ornithology laboratory doing a study of rough grouse. As Michigan Tech is in the heart of copper mine country, the laboratory retrieved and tested organs from birds donated by hunters to check if there were stamp sands left over from mine tailings. Grouse normally consume small amounts of gravel to help with digestion and so they also consume stamp sands. While not the most pleasant job, Johnson enjoyed linking the science of the project to his passion for hunting and it got him thinking about other toxic exposures in nature. He considered his first summer job laying sod and the toxic pesticide exposures possible there, as well as the toxic exposures possible in his family-owned salvage yard.

Switching from a major in ecology to human biology, Johnson considered medical school and shadowed a lot of physicians. He found that while they applied the science, they never really got to do the part he enjoyed best, which was learning and discovering the science. Therefore, his next move was to the University of Wisconsin for graduate school. The year he began his Ph.D. in 2007, the National Academy of Sciences came out with a report that discussed how the current methods of testing chemicals was unsustainable, due to the time required for testing. At the time, around 2,000 chemicals had been tested, but it was estimated there were over 80,000 chemicals being used in commerce. The report suggested there needed to be a shift from animal intensive research processes to more of a drug screening type of model with the use of robotics and automation. Johnson's Ph.D. work mostly used animal models, using knockouts and triple knockouts, which was necessary because the biology he was studying was systems based, looking at developmental signaling related to the hydrocarbon receptor. Johnson at this point decided, “The tools don't exist that I need – so what do I need to do? I need to figure out how to build the tools that we need.” Which led to his next step, a postdoctoral fellowship at the University of Wisconsin in biomedical engineering so that he could build the tools he needed to do the research that was important to him.

At the end of his postdoctoral time, Johnson had been selected for both a K99 Pathway to Independence Award and a R44 Small Business Innovation Research Grant. Wavering between going the academic route or the entrepreneurial route, an offer from MSU let him choose the best of both worlds, an academic position with the freedom to run his small company on the side. With established connections at MSU, Johnson also knew the ability to collaborate with colleagues and the opportunities to merge biomedical engineering and the biology of his research at the IQ building on campus would be unmatched.

Today, Johnson collaborates with multiple faculty across campus on varying projects. His research falls between traditional animal models and high throughput screening and he strives to bridge that gap. His overall research goal is to build models of human development and disease to identify how chemicals might either cause or contribute to birth defects in sensitive populations, and how we can better treat disease. By building these models of development, Johnson and his laboratory test and identify new chemicals with the idea that one day they can hope to prevent birth defects. Current research directions in the Johnson laboratory include 1) identifying the potential for chemical mixtures to disrupt epithelial: mesenchymal signaling in orofacial development leading to cleft lip/palate 2) developing high-throughput multicellular models of breast and prostate cancers to identify mechanisms of treatment resistance and uncover therapeutic targets in the cancer microenvironment 3) using multicellular models of the hypothalamic: pituitary: thyroid axis to inform computational modeling of thyroid homeostasis and perturbation by chemical insults.

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A.J. Robison
Associate Professor, Department of Physiology, Neuroscience Program

Aftter high school, Aj Robison chose to attend Rhodes College, a small school in Memphis, Tennessee, to play football. Starting out as an English major, Robison wasn’t sure what career he wanted after school, but just knew he wasn’t going to end up in the NFL. As a freshman, he found himself in a mycology class with an outstanding professor who ran a program on fungal research. After Robison was offered a position in his lab, he found his love for science growing and he enjoyed learning new research techniques like electron microscopy and making monoclonal antibodies. Robison’s professor encouraged him to apply for graduate school when Robison mentioned to him that he would like to do something similar as a career one day. He recommended nearby Vanderbilt University in Nashville, Tennessee.

At Vanderbilt, the people Robison met critically influenced his next research opportunities. After meeting a biochemist named Roger Colbran, Robison took a position in his lab. The laboratory focused on the biochemistry of kinases and phosphatases, and Robison worked CaMKII and its protein interaction partners. Robison found that the interactions between these proteins regulated kinase activity that was essential for the function of synapses and the formation of memories. While the laboratory was mostly biochemistry focused, the connections to the synapse led to his next focus as a postdoctoral fellow - neuroscience, neuronal physiology, and animal behavior.

While at Vanderbilt, Robison also met and married the love of his life, Michelle Mazei-Robison. They knew that they wanted to be at the same institution for postdoctoral work so they both ended up at UT Southwestern in Dallas, TX. Robison worked in the laboratory of Thomas Südhof, and Mazei-Robison in the laboratory of Eric Nestler, both very well-respected neuroscientists. When Südhof moved his laboratory to Stanford, Robison joined Eric Nestler’s lab to stay close to Mazei-Robison and their soon-to-be-growing family. Not long after, though, they went with the Nestler Laboratory when it moved to Mount Sinai School of Medicine in New York City. They spent four years total with Nestler, and while they each had their own lines of research, their interests and research programs were very integrated. When they began to look for faculty positions, they knew that they wanted two faculty positions at the same institute that would let them continue to develop their research programs together. Michigan State gave them their best offer with laboratories right next door to each other. Michelle also grew up in Western Michigan, and the pull to come back home close to family was strong. Today, Robison and Mazei-Robison each have their own laboratories, but they are very much collaborative and integral to each other’s research programs. After those whirlwind years leading up to MSU, Robison commented, “I feel like my whole life is falling backwards into good things.”

Robison describes his lab today as an octopus, with tentacles and interests that grow out in all kinds of directions based on the variety of collaborations he has across campus and beyond. Research in the Robison Lab uses mouse models of drug addiction and chronic stress to study gene expression in discreet brain regions, particularly the hippocampus. A core project in his lab, funded by the National Institute of Mental Health, works to understand how changes in gene expression in specific circuits of the brain regulate behavioral responses to stress that are relevant for diseases like depression. Robison and his team study how sex differences and sex hormones can impinge upon that regulation of gene expression, and thereby these behaviors. His laboratory uses cutting edge neuroscience techniques like chemogenetics, calcium imaging, and CRISPR modification of gene expression. They were the first lab to his knowledge to use CRISPR to modify genomic DNA in a specific circuit in the mouse brain. The other big core project in the lab is funded by the National Institute of Allergens and Infectious Diseases and then also by the National Institute of Childhood Health and Disease. The project, a large-scale collaboration with Dr. Adam Moeser in MSU College of Veterinary Medicine, aims to study gene expression in mast cells, an innate immune cell typically linked to allergic reactions and regulation of immune responses. They’ve created multiple new mouse lines allowing them to measure and manipulate mast cell gene expression and have uncovered a novel role for the transcription factor...continued on page 36
Neera Tewari-Singh grew up watching her father teach. A professor of biology, he often talked science with her and encouraged her to contribute something to the world, specifically that her contribution was important. “A teacher is like a burning candle,” he used to tell her. “Your knowledge is a light to all your students, and it is your duty to share your light with others.”

Born in northern India in the state of Uttar Pradesh, Tewari-Singh spent her early childhood in India. When she was in fifth grade, her father was offered a position to teach plant pathology in Kenya. She lived there with her family until she returned to India to Lucknow University to earn her Bachelor of Science in Botany, Chemistry and Zoology. She then went on to attend Jawaharlal Nehru University at New Delhi to work on her graduate degree in Molecular Biology. The German academic exchange fellowship awarded her the chance to study abroad at the Leibniz University Hannover in Germany. She found the opportunity to learn a different culture and to learn another language invaluable. While in Germany, her research focused on plant biotechnology and molecular biology, specifically the development of plants that could be enriched in protein and were disease resistant for use in Middle Eastern and Asian countries with large populations.

After submitting her graduate thesis, she began to look for postdoctoral opportunities in the United States. She came across a project funded by the Defense Advanced Research Projects Agency (DARPA) that was looking for a postdoctoral candidate who could work on plant biotechnology to sense chemical threat exposures. Finding this blend of synthetic biology as well as biotechnology very interesting, Tewari-Singh came to Colorado State University to pursue that postdoctoral research and decided to combine that work with therapeutics development.

During her time as a postdoctoral fellow at Colorado State University, the United States government formed a new program under the National Institutes of Health called the Countermeasures Against Chemical Threats Program. After speaking with a professor at the University of Colorado at Denver who was working on the first cycle of the grant from the new program, Tewari-Singh knew she wanted to push her research into this direction so that she could have more impact on the human population. As a research associate at the University of Colorado Denver, Tewari-Singh began to work with chemical exposures, studying their toxic effects through efficacy studies as well as models studying the mechanistic aspects, all in the goal of identifying potential therapeutic targets.

Knowing that MSU had one of the strongest toxicology programs in the nation from her experience with the Society of Toxicology, Tewari-Singh transitioned to MSU a few years ago. Today, her research goal is to pursue both basic and translational studies to develop approved and more effective targeted countermeasures/therapies against mainly the dermal and ocular injuries from chemical threat agent exposures. The chemical agents of interest include vesicating and nettle agents (sulfur mustard, nitrogen mustard, lewisite and phosgene oxime), industrial agents/pollutants and pesticides (chloropicrin, polycyclic aromatic hydrocarbons, etc.) that can cause harmful effects/mass casualties as well as long-term ailments to the human population. Developing effective and targeted medical interventions is a critical component of the modern global strategy to overcome the challenges of chemical emergencies in both civilian and military populations, making her research highly significant.

Current funded grants in her lab focus on investigating the role of mast cells and related inflammatory responses to elucidate skin, systemic and/or lung injury mechanisms that contribute to severe toxicity/long-term illnesses from vesicating agents’ exposure in civilian population as well as war veterans. In addition, under recently funded collaborative projects, her lab is elucidating the role of nuclear erythroid 2-related factor 2 (Nrf2) signaling pathway in vesicating, and pesticide chloropicrin caused ocular injuries. Outcomes from these studies are anticipated to identify novel molecular targets for therapeutic intervention and further drug development to effectively treat injuries from these chemical threat agents. Under other collaborative projects, she is studying mechanisms and testing as well as optimizing therapies including oxygen emulsion to treat ocular injuries from chemical threat agents and ocular inflammatory diseases (corneal inflammation and dry eye). Additionally, she is also elucidating the role of aryl hydrocarbon receptor in polycyclic aromatic hydrocarbon-induced exacerbation in skin inflammatory diseases (psoriasis and atopic dermatitis) for better targeted treatment strategies.

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During 2022, IIT affiliated faculty published more than 200 peer-reviewed articles. As a result, the IIT, and MSU research, has been highly visible in prominent peer-reviewed literature. The publications below are from January 1, 2022 to December 31, 2022.

**Andrea Amalfitano**


**Jamie J. Bernard**


**Eran R. Andrechek**

Sudin Bhattacharya


Lance K. Blevins


Leslie D. Bourquin


Stephen A. Boyd


Lyle D. Burgoon


Carignan, Courtney C.

Honglei Chen


Andrea I. Doseff

Susan L. Ewart


Patricia E. Ganey

John L. Goudreau


Jack R. Harkema


Syed A. Hashsham

Wallace A. Hayes


James E. Jackson
Zhou Y, Klinger GE, Hegg EL, Saffron CM, Jackson JE (2022). Skeletal Ni electrode-catalyzed...


Brian P. Johnson


A. Daniel Jones


Hui Li


John B. Kaneene

Kin Sing Lee

Gina M. Leinninger


Norbert E. Kaminski


James P. Luyendyk


Burra V. Madhukar

Michelle Mazei-Robison


Laura R. McCabe


Ilce G. Medina Meza


Cheryl A. Murphy


Rance Nault


Paneth N, Joynier MJ, Casadevall A (2022). Filling in the Spaces in Cardio-


James J. Pestka


Brian K. Petroff

A.J. Robison


Cheryl E. Rockwell


Kenneth D. Rosenman


Robert A. Roth


Rita S. Strakovsky


**Greg M. Swain**


**Brian J. Teppen**


**Neera Tewari-Singh**


**James M. Tiedje**


**Bruce D. Uhal**


PMID: 36252660.


Brad L. Upham


James G. Wagner


Felicia Wu


Wei Zhang


The affiliated faculty of the IIT participate in many external activities that promote the development of research and science in their chosen field. These activities include editorial boards, review groups or study sections, scientific advisory boards and committees, and officers in scientific societies. The professional service activities below are for the calendar year of 2022.

Bernard, Jamie
» Councilor, Carcinogenesis Specialty Section, Society of Toxicology
» Future Tox VI Organizing Committee, Society of Toxicology

Bhattacharya, Sudin
» Editorial Board member, Scientific Reports
» Ad hoc grant reviewer: CDC Special Emphasis Panel, National Science Foundation, Swiss National Science Foundation

Bourquin, Leslie
» Chair, NSF International Global Food Safety Advisory Council
» Technical Advisory Network Member, Food Safety Preventive Controls Alliance
» Editorial Board, Foods Journal

Buchweitz, John
» Executive Committee Board Member, American Board of Toxicology

Bursian, Steven
» Member, Health Advisory Board of NSF International

Burgoon, Lyle
» Vice President-Elect, Ethical, Legal, Forensic, Social Implications Specialty Section, SOT
» Associate Editor, Frontiers in Genetics
» Associate Editor, Frontiers in Toxicology
**Carignan, Courtney**

- Chair, Mentoring Committee for the International Society of Exposure Science
- Organizing Committee, Third National Conference on Per- and Polyfluoroalkyl Substances
- Scientific Advisor, ATSDR Community Assistance Panel for Pease Tradeport
- Environmental Health Research and Surveillance Guidance Panel for the Michigan Department of Health and Human Services
- CVM Committee on Graduate Study and Research
- MSU Center for PFAS Research, Research and Funding Task Force
- Environmental Science and Policy Program Advisory Council
- Emerging Issues Committee, Center for Research on Ingredient Safety
- Reproductive and Developmental Science Program, Trainer
- Food Science Curriculum Committee for the Department of Food Science and Human Nutrition
- Inclusion and Multicultural Committee for the Department of Pharmacology and Toxicology
- Ad-hoc reviewer for Environmental Health Perspectives, Journal of Exposure Science and Environmental Epidemiology, Environmental International, and Environmental Science and Technology.

**Doseff, Andrea**

- Director, Molecular, Cellular, and Integrative Physiology Graduate Program
- Director, Post-baccalaureate Graduate Program SiGuE (Success in Graduate Education)
- Associate Editor, Journal of Pharmacology and Experimental Therapeutics
- Associate Editor Journal of Medically Active Plants
- Advisory Board NIH-T32 Plant and Sustainability Training Grant, Michigan State University
- Co-Chair, American Heart Association Study Section
- National Institute of Health, Study Section Immunology and Immunotherapy
- Member, National Science Foundation
- Service at MSU: Council on Diversity and Community (CDC), College of Natural Sciences, CNS Graduate Education Strategic Plan Committee, Graduate School Strategic Plan, Graduate School Mentoring Task Force
- Organizer member of the 10th American Council for Medicinally Active Plants (ACMAP) Meeting.

**Gulbransen, Brian**

- Rome V, Neurogastroenterology Basic Science Chapter Committee Member, 2021 - present
- Councilor, American Neurogastroenterology and Motility Society (ANMS), 2022 - present
- Councilor, American Gastroenterological Association (AGA), 2022 - present
- Chair, American Neurogastroenterology and Motility Society (ANMS) 2022 Virtual Scientific Webinar Series
- Chair, NIH Neuroimmune workshop, 2022 - present
- Curator, DocMatters online community, American Neurogastroenterology and Motility Society (ANMS), 2021 - present
- Member, American Physiological Society GI & Liver Section Awards Committee, 2021 - present
- Associate Editor, Purinergic Signaling, 2020 – present
- Editorial Board Member, Cellular and Molecular Gastroenterology and Hepatology (CMGH), 2022 – present
- NIH, Regular Member, NIDDK DDK-C panel – Career development awards

**Goodman, Jay**

- Fellow, Academy of Toxicological Sciences

**Goudreau, John**

- Editorial Board, NPJ Parkinson's Disease
- NIH Study Sections: Chair, Music and Health, ZNSI SRB E01; Small Business Panel, Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders, ZRG1 ETTN-H (11); Small Business: Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders, ZRG1 AN P II
- Executive Committee, Secretary/Treasurer, National Board of Osteopathic Medical Examiners
- Mentoring Committee, Parkinson Study Group

**Harkema, Jack**

- Chair, American Thoracic Society’s Environmental Health Policy Committee, 2020 – 2022
- Member, American Thoracic Society’s Executive Committee, Assembly of Environmental, Occupational and Population Health 2021-2023

**Hashsham, Syed**

- Member, ASTM International Committee on Determining the Effects of Biogenic Sulfuric Acid on Concrete Pipe and Structures (C13.03)
- Reviewer for multiple study sections of NIEHS K99/R00 and NIEHS ONES applications

**Hayes, Wallace**

- Member, SOT/FDA Colloquium
Organizing Committee. Society of Toxicology/Food and Drug Administration
» Member, SOT/FDA Colloquium Organizing Committee. Society of Toxicology/Food and Drug Administration
» Member, Next Gen Food Toxicology project. U.S. Food and Drug Administration

Jackson, James
» Member, American Chemical Society
» Member, National Academy of Inventors
» Member (and past chair), Meridian Township Environmental Commission
» Vice Chair, Brownfield Redevelopment Authority, Meridian Township, MI

Jones, Daniel
» Review Editor, Frontiers in Plant Metabolism and Chemodiversity

Kaminski, Norbert
» External Review Committee for the Interdisciplinary Program in Toxicology at Texas A&M University
» Member, Scientific Advisory Board, GB Sciences BioPharma
» Member, Scientific Advisory Board, SciFi Foods
» External Advisory Committee, University of New Mexico P42 Superfund Center
» Academic Advisor, Institute for the Advancement of Food and Nutrition Sciences
» Member, Board of Directors, Toxicology Forum
» Editorial Board, Toxicology

Karmaus, Peer
» Immunotoxicology Specialty Section, Program Committee, Society of Toxicology
» Ad hoc Reviewer, iScience
» Ad hoc Reviewer, PLOS Pathogens

LaPres, John
» Associate Editor, Toxicology Reports
» Grant Reviewer, Congressionally Directed Medical Research Programs

Lee, Kin Sing

Leinninger, Gina
» Ad hoc Reviewer: eLife, JCI Insight, Nature Communications, Neuropeptides, Peptides, Scientific Reports,
» Abstract Reviewer: The Obesity Society, The Society for the Study of Ingestive Behaviors
» Grant Reviewer: NIDDK Fellowships Panel, Michigan Diabetes Research Center Grants Program
» Editorial Board, Neuropeptides

Li, Hui
» Guest Editor, Special Issue of Organic Contaminants in Agro-Environment for Chemosphere
» Leader of Animal Agriculture and Environmental Quality Community, American Society of Agronomy
» Fellow, American Society of Agronomy

Liby, Karen
» Editorial Board, AACR Cancer Prevention Research
» Editorial Board, Scientific Reports

Luyendyk, James
» Secretary, Society of Toxicology
» Editorial Board, Journal of Thrombosis and Haemostasis

Mansfield, Linda
» Fellow of the American Academy of Microbiology, 2022
» Appointed to Council on Education, American Veterinary Medical Association
» Albert C. and Lois E. Dehn Endowed Chair, Michigan State University
» University Distinguished Professor, Michigan State University

Mazei-Robison, Michelle
» American College of Neuropsychopharmacology (ACNP) Women’s Task Force
» ACNP Liaison Committee
» ASPET Division for Neuropharmacology Program Committee
» ASPET Division for Neuropharmacology Executive Committee
» Catecholamine Society, Councilor
» Scientific Reports, Editorial Board
Medina Meza, Ilce
- Editorial Board, Food Research International
- Chair-Elect, Food Engineering Division, Institute of Food Technologist (IFT)

Murphy, Cheryl
- Director, Center for PFAS Research, MSU
- Scientific Advisory Panel, FIFRA (EPA)

Paneth, Nigel
- Leadership team, National Convalescent Plasma Project (CCPP19.org)
- Co-Chair (with David Savitz, Brown University) State of Michigan Environmental Health Research and Surveillance Guidance Panel
- Scientific Advisory Group, Norwegian Mother and Child Cohort (MoBa) and Danish National Birth Cohort (DNCB) combined cerebral palsy study (MOBAND)
- External Advisor, Screening to Improve Health in Very Premature Infants in Europe (SHIPS) Study, INSERM, Paris, funded by European Commission

Robison, A.J.
- Editorial Board Member, Scientific Reports
- Editorial Board Member, Brain Research
- NIH Study Section, Behavioral Neuroscience Fellowship, March 2022
- NIH Study Section, Neurobiology of Motivated Behavior, June 2022
- Member, American College of Neuropsychopharmacology Public Information Committee

Rockwell, Cheryl
- Editorial Board, Molecular Pharmacology
- Editorial Board, Pharmacological Research

Rosenman, Kenneth
- Co-Lead, Occupational Health Surveillance Work Group, Conference of State and Territorial Epidemiologists (CSTE)
- Secretary, Michigan Occupational and Environmental Medical Association (MOEMA)
- Secretary, MOEMA Educational Fund
- Member, Michigan Pesticide Advisory Committee
- Member, Workers’ Compensation Research Institute Michigan Advisory Committee

Roth, Robert
- Committee Member, SOT Faculty United for Toxicology Undergraduate Recruitment and Education (FUTURE)
- External Advisory Committee, Curriculum in Toxicology, University of North Carolina at Chapel Hill
- External Advisory Committee, Graduate Program in Pharmacology, University of Kansas Medical Center

Rowlands, Craig
- Member, US EPA Science Advisory Committee on Chemicals (SACC)
- Member, US EPA TSCA PBT Panel
- Member, Board of Directors, Johns Hopkins University, Center for Alternatives to Animal Testing (CAAT)
- Since 2022: serve on the Joint Peer Review Steering Committee (JPRSC) that determines whether chemicals conform to water standards criteria such as NSF/ANSI/CAN 60: Drinking Water Treatment Chemicals.

Strakovsky, Rita
- Editorial Board Member, Nutrition Research
- Editorial Board Member, Endocrine and Metabolic Science
- Publication committee, American Society for Nutrition
- Ad-hoc grant reviewer, NIEHS Career Development & Pathway to Independence in Biomedical/Clinical Research Study Section
- President, Michigan Regional Chapter of the Society of Toxicology

Tewari-Singh, Neera
- Editorial Boards: Cutaneous and Ocular Toxicology, Toxicology Mechanisms and Methods, Toxics
- Grant Review Panels: NIH Grant review panels: ZRG1 MDCN-B (55) PAR Panel: CounterACT-Exploratory applications; Reviewer, Emerging Science and Scientists Pilot Project Program, the UC Davis NIH CounterACT Center for Excellence; Vision Research Program (VRP) for the Department of Defense (DoD) Congressionally Directed Medical Research Programs (CDMRP).
- Committee Member, National Academies of Sciences, Engineering and Medicine (NASEM) study: ‘Assessing and Improving Strategies for Preventing, Countering, and Responding to Weapons of Mass Destruction Terrorism: Chemical Threats’
- Program Committee Member, Ocular Toxicology Specialty Section, Society of Toxicology
Professional Service

- Member and mentor, Kurukshetra University Technology Incubation Center (KUTIC), RUSA, Kurukshetra University, India
- Faculty representative, University Provost and the Vice President for Research and Innovation Workgroup on ‘aligning MSU policies and practices related to outside interests and professional activities with federal requirements’
- Chair, Committee on Research and Graduate Studies, College of Osteopathic Medicine.
- Chair, Course & Curriculum Committee, Department of Pharmacology and Toxicology, Michigan State University
- Member, Communications Committee, Department of Pharmacology and Toxicology, Michigan State University
- Faculty Advisory Committee, Department of Pharmacology and Toxicology, Michigan State University
- Elected Officer Positions: 2022-2024: Treasurer/Secretary, Michigan Chapter of the Society of Toxicology; 2019-2022-Treasurer, Ocular Toxicology Specialty Section, Society of Toxicology; 2021-2022: Past President, Dermal Toxicology Specialty Section, Society of Toxicology

Tiedje, James

- Science Advisory Committee, Denmark’s CENPERM (Cnt for Permafrost change in Greenland) Projects
- Member, Science Advisory Comm for Consortium for Monitoring, Technology, and Verification (Nuclear Non-proliferation)
- Science Advisory Comm for CSIRO (Australia) Future Science Platform - Microbiomes for One System Health
- Member, NASEM Workshop on Exploring a Dynamic Soil Information System (DySIS)
- American Society of Microbiology’s Representative, US Nagoya Protocol Action Group (USANPAG)
- American Academy of Microbiology, Chair of Colloquium Committee on Microbes and Climate Change
- American Society of Microbiology Steering Comm of Role of Microbes in Mediating Methane Emissions Colloquium
- Advisory Committee, Kansas’s NSF Microbiome EPSCoR Project
- Scientific Advisor, Resistomap, a Finnish antimicrobial resistance monitoring company
- Member, NEON’s Microbial Technical Working Group
- American Society of Microbiology’s LifeTime Achievement Award

Trosko, James

- Editorial Board, Diseases
- Member, Advisory Board to the MSU-COM Institute for Global Health
- Scientific Advisory Board Member, Adult Stem Cell Research Company
- Reviewer for multiple scientific journals and grant reviews for international granting agencies (Italy, Brazil, Korea, Czech Republic, France)

Uhal, Bruce

- Member, College of External Reviewers, European Science Foundation
- Editorial Board Member, Frontiers in Pediatrics

Upham, Brad

- Associate Editor, Journal of Toxicology
- Associate Editor, BioMed Research International
- Associate Editor, Biomedicines
- Chair, Education Committee, Society of In Vitro Biology
- Co-Chair, Great Lakes Pediatrics Research Day Planning Committee

Wu, Felicia

- President-Elect, Society for Risk Analysis
- United Nations Food & Agriculture Organization (FAO) Scientific Advisory Committee on Livestock Food Security and Nutrition, Member
- Joint Expert Committee on Food Additives (JECFA) of the FAO and World Health Organization (WHO), Expert Roster
- WHO Temporary Advisor to 96th JECFA evaluation of aspartame
- Michigan Chapter Co-President, Harvard University Alumni Network of Harvard Women (ANHW)
- Harvard Agri-Food Board of Directors
- International Union of Pure & Applied Chemistry (IUPAC): US National Academy of Sciences Delegate,
- US Environmental Protection Agency (EPA) Science Advisory Board (SAB) Panel on Contaminant Candidate List 5
- Institute for the Advancement of Food and Nutrition Sciences, Scientific Leadership Council
- Vice President for University Advancement Search Committee, Michigan State University

Zacharewski, Timothy

- Editorial Board, Toxicological Sciences
- Editorial Board, Toxicology & Applied Pharmacology
- Ad-Hoc Committee Member, National Institutes of Health – Special Emphasis Panel
- Ad-Hoc Committee Member, Health Canada
- Ad-Hoc Committee Member, Canadian Institutes for Health Research
- Ad-Hoc Committee Member, The French National Research Agency (ANR)

Zhang, Wei

- Associate Editor, Canadian Journal of Soil Science, Journal of Environmental Quality, National Science Open
- Editorial Board Member: Biochar, Carbon Research
- Guest associate editor, Special section “Rhizosphere microbiology: Toward a clean and healthy soil"
Johnson also is the Project Leader for Project 2: Coupling Bioengineered and Computational Models of Thyroid Homeostasis to Support Human PCDD/F Risk-Assessment of the MSU Superfund Research Program Center. Thyroid hormones regulate cellular energy metabolism throughout the body and chemical disruption of this function in humans causes neurological, hearing, and vision dysfunction in children, as well as metabolic disorders and cancer in adults. Due to the complex nature of the thyroid system, the way many Superfund chemicals disrupt thyroid function is unclear. Johnson's project works to bioengineer thyroid and liver microtissues and use them, along with computational modelling, to understand how these chemicals cause toxicity. They also test chemicals and their mixtures for their ability to disrupt thyroid signaling, and translate their findings to determine how chemical exposures might affect human populations.

The Johnson laboratory currently has one lab manager, a graduate student in environmental engineering, a masters student in biomedical engineering and five undergraduates from varying disciplines including biology, mechanical engineering, and chemical engineering.

ΔFosB in a negative feedback loop limiting mast cell activity.

Robison also has several other smaller projects in the lab. An R01 from the National Institute of Drug Abuse he shares with three other researchers in Texas and New York studying the biochemistry of ΔFosB and how it's affected by oxidative stress and how that might play a role in addiction and other mental disorders. This project is mostly about drug discovery, and they are screening compounds which they hope will lead to actual translational solutions for the general public. Robison also has an R01 with Dr. Jeannie Chin at Baylor performing Alzheimer's Research on gene expression in the hippocampus. He also has a NIMH-funded project with Brian Trainor at UC Davis and together they do work on oxytocin and oxytocin neurons and how those are important in stress responses and sex differences. The last big project in the lab examines how the gut microbiome regulates parts of the brain that drive aggressive behavior and this work is funded by the Avielle foundation.

The Robison lab currently has two postdoctoral fellows, three graduate students, a lab manager and two part-time technicians. Robison is also the Director of the Neuroscience Program, which keeps him busy with 31 PhD students and two on-line certificate programs. He remains an active classroom teacher and in 2022, he directed three courses, co-directed two more, and gave lectures in five additional graduate courses. His most rewarding work, however, is mentoring in his lab group, and he the many successes of his postdocs and grad students.

Her lab integrates clinical and biological responses, molecular toxicology, biochemistry, signal transduction, immunology, imaging, and cutting-edge systems toxicology ‘omics’ tools to elucidate toxic mechanisms (mainly related to inflammation, DNA damage and oxidative stress). For these studies, they employ in vivo (mice, rats, rabbits and mini-pigs), ex vivo (rabbit and human tissues) and in vitro (cell culture) model systems. The Tewari-Singh laboratory currently includes a postdoctoral fellow, a lab manager, two graduate students, one master’s student, and six undergraduate students. She enjoys being able to mentor these students to find their research passion.
IIT AFFILIATED FACULTY

Andrea Amalfitano, Dean, College of Osteopathic Medicine, Osteopathic Heritage Foundation Endowed Professor of Pediatrics

Eran R. Andrechek, Professor, Department of Physiology

William D. Atchison, Professor Emeritus, Pharmacology & Toxicology

Jamie J. Bernard, Associate Professor, Pharmacology & Toxicology

Matthew P. Bernard, Associate Professor, Pharmacology & Toxicology

Sudin Bhattacharya, Assistant Professor, Biomedical Engineering, Pharmacology & Toxicology

Lance K. Blevins, Assistant Professor, Institute for Integrative Toxicology

Leslie D. Bourquin, Professor, Food Science & Human Nutrition

Stephen A. Boyd, University Distinguished Professor, Plant, Soil & Microbial Sciences

Leon H. Bruner, Adjunct Professor, Institute for Integrative Toxicology

John P. Buchweitz, Associate Professor and Toxicology Section Chief, MSU Veterinary Diagnostic Laboratory, Department of Pathobiology & Diagnostic Investigation

Lyle D. Burgoon, Adjunct Associate Professor, Institute for Integrative Toxicology; Director, Center for Existential Threat Analysis; Leader, Bioinformatics and Computational Toxicology

Steven J. Bursian, Professor Emeritus, Animal Science

Stephan A. Carey, Associate Professor & Associate Chairperson, Small Animal Clinical Sciences

Courtney C. Carignan, Assistant Professor, Food Science & Human Nutrition, Pharmacology & Toxicology

Honglei Chen, MSU Foundation Professor, Epidemiology & Biostatistics

Karen Chou, Associate Professor, Animal Science

Rory B. Conolly, Adjunct Professor, Institute for Integrative Toxicology

Bryan L. Copple, Associate Professor, Pharmacology & Toxicology

Andrea I. Doseff, Professor, Department of Physiology, Pharmacology & Toxicology

Susan L. Ewart, Professor, Large Animal Clinical Sciences

Patricia E. Ganey, Professor Emeritus, Pharmacology & Toxicology

Jay L. Goodman, Professor Emeritus, Pharmacology & Toxicology

John L. Goudreau, Associate Professor, Pharmacology & Toxicology, Neurology

Brian D. Gulbransen, MSU Foundation Associate Professor, Neuroscience Program, Department of Physiology

Jack R. Harkema, University Distinguished Professor, Pathobiology & Diagnostic Investigation

Syed A. Hashsham, Professor, Civil & Environmental Engineering; Adjunct Professor, Plant, Soil & Microbial Sciences

A. Wallace Hayes, Adjunct Professor, Institute for Integrative Toxicology, Senior Science Advisor, Spherix Consulting

Colleen C. Hegg, Associate Professor, Pharmacology & Toxicology

Robert M. Hollingworth, Professor Emeritus, Entomology

James E. Jackson, Professor, Chemistry

Brian P. Johnson, Assistant Professor, Pharmacology & Toxicology, Biodmedical Engineering

A. Daniel Jones, Professor, Biochemistry & Molecular Biology, Chemistry

Norbert E. Kaminski, Director, Institute for Integrative Toxicology; Director, Center for Research on Ingredient Safety; Professor, Pharmacology & Toxicology, Cell & Molecular Biology

John B. Kaneene, University Distinguished Professor, Large Animal Clinical Sciences and Director, Center for Comparative Epidemiology

Peer W.F. Karmaus, Adjunct Assistant Professor, Institute for Integrative Toxicology, Staff Scientist, NIEHS

John J. LaPres, Professor, Biochemistry & Molecular Biology; Graduate Program Director, Institute for Integrative Toxicology

Kin Sing Stephen Lee, Assistant Professor, Pharmacology & Toxicology

Gina M. Leinninger, Associate Professor, Physiology, Neuroscience Program

Hui Li, Professor, Plant, Soil & Microbial Sciences

Karen T. Liby, Professor, Pharmacology & Toxicology

David T. Long, Professor Emeritus, Earth & Environmental Sciences

James P. Luyendyk, Professor, Pathobiology & Diagnostic Investigation

Jane F. Maddox, Assistant Professor Emeritus, Pharmacology & Toxicology

Burra V. Madhukar, Assistant Professor Emeritus, Pediatrics & Human Development

Linda S. Mansfield, University Distinguished Professor, Large Animal Clinical Sciences, Microbiology & Molecular Genetics

Michelle Mazei-Robison, Associate Professor, Physiology, Neuroscience Program
Laura R. McCabe, MSU Foundation Professor, Physiology
J. Justin McCormick, University Distinguished Professor Emeritus, Microbiology & Molecular Genetics, Biochemistry & Molecular Biology
Ilce G. Medina Meza, Assistant Professor, Biosystems and Agricultural Engineering
Thomas P. Mullaney, Professor Emeritus, Pathobiology & Diagnostic Investigation
Cheryl A. Murphy, Professor, Fisheries & Wildlife
Rance Nault, Assistant Professor, Biochemistry & Molecular Biology
Lawrence Karl Olson, Associate Professor, Physiology
Nigel S. Paneth, University Distinguished Professor Emeritus, Epidemiology, Pediatrics
James J. Pestka, University Distinguished Professor, Microbiology & Molecular Genetics, Food Science & Human Nutrition
Brian K. Petroff, Professor, MSU Veterinary Diagnostic Laboratory, Pathobiology & Diagnostic Investigation
A.J. Robison, Associate Professor, Physiology, Neuroscience Program
Cheryl E. Rockwell, Associate Professor, Pharmacology & Toxicology
Kenneth D. Rosenman, Professor, Medicine
Robert A. Roth, Professor Emeritus, Pharmacology & Toxicology
J. Craig Rowlands, Adjunct Professor, Institute for Integrative Toxicology, Senior Scientist, Underwriters Laboratories, LLC
James G. Sikarskie, Professor Emeritus, Small Animal Clinical Sciences
Rita S. Strakovsky, Assistant Professor, Food Science & Human Nutrition
Greg M. Swain, Professor, Chemistry
Brian J. Teppen, Professor, Plant, Soil & Microbial Sciences
Neera Tewari-Singh, Assistant Professor, Pharmacology & Toxicology
James M. Tiedje, University Distinguished Professor Emeritus, Plant, Soil & Microbial Sciences, Microbiology & Molecular Genetics
David A. Tonucci, Adjunct Professor, Institute for Integrative Toxicology, Vice President for Regulatory & Toxicology, Artemys Foods
James E. Trosko, Professor Emeritus, Pediatrics & Human Development
Bruce D. Uhal, Professor, Physiology
Brad L. Upham, Associate Professor, Pediatrics & Human Development
Thomas C. Voice, Professor, Civil & Environmental Engineering, Senior Associate Dean, College of Engineering
James G. Wagner, Associate Professor, Pathobiology & Diagnostic Investigation
Michael R. Woolhiser, Adjunct Professor, Institute for Integrative Toxicology, Toxicology & Environmental Research Laboratory Director, The Dow Chemical Company
Felicia Wu, John A. Hannah Distinguished Professor, Food Science & Human Nutrition, Agricultural, Food, & Resource Economics
Timothy R. Zacharewski, Professor, Biochemistry & Molecular Biology
Joseph W. Zagorski, Assistant Professor, Center for Research on Ingredient Safety
Wei Zhang, Associate Professor, Plant, Soil & Microbial Sciences, Environmental Science & Policy Program

Academic Dept. / Disciplinary Ph.D. Programs
( Participate in the IIT’s EITS graduate program. )

- Animal Science
- Biochemistry & Molecular Biology
- Cell & Molecular Biology
- Chemistry
- Comparative Medicine & Integrative Biology
- Earth & Environmental Sciences
- Fisheries & Wildlife
- Food Science & Human Nutrition

- Forestry
- Genetics & Genome Sciences
- Integrative Biology
- Microbiology & Molecular Genetics
- Neuroscience
- Pharmacology & Toxicology
- Physiology
- Plant, Soil, & Microbial Sciences

Deans

Birgit Puschner, College of Veterinary Medicine
Kelly Millenbah, College of Agriculture and Natural Resources
Leo Kempel, College of Engineering
Aron Sousa, College of Human Medicine
Andrea Amalfitano, College of Osteopathic Medicine
Phillip Duxbury, College of Natural Science
George W. Smith, Director, AgBioResearch