2023 ANNUAL REPORT

INSTITUTE FOR INTEGRATIVE TOXICOLOGY

MICHIGAN STATE
UNIVERSITY

IIT ANNUAL REPORT 2023

Managing Editor: Writing and Design
Lauren St.John

Photos
MSU,
IIT Staff

IIT Staff
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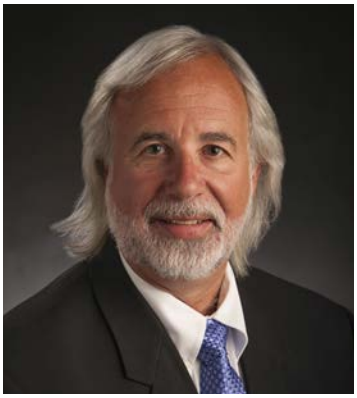
A **TRADITION** of EXCELLENCE

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.

The Center for Environmental Toxicology was initiated primarily to **assist** the State of Michigan with environmental contamination issues such as those arising from the PBB (polybrominated biphenyls) incident in the early 1970s. That unfortunate event was initiated by the accidental contamination of feed for dairy cattle with PBBs. These dioxin-like chemicals and dioxin itself remain a major topic of research at Michigan State University.

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 35 years of continuous funding. Graduates of MSU's toxicology program number over 200 and can be found in academia, industry, and governmental positions.

MESSAGE from the DIRECTOR



This year marked the 45th anniversary of our Michigan State University-wide coordinating unit for toxicology with continued success for the Institute for Integrative Toxicology's faculty and trainees.

The influence of IIT faculty's research in the field of toxicology was far-reaching this year. In 2023, several IIT faculty received nationally recognized awards for their achievements. Our faculty have continued to conduct excellent research, successfully competing for grant funding, attending scientific meetings, and receiving news coverage on their newest discoveries. Our affiliated faculty have now grown to seventy-nine specialists conducting toxicology-related research spanning investigations pertaining to the environment (air, water, soil), occupational setting, as well as food and putative therapeutic agents.

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 2023 Annual Meeting of the Society of Toxicology. Students also traveled to a wide variety of other meetings across the globe this year. Seven students graduated from the EITS program in 2023 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 2023 as well. Of particular note this year, CRIS researchers are partnering with Corewell Health to study the health effects of lead poisoning in the Grand Rapids area where about one in 10 children has elevated lead levels in their blood, according to state data. Our researchers will employ a new assay using umbilical cord-derived stem cells to evaluate the effects of lead exposure on the developing immune system during early life stages.

Lastly, a large cadre of our faculty continue to be extremely productive in their research activities and engagement with community and regulatory agencies related to work on dioxin and dioxin-like compounds as part of our NIH funded Superfund Research Center. We are now in the first full year of our most recent award period.

I look forward to seeing what 2024 brings for our institute.

Norbert E. Kaminski, Ph.D., IIT Director

2023 SEMINARS

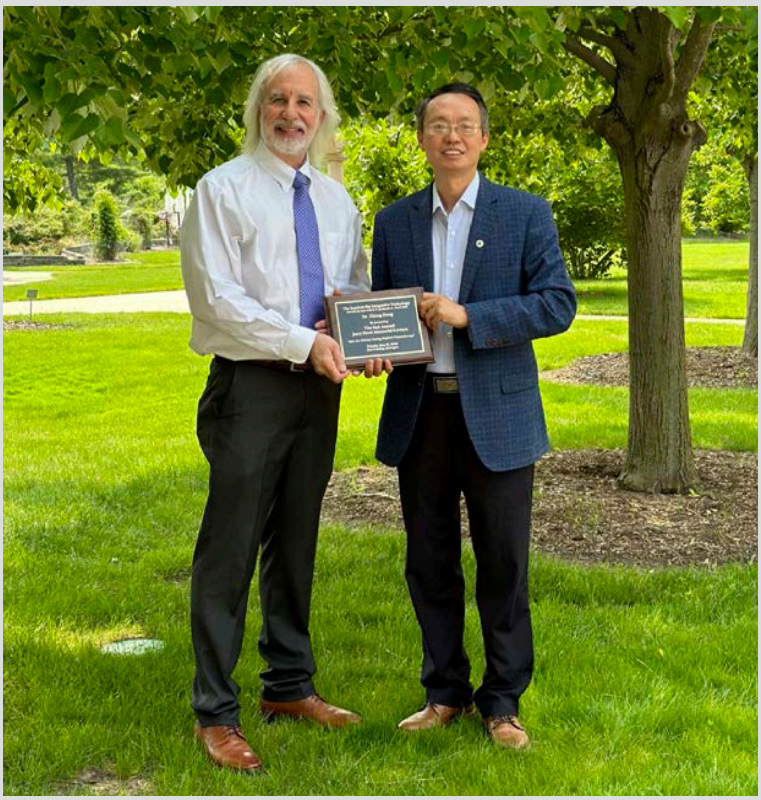
IIT Hosts Prestigous Speakers Throughout 2023

The IIT was delighted to once again host the IIT Seminar Series this year with six exciting seminars.

The IIT hosted **Dr. Jonathan Diedrich**, Michigan State University on January 17. He spoke on, "*Adipocyte-Modulated Aryl Hydrocarbon Receptor Expression and Activity in Multiple Myeloma*." Diedrich is a Senior Research Assistant in the Bernard Lab at Michigan State University.

In February, the IIT hosted **Dr. Peer Karmaus**, staff scientist at NIEHS. Karmaus is also an Adjunct Assistant Professor with the IIT. Karmaus spoke on, "*Meta-analysis of COVID-19 bronchoalveolar lavage scRNA-Seq reveals alveolar epithelial transitions and unique alveolar epithelial cell fates*."

In April, the IIT hosted **Dr. Donna Zhang**, Musil Family Endowed Chair in Drug Discovery, University of Arizona, on April 18. She spoke on, "*Nrf2-mediated regulation of redox balance, proteostasis, and iron homeostasis in human cancer.*"



Above: Dr. Jay Goodman, Dr. Jackie Smith (widow of Dr. Hook), distinguished lecturer Dr. Vishal S. Vaidya, and IIT Director Dr. Norbert Kaminski in the MSU gardens after Dr. Vaidya's lecture.

The fall series began with IIT-affiliated faculty member **Dr. Honglei Chen**, Michigan State University on September 19. He spoke on, "*The Study of Olfaction: Environment, Prodromal Neurodegeneration, and Beyond.*"

On October 14, the IIT hosted **Dr. David Tonucci**, Principal Consultant, Product Safety and Stewardship, Ramboll Americas. Tonucci is also an Adjunct Professor with the IIT. Tonucci spoke on, "*Cultivated Meat: Technical Approaches, Safety Considerations and Regulatory Implications*."

The final seminar of the series was given by **Dr. Stephen Safe**, Texsas A&M University, on November 14. He spoke on, "*Nuclear Receptor 4A (NR4A) as a Traget for Inhibition of Tumor Growth and Reversal of T cell Exhaustion*."

In addition to the annual seminar series, the IIT was thrilled to host **Dr. Zheng Dong** for the 2nd Annual Jerry Hook Distinguished Lectureship. This year's lecture was held May 23 at the MSU Food Safety and Toxicology Building. Dr. Dong is Regents' Professor and Leon H. Charbonnier Endowed Chair at the Medical College of Georgia of Augusta University. He is also the Director of Research & Development and Senior Research Career Scientist at the Charlie Norwood VA Medical Center.

Dong's lecture, "*Save the Kidneys During Cisplatin Chemotherapy*," was well attended by numerous IIT-affiliated faculty and EITS students. Dong discussed how cisplatin is one of the most widely used chemotherapeutic drugs for cancer treatment, but it is also notorious for its side effects in normal tissues and organs, especially the kidney. Cisplatin induces acute kidney injury within days of exposure, which can progress into long-term pathologies resulting in chronic kidney disease. In the past two decades, research has delineated the mechanism of kidney tubular cell death involving the DNA damage response, DNA damage-independent pathways, and epigenetic regulations. Interestingly, intrinsic cytoprotective mechanisms, such as autophagy, are also activated. These and further investigations could lead to effective strategies that might not only protect the kidney but may also enhance the chemotherapeutic effects of cisplatin in tumors.

INSTITUTE HIGHLIGHTS

Dr. Neera Tewari-Singh

was recently awarded a R01 grant from the National Eye Institute for her project, "*Understanding Mustard Vesicants Distribution and Toxicity in the Eye Using In Vivo and In Silico Models.*" Tewari-Singh will receive $1,380,587 to perform this research over the next three years.

Dr. Brian Johnson

received the Withrow Teaching Excellence Award in Biomedical Engineering from the College of Engineering. Students in the MSU College of Engineering nominate their favorite faculty members for the highly prized annual Withrow Teaching Excellence Awards.

Dr. Hui Li

was selected for two prestigious awards this fall. Li was selected as the recipient of the Impact Award for the 2023 CANR Excellence in Research Awards. Li was also honored with the 2023 Environmental Quality Research Award from the American Society of Agronomy (ASA).

Dr. Kin Sing Lee

recently received a Maximizing Investigators' Research Award (MIRA) R35 from the National Institute of General Medical Sciences (NIGMS) was awarded in the amount of $1.9 million. The second award, an R01 granted by the National Institute on Aging (NIA) will supply $3.1 million for Lee's research.

Dr. Felicia Wu

was recently named as a University Distinguished Professor in recognition of her outstanding achievements in teaching, research and public service. Wu was one of ten faculty to receive the honor this year.

Jessica Moerland

was recently selected for two prestigious fellowship awards for her research on the pharmacological modulation of the lung tumor microenvironment. Moerland was selected for the National Cancer Institute (NCI) Ruth L. Kirschstein NRSA for Individual Predoctoral Fellows (F31) Award and also as one of four Aitch Foundation Fellows for 2022-2023.

Dr. James Tiedje

was recently selected for the 2023 Lifetime Achievement Award by the American Society of Microbiology (ASM). The ASM Lifetime Achievement Award is ASM's premier award for sustained contributions to the microbiological sciences.

Isha Khan

in collaboration with a team of scientists including Peer Karmaus, Anthony Bach, Robert Crawford and Norbert Kaminski, recently published exciting research on the role of the aryl hydrocarbon receptor (AHR) in human hematopoiesis, the process by which blood cells are formed.

EITS TRAINING PROGRAM

An overview of the current EITS training program and review of 2023 activities.

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, 26 doctoral students are enrolled in the EITS program, distributed among several of our partnering PhD programs. Nineteen 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. 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 2023. 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.

2023 EITS Graduates

Olivia Favor
Pharmacology & Toxicology
Mentor, Kin Sing Lee

Lipidome Modulation of Environmentally-Triggered Autoimmunity

Lauren Heine
Pharmacology & Toxicology
Mentor, Jack Harkema

Glucocorticoid and Omega-3 Fatty Acid Interventions in Environmental Triggered Inflammation and Autoimmune Disease

Amanda Jurglewicz
Pharmacology & Toxicology
Mentor, John LaPres

The Role of HMG-CoA Reductase in AHR-mediated, TCDD-induced Liver Injury

Omar Kana
Pharmacology & Toxicology
Mentor, Sudin Bhattacharya

Application of Deep Generative Modeling to Single Cell RNA Sequencing Data in Toxicology

Isha Khan
Pharmacology & Toxicology
Mentor, Norbert Kaminski

Role of Aryl Hydrocarbon Receptor Activation by 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) in an In Vitro Model of Human Hematpoiesis

Diana Pacyga
Food Science & Human Nutrition
Mentor, Rita Strakovsky

Gestational Phthalate/Replacement Exposure: A Glimpse into Maternal Risk Factors, Biological Targets, and Gestational Cardiometabolic Health

Michelle Steidemann
Pharmacology & Toxicology
Mentor, John LaPres

The Role of Crosstalk Between the Aryl Hydrocarbon Receptor and Translocator Protein in Modulation of Gene Expression and Cellular Homeostasis

GRADUATE SPOTLIGHTS

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.

Robert Freeborn

Scientist II, Biology, Tr1X, Inc.
EITS Alumnus

At a glance:

Department: Pharmacology & Toxicology

Mentor: Cheryl Rockwell

Dissertation: "The Role of NRF2 Activation on the Murine T Cell Response to Influenza Infection"

Defended: Fall 2020

Significant Achievements During Graduate School:

- Frank C. Lu Graduate Student Award, 1st place, 2020, Society of Toxicology, Food Safety Specialty Section
- Best Presentation by a Student Award, 1st place, 2019 Society of Toxicology, Immunotoxicology Specialty Section
- Robert J. Rubin Student Travel Award, 1st place, 2019, Society of Toxicology, Risk Assessment/ Mechanisms Specialty Sections
- Carl C. Smith Graduate Student Award, 1st place, 2019, Society of Toxicology, Mechanisms Specialty Section

Robert Freeborn applied to college with the idea to pursue either biochemistry or studio jazz guitar. After an incredible mentor lit his passion for research, there was no question in continuing to pursue biochemistry. After earning his Bachelor of Science in Biochemistry from California Polytechnic State University, Freeborn then attended MSU to earn his Ph.D. in Pharmacology and Toxicology with a dual major in Environmental & Integrative Toxicological Sciences. Freeborn trained with Dr. Cheryl Rockwell and completed his dissertation, "*The Role of NRF2 Activation on the Murine T Cell Response to Influenza Infection*," in 2020.

Today, Freeborn is a Scientist II at Tr1X, where he runs a team developing a cell therapy candidate which they hope can be used to cure many autoimmune diseases. In his current role, Freeborn is driving a project which involves engineering T cells to convert them into type 1 regulatory T (Tr1) cells. Tr1 cells play a powerful role in preventing excessive inflammation and autoimmune diseases. As autoimmune diseases are fairly common and require life-long treatment in most instances, Freeborn hopes that the research he is doing at Tr1X will drastically improve the quality of life for patients suffering from these diseases by enabling a one-time treatment that cures the disease for good.

Freeborn has always had a passion for science that has the potential to greatly impact society. His position at Tr1X has allowed him to pursue this passion. "It is incredible doing cutting-edge, rigorous science at an extremely fast pace while working alongside brilliant minds," commented Freeborn. As an early career scientist, Freeborn appreciates the smaller company size. He has had the opportunity to be involved in a lot of upper-level meetings and have a high level of communication and collaboration with the C-suite.

Freeborn found his experience in the EITS program invaluable for his work as a scientist today. "I must wear many hats due to the size of the company and how many things we have going on, including some pharmacology and toxicology work," said Freeborn. "The EITS program prepared me to balance a big workload and manage time well. In this environment, that is probably the most important skill as I balance meetings, collaborations, experiments, reading and mentoring every day." Freeborn found the course load, workshops, seminars and other EITS activities in addition to his normal grad school activities contributed greatly to honing the skills he uses daily.

Dawn Kuszynski

Research/Project Scientist, In Vivo Laboratory, TSRL, Inc.
EITS Alumna

At a glance:

Department: Pharmacology & Toxicology

Mentor: Adam Lauver

Dissertation:
"The Vascular Effects of Clopidogrel"

Defended: Summer 2022

Significant Achievements:

- Travel Award, Doctoral Program in Environmental and Integrative Toxicological Sciences (EITS), Institute for Integrative Toxicology, to attend Experimental Biology in April 2022
- Best Paper Award in the Department of Pharmacology and Toxicology, Michigan State University, December 2021
- Best Ph.D. Student Presentation at Phi Zeta Day, October 2021
- 1st place in poster competition at Experimental Biology in April 2021
- NIH F31 Training Fellowship (1 F31 HL154613-01) awarded in October 2020

Dawn Kuszynski believes strongly that her journey into science was shaped one conversation at a time. It all started in middle school for her when a dear friend was diagnosed with bone cancer. As a young and impressionable child, she couldn't comprehend why there wasn't a cure for such a devastating disease. Although she struggled with science in grade school and never saw it as a potential career path, everything changed when Kuszynski reached college. After some exciting science courses with passionate professors and some enlightening hands-on lab experiences, Kuszynski's path into science was laid out.

Kuszynksi earned her Bachelor of Science in Cell and Molecular Biology from the University of Michigan where she ultimately discovered her passion for cardiovascular research. Kuszynski then attended MSU to earn her Ph.D. in Pharmacology and Toxicology with a dual major in Environmental & Integrative Toxicological Sciences. Kuszynski trained with Dr. Adam Lauver and completed her dissertation, "*The Vascular Effects of Clopidogrel*," in 2022.

Today, Kuszynski is a Research/Project Scientist in the In Vivo Laboratory at TRSL, Inc., a preclinical accelerator. TRSL teams up with professors at universities to help move their drug research through preclinical development to Phase 1 clinical trial. The majority of TRSL's preclinical development receives funding from NIH SBIR grants. To move a drug product through Phase 2 and Phase 3 clinical trials, TRSL positions the intellectual property of the drug within a start-up company to add strategic partnerships or prepare the drug to be acquired by larger pharmaceutical companies for further development. As the Head of In Vivo Operations at TSRL, Kuszynski's role encompasses designing experimental studies, overseeing their precise execution, and analyzing and interpreting resulting data. Additionally, she also assists in grant writing, publication preparation, protocol development, and report generation to support TSRL's research initiatives and drive progress in drug development. Kuszynski works on a variety of projects at TSRL including a therapeutic to treat sepsis, a reversal agent for heparin, antibiotics, and microneedle delivery of various therapeutics. TSRL's research is focused on the safety and efficacy of the drug to de-risk the therapeutics before clinical trials.

The knowledge and insights Kuszynski has acquired at TSRL over the past two years since graduating have been profound. She has been able to immerse herself in the complexities of drug development, extending beyond mechanistic studies. Kuszynski now possesses a comprehensive understanding of the challenges involved in bringing a drug to market. Merely possessing an effective and safe drug does not guarantee its journey to market success. Beyond efficacy and safety, she has also learned that factors such as cost-effectiveness and market size play pivotal roles in determining the drug's viability and accessibility to patients.

Kuszynski's experience as an EITS student instilled in her the fundamental principle that "the dose makes the poison." This concept underscores the critical importance of dosage in determining a substance's effects. While many drugs may be safe at low doses, achieving a wide enough therapeutic window is essential for developing a viable product. "I can't emphasize enough how often I find myself repeating the phrase "the dose makes the poison,"" commented Kuszynksi, "Thank you Dr. Goodman and Dr. Roth!"

Kuszynksi's ultimate career aspiration is to evolve into an independent principal investigator, leading SBIR-funded projects aimed at advancing drug development through preclinical research. While her heart remains deeply rooted in cardiovascular research, the versatile skills she has acquired empower her to navigate the drug development process across various therapeutic areas.

Sean Nguyen

Senior Staff Data Scientist, S2G Ventures
EITS Alumnus

At a glance:

Department: Cell & Molecular Biology

Mentor: Margaret Petroff

Dissertation:
"Placental Extracellular Vesicle Trafficking in Murine Pregnancy"

Defended: Summer 2020

Significant Achievements During Graduate School:

- Oral Presentation Gusdon Award, 3rd place, 2019, American Society for Reproductive Immunology
- Environmental Integrative Toxicological Sciences Travel Fellowship 2019, 2018, 2017, 2016, MSU Institute for Integrative Toxicology
- Thorp Travel Fellowship, 2018, Michigan State University College of Veterinary Medicine
- NIH Young Investigator Award, 2016, National Institutes of Health (IFPA Conference)
- MSU Cell and Molecular Biology Travel Fellowship, 2016, MSU Cell and Molecular Biology Program
- MSU Graduate Research Enrichment Research Fellowship, 2016, MSU Graduate School
- T32 Pharmacological Sciences Research Fellowship, 2016, MSU Department of Pharmacology and Toxicology

When Sean Nguyen's interest in science and experimentation was sparked by his undergraduate research at the University of Michigan Energy Institute, he knew he wanted to continue to further his education in the field. After earning his Bachelor of Science in Biological Sciences and Psychology from the University of Michigan Dearborn, Nguyen attended MSU to earn his Ph.D. in Cell and Molecular Biology with a dual major in Environmental & Integrative Toxicological Sciences. Nguyen trained with Dr. Margaret Petroff and completed his dissertation, "*Placental Extracellular Vesicle Trafficking in Murine Pregnancy*," in 2020.

Today, Nguyen is a Senior Staff Data Scientist at S2G Ventures, where their aim is to invest in startups within the food, agriculture, oceans, and energy sectors, with a vision towards fostering a healthier and more sustainable planet. Nguyen's responsibilities involve developing machine learning models and tools to effectively identify promising startups and identifying potential co-investors for S2G Ventures' portfolio companies. In this position, Nguyen is tasked with the critical job of enhancing the company's data infrastructure. This involves not only the collection of vast amounts of information but also its analysis and transformation into actionable strategies. The essence of Nguyen's work lies in handling diverse types of data; this includes historical financial transactions of companies, which offer insights into their financial health and trends, as well as network science relation graph data, which illustrates the intricate web of connections between various entities in the industry.

Utilizing this data, Nguyen's primary objective is to pinpoint strategic partners for S2G Ventures' portfolio companies. This task is pivotal as it involves sifting through complex datasets to identify those connections that can foster growth, collaboration, and innovation. Moreover, by synthesizing this information, Nguyen equips their investors with the knowledge and insights necessary to initiate and nurture these strategic partnerships.

This work aligns with Nguyen's overarching goal of leveraging his scientific and analytical skills, honed at MSU, to decipher complex data and generate impactful insights. Ultimately, his ambition is to contribute to transformative change by supporting the emergence of innovative startups. So far, Nguyen's role at S2G Ventures has been an extraordinary experience. Being the first to join the data science team, he had the unique opportunity to lay the groundwork for their technology and data infrastructure. This role has also allowed Nguyen to apply his advanced academic training during discussions on scientific matters with several of their portfolio companies, especially those operating within the realms of RNA, food regulation, and healthcare.

Nguyen believes his time as an EITS student was instrumental in shaping his career trajectory. Through the EITS program, Nguyen was fortunate to receive funding to participate in a workshop at The University of Cambridge. "This experience was pivotal, not only allowing me to focus on my dissertation work but also exposing me to the broader field of data science. It ignited my passion for pursuing a career in data science," commented Nguyen. In addition, the diverse range of research conducted by EITS students opened doors to numerous collaboration opportunities, enabling Nguyen to learn about innovative scientific methods and techniques. "This exposure has been invaluable in keeping me adaptable and informed about the latest advancements in artificial intelligence and machine learning," said Nguyen. "Remarkably, I continue to collaborate with colleagues from the EITS program, illustrating the lasting impact of these connections, even as we venture into different fields."

Brittany Winner

Consultant, Aclairo Pharmaceutical Development Group, Inc.
EITS Alumna

At a glance:

Department: Pharmacology & Toxicology

Mentor: John Goudreau

Dissertation:
"UCH-L1 as a Susceptibility Factor for Nigrostriatal and Mesolimbic Dopamine Neurons after Neurotoxicant Exposure and Aging"

Defended: Fall 2017

Significant Achievements:

» IIT NIEHS T32 Training Grant Trainee

Brittany Winner began college with the goal to become a forensic scientist to use analytical methods to solve crimes. After she had the opportunity to participate in undergraduate research in a Department of Defense funded cyanide project, she decided to shift her focus to pursue a career in toxicology so that she could help cure diseases. After earning her Bachelor of Science in Forensic Chemistry from Sam Houston State University, Winner attended MSU to earn her Ph.D. in Pharmacology and Toxicology with a dual major in Environmental & Integrative Toxicological Sciences. Winner trained with Dr. John Goudreau and completed her dissertation, "*UCH-L1 as a Susceptibility Factor for Nigrostriatal and Mesolimbic Dopamine Neurons after Neurotoxicant Exposure and Aging*," in 2017.

As a postdoctoral fellow, Winner developed countermeasures against botulinum neurotoxin and served as principal investigator to study the therapeutic potential of augmenting endocannabinoid signaling following nerve agent exposure at the United States Army Medical Research Institute of Chemical Defense. Prior to her position at Aclairo, Winner served as a technical specialist for a patent law firm and as a nonclinical consultant with another company.

Today, Winner is a consultant at Aclairo Pharmaceutical Development Group, which delivers independent and objective nonclinical and regulatory advice to the pharmaceutical industry. The company offers multiple decades of experience as industry scientists and strategists; FDA supervisors and reviewers; and operations specialists to integrate and solve the complexities in non-clinical pharmacology, toxicology, ADME, pharmaceutical, and cell and gene therapy development. Winner specifically works to advise companies on new drug development, from study design and data interpretation from nonclinical studies (pharmacology, pharmacokinetics/toxicokinetics, toxicology) to writing regulatory submissions and interacting with FDA and other regulators. These new drugs her company works to support in development represent an exciting opportunity to treat diseases including atherosclerosis, cancer, botulism, preeclampsia, depression, autoimmune diseases, and many more.

Winner's long term career goal is to become a Senior Consultant at the company where she could attract and retain her own clients from small, mid and large pharmaceutical companies. Her experience so far at Aclairo has exceeded her expectations and she has found herself growing exponentially as a toxicologist since joining the team. Winner found her time as an EITS student prepared her to think critically about mechanistic toxicology. She also found it invaluable to be able to learn from leaders in the field of toxicology – her professors in the program as well as speakers and guests of the program.

FACULTY FEATURES

The IIT is a leader in conducting diverse, interdisciplinary research, with over seventy affiliated faculty members who conduct toxicology-related research spanning investigations of environmental (air, water, soil), occupational, food-borne and pharmaceutical agents. These faculty are from twenty-two different academic departments across campus. Faculty research is primarily supported by federal agencies such as NIH, EPA, NSF and USDA as well as through partnerships with private industry. The research partnerships that MSU toxicologists have forged over the decades in conducting interdisciplinary research have been highly beneficial in the context of research productivity, education and service. This year we feature three faculty with various specialties across our program.

Syed Hashsham

Professor, Department of Civil & Environmental Engineering

When Syed Hashsham completed his Ph.D. at the University of Illinois at Urbana-Champaign, he was looking for a postdoctoral position where he could delve into the environmental aspects of his degree, specifically microbiology, toxicology and bioremediation. At that time, the Center for Microbial Ecology at MSU was at its peak and he admired the researchers leading the team there. He knew they could teach him microbial ecology first hand and was excited to accept a postdoctoral position with them at MSU. It was obvious to Hashsham during his travels at conferences around the world, that the Center for Microbial Ecology at MSU was well known and respected and that they had created a very niche vein of research that Hashsham wanted to continue to be a part of.

Hashsham accepted a professor position at MSU in ???? . He was excited to continue his work in an environment that valued collaborative research and joined the Center for Microbial Ecology as well as the MSU Superfund Research Program immediately. "Quote on getting to work with other researchers here."

Today Hashsham's research interests lie at the intersection of three closely related areas. First, he strives to understand how complex microbial communities work. Second, he works on the development of parallel detection tools for these microbial communities. And lastly, he works to develop and evaluate the processes relevant to environmental biotechnology. For complex communities (e.g., in bioreactors, gut, or environment), he studies the abiotic and biotic factors that makes a microbial system stable or unstable with respect to function and community structure. As part of projects funded by NIH, EPA, and MEDC to develop parallel detection tools, his team has developed a low cost handheld gene analyzer capable of quantifying genetic markers within 30 minutes. Projects related to development of processes relevant to environmental biotechnology encompass a number of activities ranging from studies focusing on chlorinated solvents, methanogenesis, and microbial corrosion. He is a co-investigator in the NIEHS Superfund Basic Research Center, EPA-DHS Center for Advancing Microbial risk Assessment, and NIH's Enterics Research Investigational Network.

Hashsham is Project Leader for Project 4, "*Design Principles and Field-Deployable Models for Economical Remediation of Dioxin-Contaminated Sites*," of the MSU Superfund Program. Some anaerobic bacteria are capable of breathing dioxins. Hashsham's project aims to leverage this capability to develop integrated methods for economical clean-up of dioxin-contaminated sites. Key goals of the project include reduction in time to clean-up and toxicity, development of biomarkers indicative of the rates, and establishment of decision-making tools. Hashsham is working to apply his research into mathematical models that can then be used to predict or make decisions. "We are working to actually predict the dioxin respiration and the remediation mathematically," explained Hashsham. "For example, if we are able to remove a specific dioxin, what is the effect on human health? How many people will then not be exposed to the dioxin and therefore what will be the benefit in terms of human health? Those are very quantitative tools." Collaborating with other Superfund project groups, Hashsham then hopes to use these mathematical models to predict toxicity and bioremediation for other toxins in the environment.

In the next five years, Hashsham hopes to develop even more sensitive tools to measure the slow respiration process of toxins. The kind of tools that can measure respiration over decades instead of days. Hashsham sees a need for this kind of research and development because often tools are developed but then never refined. He hopes to push the boundaries of what scientists think can be measured in the future.

Kin Sing Lee

Assistant Professor, Department of Pharmacology & Toxicology

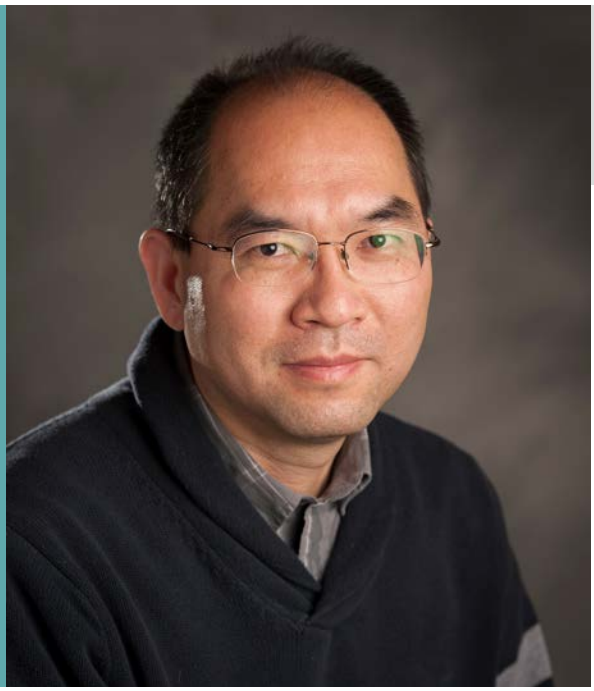
By the last year of his undergraduate degree at Hong Kong University of Science and Technology, Kin Sing Stephen Lee began to be intrigued by research. His undergraduate supervisors were studying a molecule called poryphyrin, a key cofactor in the body, trying to see if they could use this molecule in a therapeutic application for the treatment of disease. This is when Lee became interested in designing chemicals to have biological applications to benefit human health. After earning a Ph.D. in Chemistry at MSU, Lee did his postdoctoral work at the University of California at Davis in Medicinal Chemistry and Chemical Biology. At his final postdoctoral fellowship at the National Academy of Science Fellows, Lee began to dive into his current research focus, how lipid metabolism affects human health.

When Lee began looking for faculty positions, MSU was never far from his mind. The position he accepted perfectly matched his goals for the future – a mix of chemical biology and drug discovery. Having completed his Ph.D. here at MSU, he also knew the collaborative environment he would be welcomed into as a faculty member. "I enjoy the overall very collaborative environment around campus," commented Lee. "I have established multiple collaborations across different disciplines within MSU and value these relationships for unparalleled technology access, specifically the Mass Spectometry and Metabolomics Core here at MSU."

Today, Lee's research focuses on using chemical biology methods to study the interactions between dietary lipids (what we eat), environmental chemicals (what we are exposed to) and human health (our body) at a molecular level. Lee and his laboratory are particularly interested in studying the molecular mechanisms on how the dietary omega-3 (DHA or EPA) to omega-6 (e.g. soybean oil) ratio affects human health and human responses to environmental toxicants. It has been shown that these fatty acids affect human health partly through their metabolites and one of the major metabolites derived from the dietary lipids is the corresponding epoxides. Both omega-3 and omega-6 fatty acid epoxides are potent signaling molecules and play an important role in inflammation, blood pressure regulation, pain perception and angiogenesis. However, how they initiate their biological effects remain unknown.

Currently, Lee and his team have three research programs they are using to elucidate the mechanism on how omega-3 and omega-6 PUFA metabolites affect human physiology. First, Lee is using chemistry to design a chemical probe to help them better understand how specific lipid metabolites in the body affect neurodegenerations using C. elegans, a tiny worm, to study the mechanism. The second program leverages the analytical panel they have established in their laboratory that is capable of measuring over 120 different lipid metabolites in the body. They hope to use this platform to identify biomarkers for different diseases focusing specifically on neurodegenerative and autoimmune diseases. Comparing lipid profiles of healthy vs diseased tissue and then monitoring disease progression to develop biomarkers is the main goal of this arm of the program. Lastly, Lee and his team are leading a drug discovery program where they hope to design and synthesize inhibitors of lipid metabolites. Their hope is this work can lead to treatments for Alzheimer disease and other neurodegenerative diseases one day.

Looking forward, Lee and his team hope to develop a clinical drug candidate within the next several years. They look forward to starting some pre-clinical testing on the inhibitors they are currently working on so they can keep moving in the direction of creating treatments to help Alzheimer disease patients. Lee also hopes to continue to develop a higher understanding of the fundamentals of the disease's progression. They hope to leverage the technology and research programs they have already developed to take their knowledge of current lipid triggers and apply these biomarkers to other neurodegenerative diseases, autoimmune diseases, as well as cancer, to help develop new therapeutics and treatments. Lee's laboratory is also working to develop high throughput screening models using a newly developed assay based off their current research. The goal would be to use these models to test other potential therapeutic drugs for neurodegenerative and genetic diseases.



Hui Li

Professor, Department of Plant, Soil and Microbial Sciences

When Hui Li decided to pursue graduate school in the United States, he knew he had an interest in chemistry but wanted something more interdisciplinary and ended up choosing environmental chemistry. After earning his Ph.D. at Purdue, Li came to MSU for his postdoctoral work and started to delve specifically into the area of soil chemistry, a research expertise he was excited to pursue because of its challenges. Happy to continue working with other environmental researchers on campus, Li took a permanent faculty position at MSU in the field of emerging contaminants in agricultural systems.

Today, Li's overall research goal is to advance science and develop technology to improve sustainable agriculture by minimizing the impacts of harmful chemicals in soils. As a soil chemist, his approach has been to develop fundamental knowledge regarding the transformation, retention and mobility of harmful chemicals in soils at the molecular scale and to determine their impacts at the field scale. He seeks to develop management practices that modulate the flux of unwanted chemicals into soils in order to achieve more sustainable agricultural systems and hence improve food safety while minimizing chemical impacts to the ecosystem and human health.

When Li began as a tenure-track assistant professor at MSU, he collaborated with other environmental and soil chemists, most notably Dr. Stephen Boyd and Dr. Brian Teppen at MSU and Dr. Cliff Johnston at Purdue University, and made significant advances in understanding the fundamental molecular-scale science of organic contaminant sorption by soil clay minerals and carbonaceous materials including soil organic matter. They utilized a combination of complimentary approaches including thermodynamic measurements, spectroscopic analysis and computational chemistry to reveal the basic mechanisms of interaction between organic contaminants/pesticides and soil geosorbents. Their results have been published in over 50 peer-reviewed articles in premier journals. The research approach has now been extended to elucidate sorption and transformation mechanisms of pharmaceuticals and personal care products (PPCP) in soils. The knowledge, collaboration and research approach developed and demonstrated by Li and the environmental soil chemistry team at MSU provided the essential expertise needed to successfully compete for three consecutive awards from the NIEHS Superfund Research Program (SRP) beginning in 2006 with a specific focus on dioxins.

Li has also initiated a new research area on emerging contaminants in the environment. He investigated physical and chemical processes governing the fate and impacts of emerging contaminants in natural and engineered environments. Working with Tiedje, they developed a new line of research to link the environmental chemistry of antibiotics with their bioavailability to bacteria for the development, preservation and proliferation of antibiotic resistance in agroecosystems.

After Li was promoted to associate professor with tenure, he worked with Dr. Ray Hammerschmidt and Dr. Wei Zhang to initiate research on the plant uptake of PPCP from soil and water. This team was among the first to study plant uptake of PPCP from soils, and developed several analytical methods to quantify PPCP in soil, water, plant and biosolids using the state-of-the art analytical equipment, i.e., LC-MS/MS, to quantify trace levels of PPCP in these complex media. Their research demonstrated that soil pore water is the major carrier that moves PPCP from soils to plant roots. The molecular size of pharmaceuticals plays an important role in influencing their transport via the plant transpiration stream. They have published over 20 peer-reviewed papers on this topic, and secured several USDA-NIFA AFRI competitive grants to support this and other related research.

Recently, the focus of Li's research program on emerging contaminants moved to the ubiquitous group of per- and polyfluoroalkyl substances (PFAS) in agriculture. In the past several years, his research program has been awarded over 2.5 million dollars from EPA and USDA competitive grants to investigate the sources, fate, plant uptake and potential risks of PFAS in agricultural environments and crop produce. Li and his team are developing strategies to mitigate PFAS accumulation in agricultural products. The research program in his laboratory is progressing from the fundamental molecular-scale studies on the fate of these harmful chemicals in agricultural environments to more applied research at the field scale aimed at mitigating their adverse impacts.

During his tenure at MSU, Li's laboratory has conducted cutting-edge research and advanced the fundamental knowledge in the analysis, plant uptake, sorption, transformation, bioavailability and environmental remediation of both emerging and legacy contaminants. He has found his collaborations on campus invaluable to the development of his research and feels lucky to have made MSU his home.

FACULTY PUBLICATIONS

During 2023, 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, 2023 to December 31, 2023.

Eran R. Andrechek

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Greg M. Swain

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Brian J. Teppen

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Neera Tewari-Singh

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James M. Tiedje

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Bruce D. Uhal

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James G. Wagner

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Timothy R. Zacharewski

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FACULTY PROFESSIONAL SERVICE

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 activites below are for the calendar year of 2023.

Bernard, Matthew P.

- International Society for the Advancement of Cytometry (ISAC) SRL Content Subcommittee Member

Bhattacharya, Sudin

- Editorial Board member, Scientific Reports

Bourquin, Leslie D.

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

Buchweitz, John P.

- Executive Committee Board Member, American Board of Toxicology

Burgoon, Lyle D.

- Vice President-Elect, Ethical, Legal, Forensic, Social Implications Specialty Section, SOT
- Associate Editor, Frontiers in Genetics
- Associate Editor, Frontiers in Toxicology

Carignan, Courtney C.

- Joan M. Daisey Outstanding Young Scientist Award, International Society of Exposure Science
- Editorial Board, Journal of Exposure Science and Environmental Epidemiology
- Organizing Committee, International Society of Exposure Science

Annual Meeting

- Chair, Fourth National Conference on Per- and Polyfluoroalkyl Substances
- Scientific Advisor, Agency of Toxic Substances and Disease Control Registry, Community Assistance Panel for Pease Tradeport
- Environmental Health Research and Surveillance Guidance Panel, Michigan Department of Health and Human Services

Chen, Honglei

- Editorial board, Neurotoxicology
- Committee Member, Environmental Risk Factors of Parkinson's Disease, Michael J Fox Foundation

Copple, Bryan L.

- Associate Editor, Frontiers in Pharmacology
- Study section member, Hepatobiliary Pathophysiology (HBPP)

Doseff, Andrea I.

- Director, Post-baccalaureate Graduate Program SiGuE (Success in Graduate Education)
- Associate Editor, Journal of Pharmacology and Therapeutics
- Associate Editor Journal of Medicinally Active Plants
- Associate Editor Nutrients, Section Phytochemicals for Health
- Associate Editor Frontiers in Immunology
- 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
- National Science Foundation study section
- American Heart Association study section
- Organizer member of the 12th American Council for Medicinally Active Plants (ACMAP) Meeting. Rutgers, New Jersey

Ewart, Susan L.

- National Institutes of Health Special Emphasis Review Panel/Scientific Review Group 2023/05 ZRG1 EMS-K (50) R reviewer, March 2023
- National Institutes of Health; ZAI1 TC-D (S1) NIAID Research Education Program Advancing the Careers of a Diverse Research Workforce (R25), reviewer and committee chairperson, July 2023
- National Institutes of Health; ZAI1 TC-D (J1) NIAID Research Education Program Advancing the Careers of a Diverse Research Workforce (R25), reviewer and committee chairperson, November 2023

Goodman, Jay I.

- Fellow, Academy of Toxicological Sciences
- Diplomate, American Board of Toxicology

Goudreau, John J.

- Editorial Board, NPJ Parkinson's Disease
- NIH Study Sections: Chair, Music and Health, ZNS1 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 11
- Executive Committee, Secretary/Treasurer, National Board of Osteopathic Medical Examiners
- Mentoring Committee, Parkinson Study Group

Gulbransen, Brian D.

- 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 Signalling, 2020 – present
- Editorial Board Member, Cellular and Molecular Gastroenterology and Hepatology (CMGH), 2022 – present
- NIH, Regular Member, NIDDK DDK-C panel – Career development awards

Harkema, Jack R.

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

Jackson, James E.

- Member, American Chemical Society
- Member, National Academy of Inventors
- Vice Chair, Brownfield Redevelopment Authority, Meridian Township, MI

Jones, A. Daniel

- Review Editor, Frontiers in Plant Metabolism and Chemodiversity

Kaminski, Norbert E.

- External Review Committee for the Interdisciplinary Program in Toxicology at Texas A&M University
- Member, National Academy of Sciences, Committee on the Use of Emerging Science for Environmental Health Decisions
- Member, Joint Committee for NSF/ANSI Standard 500 GRAS-PAS Ingredient Review
- Member, Board of Directors, Toxicology Forum

- Editorial Board, Toxicology

Lee, Kin Sing

- Reviewer: Journal of Medicinal Chemistry, Journal of Fluorine Chemistry, ChemMedChem, ACS Neuroscience, Journal of Proteome Research, Bioorganic and Medicinal Chemistry Letter

Leinninger, Gina M.

- Ad hoc Reviewer in Past Year: Appetite, Current Biology, Neuron, Neuropharmacology, Obesity, Progress in Neurobiology
- Society Service: The Obesity Society Annual Program Committee, The Society for the Study of Ingestive Behaviors Program Committee, American Physiological Society - Awards Committee, Michigan Diabetes Research Center-Grants Program Advisory Council
- Abstract Reviewer: The Obesity Society, The Society for the Study of Ingestive Behaviors
- Grant Reviewer: NIH - Pathophysiology of Obesity and Metabolic Diseases (Standing Member); Michigan Diabetes Research Center Grants Program
- Editorial Board, Neuropeptides

Li, Hui

- Guest Editor, Special Issue of PFAS in Agroecosystems—Sources, Impacts, and Opportunities for Mitigating Risks to Human and Ecological Health, Journal of Environmental Quality
- Guest Editor, Special Issue of Antibiotics and Antibiotic Resistance Genes in the Agro-Environment: Fate, Risk and Control for Environment International

Liby, Karen T.

- Editorial Board, AACR Cancer Prevention Research
- Editorial Board, Scientific Reports
- Editorial Board, Carcinogenesis
- Member, PREVENT Program Scientific Review Panel
- Member, AACR Cancer Prevention Steering Committee
- Member, Education Committee for the AACR Annual Meeting
- Member, DOD Lung Cancer Research Program Review Panel
- Reviewer, NCI Predoctoral to Postdoctoral Fellow Transition Award (F99/K00)
- Reviewer, NIH Cancer Prevention (CPSS) Study section
- Reviewer, NIH Maximizing Opportunities for Scientific and Academic Independent Careers K99/R00 Review Panel
- Reviewer, NIH SEP Workforce Diversity in Cancer Biology and Drug Discovery R21 Panel

Luyendyk, James P.

- Secretary, Society of Toxicology
- Editorial Board, Journal of Thrombosis and Haemostasis

Mansfield, Linda S.

- Albert C. and Lois E. Dehn Endowed Chair, Michigan State University
- University Distinguished Professor, Michigan State University

McCabe, Laura R.

- FASEB Science Policy Committee Member
- Federal Demonstration Partnership: Foreign Influence Work Group Member, Faculty Executive Committee Member
- NIH Grant Reviewer

Mazei-Robison, Michelle

- Catecholamine Society, Treasurer
- HHMI Gilliam Fellowship Review Panel
- NIH Study Section (NIEHS: ZES1 VSM-S (PD), NIDA: ZDA BSW-N (A1) and ZDA1 SKP-D (M1))
- Scientific Reports, Editorial Board

Medina Meza, Ilce G.

- Editorial Board, Food Research International
- Chair-Elect, Food Engineering Division, Institute of Food Technologist (IFT)

Murphy, Cheryl A.

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

Paneth, Nigel S.

- 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
- Associate Editor, Progress in Neurobiology
- NIH Study Sections
- NIH ZMD1 Special Emphasis Panel, NIMHD Centers of Excellence in Investigator Development and Community Engagement, P50, February 2023, ad hoc
- NIH Research Centers in Minority Institutions (RCMI), U54, June 2023, ad hoc
- NIH Molecular Cellular Neuropharmacology (MCNP), October 2023, Standing Member

Rosenman, Kenneth D.

- 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, Workers' Compensation Research Institute Michigan Advisory Committee

Roth, Robert A.

- 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, J. Craig

- US EPA Board of Scientific Counselors ad hoc panel on EPA Transcriptomic Assessment Product (ETAP)
- Board of Directors, Johns Hopkins University, Center for Alternatives to Animal Testing (CAAT)
- Texas A&M University Interdisciplinary Faculty of Toxicology T32 NIEHS Training Program In Regulatory Sciences
- 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.
- American National Standards Institute (ANSI) Standardization Roadmap For Additive Manufacturing, Working Group 5 (WG5) Finished Material Properties

Strakovsky, Rita S.

- 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
- Past 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
- Committee on Research and Graduate Studies for the College of Osteopathic Medicine, Michigan State University
- 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
- Treasurer/Secretary, Michigan Chapter of the Society of Toxicology

Tiedje, James M.

- Science Advisory Committee, Denmark's CENPERM (Cntr 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
- 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

Trosko, James E.

- Scientific Advisory Board Member, Kangstem Biotech, Seoul, Korea
- Keynote Lecturer, International Colloquium on Gap Junctions and Cancer, "Cellular Communication, Carcinogenesis and Targeted Interventions," Sao Paulo, Brazil
- Lecturer, University of Chungbuk, South Korea, Bio-Pride LMS, Chungbuk Bio-Health Innovation Industry Center

Upham, Brad L.

- Reviewer/Panel Member, NIH, Fellowship Review Panel: Cell Biology,

Developmental Biology, and Bioengineering

Wagner, James G.

- Chairperson, NIEHS Special Emphasis Panel, Career Development (K99/R00, K01, K08, K23)
- Associate Editor, Inhalation Toxicology
- Editorial Board, Particle and Fibre Toxicology
- Member, Health Effects Institute Planning Committee, State of Science for Particulate Matter Health Effects
- Member, Committee for Threshold Limit Values for Chemical Substances (TLV-CS); American Conference of Governmental Industrial Hygienists (ACGIH)

Wu, Felicia

- Named University Distinguished Professor
- Appointed Commissioner of Agriculture and Rural Development for the State of Michigan
- 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), Member and WHO Temporary Advisor to 96th JECFA evaluation of aspartame
- Commissioner of Agriculture and Rural Development, Michigan (appointed by Governor Gretchen Whitmer)
- 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
- Institute for the Advancement of Food and Nutrition Sciences, Scientific Leadership Council

Zacharewski, Timothy R.

- Editorial Board, Toxicology & Applied Pharmacology
- Standing Member, Environmental Determinants of Disease (EDD) Study Section
- Advisor - eSTAR Carcinogenomics Gene Signature Development Committee, Health and Environmental Sciences Institute (HESI)

Zagorski, Joseph W.

- Junior Councilor, Mechanisms Specialty Section of SOT
- Program Planning Committee, Toxicology Forum
- Review Editor, Frontiers in Toxicology – Immunotoxicology

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 environment”, in Frontiers in Microbiology
- Committee Member, AGU Unsaturated Zone Technical Committee

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, Neuroscience Program

Jamie J. Bernard, Associate Professor, Pharmacology & Toxicology

Matthew P. Bernard, Associate Professor, Pharmacology & Toxicology

Sudin Bhattacharya, Associate 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 Clincial 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 I. 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

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 Clincial Sciences and Director, Center for Comparative Epidemiology

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

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, Adjunct 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

James G. Sikarskie, Professor Emeritus, Small Animal Clinical Sciences

Rita S. Strakovsky, Associate Professor, Food Science & Human Nutrition

Greg M. Swain, Professor, Chemistry

Brian J. Teppen, Professor, Plant, Soil & Microbial Sciences

Neera Tewari-Singh, Associate 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

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

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

Institute for INTEGRATIVE TOXICOLOGY

Michigan State University
1129 Farm Lane
Food Safety and Toxicology, Rm 165
East Lansing, MI 48824

517.353.6469
tox@msu.edu