INSTITUTE FOR INTEGRATIVE TOXICOLOGY

IIT Affiliates Recognized at 64th SOT Meeting in Orlando, Florida

Students and faculty of the MSU Institute for Integrative Toxicology were excited to attend and present at this year's 64th annual Society of Toxicology (SOT) meeting held in Orlando, Florida.

The SOT annual meeting brings together 5,000 plus toxicologists and those working in areas related to toxicology to share the latest science and technology in the field, as well as to make new connections, gather with friends, and engage in mentoring and professional development. This year's meeting was held March 16-20, 2025.

The following students affiliated with IIT received recognition:

» Saamera Awali, training with Dr. Cheryl Rockwell, received the Immunotoxicology Specialty Section (ITSS) HESI Immunotoxicology Young Investigator Travel Award and the ITSS Best Presentation by a Student Award for her abstract, "The Nrf2 activator, tBHQ, blunts dendritic cell function upon influenza A infection."

- » Brianna Finn, training with Dr. Norbert Kaminski, won the Out Toxicologists and Allies (OTA) Graduate Student Achievement Award, the Immunotoxicology Specialty Section (ITSS) Best Student Presentation Award, and the In Vitro and Alternative Methods Specialty Section (IVAMSS) Best Poster Award. Finn's abstract was, "Effects of cannabis use on inflammasome formation and IL-1β secretion in monocytes derived from HIV+ individuals: Implications for immune modulation in HIV-associated systemic inflammation."
- » Samantha Musso, training with Dr. Jamie Bernard, received the Mechanisms Specialty Section Sheldon D. Murphy Student Endowment Award, first place for the CSS Environmental Carcinogenesis Merit Award for Graduate Students, and third place for the Clinical and

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Translational Toxicology Specialty Section Graduate Student Award for her abstract, "A Novel Role of Fibroblast Growth Factor-1 Modulation on the Enhancement of Kynurenine Uptake in an In Vitro Model of Estrogen Receptor Positive Tamoxifen Resistant Breast Cancer."

- » Ebenezar Okoyeocha, training with Dr. Neera Tewari-Singh, received the Early Career Award from the Ocular Toxicology Specialty Section for his work with Dr. Singh developing a novel model of the eye to quantify corneal injuries. Okoyeocha's abstract for the meeting was, "Loss of Nuclear Factor Erythroid 2-related Factor 2 Modulates Chloropicrin Induced Inflammatory Response in the Corneal Tissue."
- » Andrew Roney, training with Dr. Neera Tewari-Singh, received the SOT Dermal Toxicology Specialty Section Edgewell Personal Care Student Award for excellence in research relating to dermal toxicology for his abstract, "Investigation of Inflammatory Cytokines in the Long-term Toxicity Induced by Acute Cutaneous Nitrogen Mustard Exposure."

And lastly, IIT-affiliated faculty member Dr. Karilyn Sant was appointed to serve as Co-Chair on SOT's Career Advancement, Mentoring, and Networking Committee (CAMAN). Dr. Sudin Bhattacharya was also apppointed as a member of CAMAN. Congratulations to all the IIT-affiliated SOT award winners this year!

Clockwise from top: EITS graduate student Brianna Finn with IIT Director Dr. Norbert Kaminski, EITS graduate student Andrew Roney, EITS graduate student Samantha Musso, EITS graduate student Ebenezar Okoyeocha, and EITS graduate student Saamera Awali.







Two EITS Students Receive Awards

Two Environmental and Integrative Toxicological Sciences (EITS) graduate students, Joel Marty and Jacob Reynolds, recently received prestigious awards from their respective departments and colleges.



Joel Marty, training with Dr. Norbert Kaminski, received the Eleanor L. Gilmore Endowed Excellence Award from the Microbiology, Genetics and Immunology Department. The award was established by Eleanor L. Gilmore, class of 1943, to benefit research and scholarships in the Department of Microbiology and Public Health in the College of Natural Science. The intent of this endowed fund is to

encourage and support excellence in research by students and faculty. Marty's research investigates the contribution of CD8+ T cells to chronic inflammatory conditions associated with HIV infection, and how these responses can be modulated with tetrahydrocannabinol (THC) treatment. The CD8+ T cell population can promote inflammation through interactions with other immune cells and resident cells of the central nervous system, including astrocytes. The goal of this research is to improve the understanding of CD8+ T cells and their interactions with other cells on neuroinflammation associated with chronic HIV infection and THC-mediated suppression of systemic inflammation.



Jacob Reynolds, training with Dr. Brian Johnson, received the Outstanding Graduate Student Award from the College of Engineering. This annual award recognizes the most outstanding graduate student from each doctoral program in the college. Reynolds was selected by faculty within his program of Biomedical Engineering and will recieve a \$1,000 stipend, certificate and medal to be

worn at graduation. Reynolds' research focuses on engineering and applying new approach methods to facilitate drug and chemical testing. His thesis work has centered around applying a cellular model of orofacial development to help study disruption of the Sonic Hedgehog signaling pathway in the context of orofacial cleft formation.

Luyendyk Appointed College of Veterinary Medicine's Associate Dean for Research & Graduate Studies



IIT-affiliated faculty member Dr. **James Luyendyk** was recently named the College of Veterinary Medicine's Associate Dean for Research and Graduate Studies, effective May 1, 2025. In his new position Luyendyk will lead the College's research initiatives, support faculty in securing funding, and strengthen partnerships with funding agencies and collaborators.

Luyendyk is a professor and Albert C. and Lois E. Dehn Endowed Chair in Veterinary Medicine in the Department of Pathobiology and Diagnostic Investigation, where his work focuses on identifying novel mechanisms whereby the coagulation cascade contributes to liver disease pathogenesis. Specifically, Luyendyk's laboratory focuses on mechanisms of hepatotoxicity and liver repair/regeneration, with an emphasis on how components of the blood clotting system participate in acute liver injury and chronic liver disease.

After earning his Ph.D. in Pharmacology and Toxicology with a dual major in Environmental Toxicology from the IIT's EITS graduate training program in 2004, Dr. Luyendyk conducted his postdoctoral training at the Scripps Research Institute in La Jolla, California, studying immunology and hemostasis. He then began his career in academia, first at the University of Kansas Medical Center as an Assistant Professor and thereafter joining the Michigan State University faculty as an Associate Professor.

Since that time, Luyendyk has published more than 135 peer-reviewed papers and earned recognition from leading scientific organizations. He currently serves as Vice President-elect of the Society of Toxicology, Co-chair of the International Society on Thrombosis and HISTH SSC Subcommittee on Hemostatic Management of Patients with Liver Disease, and Councillor for the International Fibrinogen Research Society. His contributions to the field have been recognized with numerous awards, including the Society of Toxicology Achievement Award and election as a Fellow of the Academy of Toxicological Sciences.

Congratulations to Dr. Luyendyk on being selected for this prestigious position!

Dr. Yun Liang Joins IIT-Affiliated Faculty



The IIT is pleased to welcome Dr. Yun Liang as an affiliated faculty member. Dr. Liang is an assistant professor in the Department of Physiology and the Department

of Pharmacology and Toxicology. She received her B.S. in Biological Sciences in 2007 from Tsinghua University. Liang completed her Ph.D. in Biological Sciences from University of California San Diego and the Salk Institute for Biological Studies in 2013. She completed her postdoctoral training in 2018 at the University of Michigan.

Dr. Liang's research is focused on understanding the pathogenic mechanism of autoimmune diseases. Many autoimmune diseases feature increased prevalence in females (~78% female overall and up to ~95% female for specific diseases). However, the disease can be more severe in male patients. Dr. Liang and her laboratory aim to understand fundamental differences in the immune system between males and females to ultimately find prevention and treatment options for chronic inflammation and autoimmunity. Studies indicate that both genetic and environmental factors contribute significantly to autoimmune pathogenesis. Recent findings in Liang's lab suggest that toxic chemicals such as benzo[a]pyrene cause molecular changes that may help explain the increased risk of end organ damage in autoimmune diseases. Liang and her team are actively looking for ways that can prevent or reverse the immunological damages caused by environmental toxicants.

To learn more about Dr. Liang, please visit: <u>https://iit.msu.edu/di-</u> rectory/liang-yun.html. **◊**

IIT Wraps Up Spring Seminar Series 2025

The IIT was delighted to once again host the IIT Seminar Series this spring with three exciting seminars including the 4th Annual Jerry Hook Distinguished Lectureship.

The series began with Dr. Matthew Campen, University of New Mexico, on January 21. He spoke on, "Neuroplastics." The global burden of plastics waste is progressively degrading into micro- and nanoplastics that have the potential to access the human body and alter health. Campen and his team have used several methods to identify and quantify plastic content in the human body, highlighting a preferential uptake into the human brain that is increasing over time. Campen's presentation provided a new benchmark for the concentrations in the human body and discussed research needs to improve upon this body of knowledge.

On April 15 the IIT hosted Dr. Karina Orlowska, MSU, who spoke on, "Generation and Evaluation of an Inducible Hepatocyte-Specific AhR Knockout Model to Investigate TCDD-Elicited Hepatic Effects." Orlowska is a postdoctoral research associate training with Dr. Timothy Zacharewski and works with the MSU Superfund Research Center. Her research focuses on elucidating the underlying mechanisms of action of environmental contaminants in order to better understand their effect



on liver metabolism.

The 4th Annual Jerry Hook Distinguished Lectureship was given by Dr. **Christopher Bradfield** on May 20. Bradfield is a Professor of Oncology at the McArdle Laboratory for Cancer Research at the University of Wisconsin–Madison, where he is also a member of the UW Carbone Cancer Center's Genetics Program and serves as the Director of UW Biotechnology Center. Bradfield's laboratory is internationally recognized for its pioneering work on the PAS family of sensor proteins, which play crucial roles in environmental sensing and

regulation of physiological processes such as xenobiotic metabolism, circadian rhythms, and angiogenesis. His research has significantly advanced understanding of how environmental contaminants like dioxins, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) interact with the aryl hydrocarbon receptor (AhR) and related pathways to influence cancer risk and other diseases. The Distinguished Lectureship is held annually by the Institute for Integrative Toxicology in memory of Dr. Jerry Hook. Hook was a very well-known and highly respected pharmacologist and toxicologist who was critical in advancing the field of toxicology by helping to drive it from observational to a mechanism-based science. 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 toxicology issues. Jerry's achievements were the foundation for the CET to develop into today's Institute for Integrative Toxicology.

Photo: Dr. Christopher Bradfield was the 4th Annual Jerry Hook Distinguished Lectureship speaker shown here with IIT Director Dr. Norbert Kaminski.

MSU Superfund Research Center News



Above: Instuctors and graduate students participating in the Introduction to PBTK/PBPK Modeling Workshop at MSU on May 4 - 6, 2025.

MSU SRC Hosts Introduction to PBTK/PBPK Modeling Workshop

The MSU SRC recently hosted the Introduction to Physiologically Based Toxicokinetic (PBTK) / Pharmacokinetic (PBPK) Modeling Workshop on May 4 - 6, 2025 on Michigan State's campus. Course instructors were Sudin Bhattacharya from Michigan State University, Qiang Zhang from Emory University, and Eberhard Voit from the University of Texas at Dallas.

The workshop was attended by 12 students and covered the principles of physiologically based toxicokinetic (PBTK) or pharmacokinetic (PBPK)

Featured Publication

modeling and introduced the application of this technique in chemical health risk assessment. Upon completion of the workshop, students learned how to:

- » Understand the fundamental concepts underlying PBPK modeling
- » Describe the absorption, distribution, metabolism, and elimination of chemicals using mass balance differential equations
- » Build PBPK models to simulate tissue dosimetry using Berkeley Madonna
- » Appreciate the application of PBPK models in human health risk/safety

assessment including New Approach Methodologies (NAMs)

The workshop comprised lectures and hands-on computer exercises in R and was a collaborative effort between the Computational Modeling Core, the Research Experience and Training Coordination Core, and the Data Management and Analysis Core of the NIH-funded MSU Superfund Research Center.

An ongoing research collaboration between MSU Superfund **Project 4**, "Design Principles and Field-Deployable Models for Economical Remediation of Dioxin-Contaminated Sites," and **Project 5**, "Bioavailability as a Central Concept in Determining Remediation Goals and Strategies for PCDD/F-Contaminated Superfund Sites," led to the recent publication, "Comprehensive model for predicting toxic equivalents (TEQ) reduction due to dechlorination of polychlorinated dibenzo-p-dioxin and dibenzofurans (PCDD/F congeners)," in the Journal of Hazard Mater.

View the full article: <u>https://pubmed.</u> ncbi.nlm.nih.gov/39276747/

McCabe Named AAAS Fellow



IIT-affiliated faculty member Dr. **Laura McCabe** was recently recognized as a 2024 fellow of the American Association for the Advancement of Science (AAAS).

She was one of four MSU researchers chosen for the honor. AAAS — pronounced "triple-A-S" — is the world's largest general scientific society, which recognizes distinguished individuals as fellows for their contributions to science and society. The 2024 cohort includes more than 470 scientists, engineers and innovators.

McCabe is an MSU Foundation Professor in the Departments of Physiology and Radiology and is also the Associate Vice President of Research Regularity Support at the Office of Research and Innovation. McCabe's research focuses on exploring the mechanisms regulating bone cell differentiation and bone formation and developing new strategies for the prevention and treatment of osteoporosis. Her recent innovative endeavors in the manipulation of intestinal health for improved bone health are promising not only for patients with osteoporosis but also for animal health (especially the feed industry). McCabe was elected as a fellow thanks to this work and more, being honored for distinguished contributions to understanding the role the gut and microbiome have on bone health and for strong science advocacy on regulatory policy.

McCabe obtained a Ph.D. at the University of Chicago in 1991. Her commitment to MSU spans more than two decades, including as the associate chair in the Department of Physiology from 2011 to 2013 and director of the Molecular Metabolism and Disease Program from 2013 to 2017, and she established and led the Beckman Undergraduate Scholar Program from 2014 to 2018.

McCabe's research has generated an outstanding body of work, with critical contributions to more than 90 peer-reviewed articles and numerous book chapters. Numerous scientific symposia have benefited from her organizational leadership, and she has been a frequent advisor on a wide range of grant review boards and committees both here and abroad. She holds several patents and has a number of pending patents related to the treatment of osteoporosis. Her internationally recognized research program has been continuously funded for nearly 20 years through external federal agencies, including the National Institutes of Health, National Science Foundation, the U.S. Department of Defense, and a number of private foundations.

Li Receives William J. Beal Outstanding Faculty



IIT-affiliated faculty member Dr. Hui Li was selected as one of ten MSU faculty to receive the William J. Beal Outstanding Faculty Award in 2025. William J. Beal

Outstanding Faculty Awards are made each year to members of the

faculty for outstanding total service to the University. Each college making nominations for the award has its own detailed criteria and methods for nomination. The nominations are based on teaching; advising; research; publications; art exhibitions; concert performances; committee work; public service including extension, continuing education and work with government agencies; or a combination of these activities. Final selection of William J. Beal Outstanding Faculty

Award winners is made by an All-University Awards Committee appointed by the President.

Li is a professor in the Department of Plant, Soil and Microbial Sciences as well a co-investigator on Project 5 of the MSU Superfund Research Program. Dr. Li's research expertise is in the area of environmental soil chemistry, and the fate and transport of contaminants in plant-soil-water systems.



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Recent EITS Graduates



Jessica Moerland

Pharmacology and Toxicology Mentor, Karen Liby

Dr. Jessica Moerland received her Ph.D. after completing the dual major program in Pharmacology and Toxicology and Environmental Toxicology. Her dissertation was, *'Pharmacological Nrf2 Activation Reprograms the Immune Microenvironment and Decreases Tumor Burden in KRAS-driven Lung Cancer,.'*

Moerland is now a postdoctoral fellow in Dr. Melissa Fishel's laboratory at the Indiana University Melvin & Bren Simon Comprehensive Cancer Center in Indianapolis. The Fishel lab studies pancreatic ductal adenocarcinoma (PDAC), which is a hypercoagulative disease. Moerland's project specifically focuses on how elements of the coagulation cascade facilitate PDAC progression and metastasis, and how these pathways can be targeted pharmacologically. The goal of this project is to modify the microenvironment to reduce both primary and metastatic tumor burden as well as potentiate patient response to standard of care anticancer treatment.



Above: Congratulations to recent EITS graduates (from left): Dr. Jess Moerland, Dr. Nat Ato Yawson, Dr. Romina Gonzalez-Pons and Dr. Rachel Bauer. Graduate articles on the last three will be in our next edition of the newsletter when they have decided on next steps. *Photo credit: MSU Pharmacology & Toxicology*

IIT Welcomes New EITS Students

The IIT is pleased to welcome several new students to the Environmental and Integrative Toxicological Sciences (EITS) multi-disciplinary graduate program. New students include:

» Dayita Banerjee Comparative Medicine & Integrative Biology *Mentor:* James Luyendyk



- » Nana Kwame Kwabi Boateng Pharmacology & Toxicology *Mentor:* James Luyendyk
- » Natalie Vredevoogd Pharmacology & Toxicology *Mentor:* Neera Tewari-Singh



» Cao Qinyuan

Plant, Soil and Microbial Sciences *Mentor:* Wei Zhang

To learn more about the research interests of our current EITS students, please visit: <u>https://iit.msu.edu/training/eits/current-students.html</u>.



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