IIT UPDATE

INSTITUTE FOR INTEGRATIVE TOXICOLOGY

December 2025

SRC Transitions Leadership Roles

Since 2005, Dr. Norbert Kaminski has directed the MSU Superfund Research Center. Taking the helm when the focus was on studying groundwater contaminants, Kaminski leaned into shifting the focus of the center to addressing dioxin contamination in Michigan's Tittabawassee River. Today, the MSU SRC's research focuses on the human health effects of dioxins and dioxin-like compounds (DLCs) and the remediation of contaminated Superfund sites. Kaminski will continue this work as a Project Co-Investigator and Deputy Director, but will hand over the Director role to colleague **Dr. Timothy Zacharewski**.

Dr. Zacharewski became a member of the MSU SRC in 2000 and is currently the Co-Leader of Project 3. His research focuses on the aryl hydrocarbon receptor (AHR)-mediated hepatic effects of DLCs. This includes the disruption of metabolism during DLC-induced progression of steatosis to steatohepatitis with fibrosis which increases the risk of fatty liver diseases such as Metabolic Syndrome, end-stage liver disease, liver cancer and Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD, formerly referred to as non-alcoholic fatty liver disease (NAFLD)). The primary goal is to elucidate the mechanisms underlying adverse effects elicited by DLCs. Current projects in the Zacharewski group are collaborative efforts that use novel in vitro organoid and in vivo genetic models and involve the integration of multi-omic approaches in complementary dose response studies.

Zacharewski is excited to lead the MSU SRC into the future, "I look forward to continuing to work closely with Norb as well as the other MSU SRC team in pursuing ground breaking human health research, developing solutions to remediate Superfund sites and engaging with affected communities."

in this issue....

MICHIGAN STATE UNIVERSITY

Celebrating Student Research at the 2025 EITS Research Evening

The Institute for Integrative Toxicology's Annual Research Evening showcased trainees in the Environmental and Integrative Toxicological Sciences Graduate Training program and their accomplishments. This year's event took place on Thursday, December 4, 2025 in the Lincoln Room at the MSU Kellogg Center. The event included dinner, student posters and platform presentations.

Three EITS graduate students gave platform presentations:

Antryg Benedict, training in the lab of Dr. Wei Zhang, spoke on, "*Exploring Interactions of Prion Fibrils with Metal Ions and Geosorbent Surfaces using Molecular Dynamics*." Benedict is a doctoral student in the Department of Plant, Soil and Microbial Sciences. She uses computational modeling to research the interactions between infectious prion fibrils and geosorbents (clays, quartz, iron oxide, calcium hydroxide, and pyrogenic carbon) in order to find materials that could be used to line landfills to prevent prions from leaching into the environment. She is also using modeling to predict possible copper and managese binding sites to infectious prion fibrils. With these projects, Benedict aims to expand our knowledge of prions' interactions in the environment and their environmental fate.

Patricia Hsu, training in the lab of Dr. Felicia Wu, spoke on, "*From Toxicological Evidence to Policy Action: Quantifying the Causality and Public Health Burden of Dietary Arsenic and Lead Expousre*." Hsu is a doctoral student in the Department of Food Science and Human Nutrition and has focused her research on health risk assessment, recall management, and food safety policy, particularly regarding dietary exposure to heavy metals like arsenic and lead, aiming to integrate epidemiology and toxicological evidence to quantify disease burden and inform regulation. She also investigates pathogen-related outbreaks linked to raw milk and cheese in the U.S., estimating underreported cases and their economic and public health impacts.

Christine Wei, training in the lab of Dr. James Luyendyk, spoke on, "*Mechanisms Linking the Hemostatic System and Liver Regeneration*." Reynolds is a doctoral student in the Comparative Medicine and Integrative Biology graduate program. Both chronic liver disease and acute liver injury can be induced by chemical exposures and in each context, the blood coagulation cascade is activated. Multiple studies suggest that components of the blood coagulation system modify the pathogenesis of acute hepatotoxicity and participate in the regeneration of the injured liver. Wei's long-term research interest focuses on understanding the role of the different components of coagulation cascade in liver regeneration.

To those who attended, thank you for joining us for this special evening of celebration, camaraderie, and learning!

IIT Seminar Series Fall 2025

The IIT was excited to host two great speakers for the Fall 2025 IIT Seminar Series.

The semester-long series began in September with **Dr. Kyle Poulsen**, Assistant Professor, Pharmacology and Toxicology, MSU, who spoke on, "*Multifunctional MIF in Alcohol-related Liver Disease*."

On October 14, the IIT hosted **Dr. Aitor Aguirre**, to speak on, "*Synthetic Heart Models for the Study of Human Cardiac Development and Disease*." Dr. Aguirre is an Associate Professor in Biomedical Engineering; Chief of the Division of Developmental and Stem Cell Biology, Institute for Quantitative Health Science and Engineering; and Faculty Director of the Stem Cell Core all here at Michigan State Univeristy.

The IIT is excited to continue the seminar series this spring with three more dynamic speakers. The series will begin on January 13, 2026 with **Dr. Weston Porter** from Texas A&M University who will speak on, "*Powering Cell Identity: Mitochondrial Control of Development and Plasticity*." Look for more information on the rest of the series soon!

Recent Student Achievements

The IIT is pleased to share some exciting recent achievements by our EITS graduate students and IIT-affiliated postdoctoral students.

Dayita Banerjee, training in the lab of Dr. James Luyendyk, recently attended the 27th Congress of the International Society for Fibrinolysis and Proteolysis (ISFP) and the 28th Workshop of the International Fibrinogen Research Society (IFRS) in Corfu, Greece. She was awarded the IFRS/ISFP Congress Travel Award for her presentation, "*Role of plasminogen in acetaminophen-induced acute liver injury*."

Nana Kwame Kwabi Boateng, training in the lab of Dr. James Luyendyk, recently attended the 27th Congress of the International Society for Fibrinolysis and Proteolysis (ISFP) and the 28th Workshop of the International Fibrinogen Research Society (IFRS) in Corfu, Greece. He was awarded the IFRS/ISFP Congress Travel Award for his presentation, "*Tissue transglutaminase drive fibrin β-Chain cross-linking: a novel fibrin modification observed in trauma patients*."

Brianna Finn, training in the lab of Dr. Norbert Kaminski, was recently selected to give a platform presentation at 2025 Michigan Regional Chapter of the Society of Toxicology (MISOT) annual meeting on October 3rd. The title of her presentation 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*."

Heather Gutterman, postdoctoral researcher with Dr. Rita Strakovsky, won second place at the MISOT annual meeting for her oral presentation, "*Identifying Dietary Predictors of Per- and Polyfluoroalkyl Substances in Pregnancy Using Supervised Mixtures Methods to Inform Public Health-Relevant Dietary Interventions*."

Heather was also recently named the Student and New Researcher Network Abstract Awardee for the North American Chapter of the International Society for Environmental Epidemiology. As the abstract award winner, Guetterman will give a webinar in the new year. Heather's presentation will begin by highlighting recent progress in the field related to diet as a source of environmental chemical exposures. She will then present her recent work evaluating dietary predictors of per- and polyfluoroalkyl substances (PFAS) during pregnancy. Specifically, she will discuss the application of mixtures methods to dietary data and the use of hypothetical interventions to generate policy-relevant estimates for reducing dietary exposure to chemicals.

The webinar will take place January 21 from 1:00 - 2:00 pm ET. Register at: https://us02web.zoom.us/meeting/register/1etVEepsQ5qYfe0BcN37PQ#/registration.

Joel Marty, training with Dr. Norbert Kaminski, won second place in the graduate student poster session at the MISOT annual meeting for his presentation, *"∠9-tetrahydrocannabinol (THC) impairs both interferon gamma (IFNγ) secretion by CD8+ T cells from HIV+ individuals and the enhanced IFNγ responses associated with primary human monocyte-CD8+ T cell co-cultures."*

Kamila Sadko, training in the lab of Dr. Adam Lauver, was recently selected to receive the Junior Investigator Travel Award for the Safety Pharmacology Society annual meeting in Utrecht, Netherlands this past October. She was also chosen to do an oral presentation on her research titled, "*Addressing the Confounding Influence of Activity on Heart Rate Measurements in Conscious Rats*."

Sera Sermet, training in the lab of Dr. Norbert Kaminski, recently had a paper published in the Journal of Pharmacology and Experimental Therapeutics on the effect of cannabinoids on the inflammatory cytokine production from monocytes. The publication, "*∠9-Tetrahydrocannabinol and cannabidiol selectively suppress toll-like receptor (TLR) 7– and TLR8-mediated interleukin-1β production by human CD16+ monocytes by inhibiting its post-translational maturation*," can be viewed at: https://www.sciencedirect.com/science/article/pii/S0022356525398289.

Ashten Stambersky, postdoctoral researcher with Dr. Neera Tewari-Singh, won first place at the MISOT annual meeting for her poster presentation, "*Chemical Threat Agents Decrease Corneal Sensitivity and Induce Ocular Nerve Injury*."

Cinzori Awarded Prestigious NIH F31 Fellowship

EITS and Human Nutrition graduate student, **Maria Cinzori**, was recently selected to receive the NIH Ruth L. Kirschstein National Research Service Award for Individual Predoctoral Fellows (F31). The prestigious fellowship will support Cinzori in enhancing her training in environmental epidemiology, clinical pregnancy health outcomes, and science communication related to the implications of chemical exposures in pregnancy. The purpose of the Kirschstein-NRSA program is to enable promising predoctoral students with potential to develop into productive, independent research scientists and to obtain mentored research training while conducting dissertation research.

Cinzori is mentored by IIT-affiliated faculty member **Dr. Rita Strakovsky** in the Department of Food Science and Human Nutrition. Cinzori's dissertation research primarily focuses on how exposure to endocrine disrupting chemicals impacts maternal cardiometabolic health in pregnancy and postpartum. In her awarded project, "Exposure to Metabolism Disrupting Chemicals: Implications for Maternal Health in Pregnancy," Cinzori will apply data from the nation-wide Environmental influences on Child Health Outcomes (ECHO) Program to evaluate relationships between many common environmental chemicals and maternal risk of gestational diabetes and hypertensive disorders of pregnancy (e.g. preeclampsia). She will then use complex causal statistical methods to evaluate whether a hypothetical intervention to decrease exposure to specific chemicals will improve maternal health outcomes.

With this award, Cinzori hopes to further her training as a women's health researcher and science communicator to work with the community to inform and influence policy decisions and improve women's health across the lifespan.

Dr. Kyle Poulsen Joins IIT-Affiliated Faculty

The IIT is pleased to welcome **Dr. Kyle Poulsen** as an affiliated faculty member. Dr. Poulsen is an assistant professor in the Department of Pharmacology and Toxicology. He received his B.S. in Biological Sciences in 2008 from Eastern Michigan University before coming to MSU to pursue his Ph.D. Poulsen is a proud EITS alumnus. He completed the program in 2013 under the mentorship of Dr. Robert Roth and earned his dual major Ph.D. in Pharmacology and Toxicology and Envirnonmental Toxicology. He completed his postdoctoral training at Cleveland Clinic Foundation's Lerner Research Institute.

Today Poulsen's translational research program in his laboratory investigates chronic liver disease. From mechanistic discovery through preclinical therapeutic design, Poulsen's lab employs state-of-the-art in vitro and in vivo models to test their hypotheses and develop new therapeutic strategies for unmet needs in chronic liver disease. Poulsen's pathway of interest, macrophage migration inhibitory factory (MIF) and its cognate receptor, CD74, are a dynamic mechanism of intercellular communication that is implicated in nearly every disease, despite the usual characterization of MIF-CD74 as an immune master switch. Poulsen's laboratory's work in models of chronic ethanol exposure have revealed a time- and context-dependent language of MIF-CD74 between the epithelial cells of the liver and the resident immune cells as well as infiltrating cells of the liver. They have uncovered that MIF can drive both maladaptive and protective mechanisms in the liver via immune cell infiltration and activation, intracellular stress responses, and more recently they have discovered that MIF directly decreases function of mitochondria.

Current research areas in the Poulsen lab include 1) deciphering the epithelial-immune language of MIF-CD74 in alcohol-related liver injury; 2) studying interference anti-sense therapies against MIF and CD74 in cell-specific contexts; 3) developing novel 3D spheroid/organoid models for liver disease in animal and in human stem cells; and 4) studies into organellar transplantation as a therapeutic modality.

To learn more about Dr. Poulsen, please visit: https://iit.msu.edu/directory/poulsen-kyle.html.

MSU Superfund Research Center News

Johnson and Team Earn New Awards to Advance Research Goals on the MSU SRC

Dr. **Brian Johnson** and his team have recently earned two awards to determine the commercial potential of two unique inventions related to advanced in vitro cell culture models. Johnson is an assistant professor in the Department of Pharmacology and Toxicology and the Department of Biomedical Engineering and is Project Leader for Project 2 of the MSU Superfund Research Center.

The first award from the University Early-Stage Proof-of-Concept Fund known as the ADVANCE Grant Program sponsored by Michigan Economic Development Corporation will allow Johnson and his team to determine the technical and commercial feasibility of contactless thermal-driven convection as a novel means to induce fluid flow in high-throughput microplate microfluidic devices. Fluid flow is a key physiological parameter in blood, lymphatics, and other body systems, regulating endothelial shear stress, tissue oxygenation, and waste removal. Cell cultures lack many physiologically relevant features from their normal in vivo environment. Introducing flow to microphysiological cell culture models can be accomplished in several ways, such as adding pumps, incorporating hydraulic heads, or rocking the devices. However, these methods add complexity, decrease throughput, or interfere with analyses. The Johnson team has identified a novel solution that utilizes convection currents to create predictable, contactless, controlled flow within microplate-based wells and microfluidic devices. Under a provisional patent application, Johnson and his team have leveraged this phenomenon to induce fluid flow in purpose-built microplate-based devices in a contactless and throughput compatible manner.

The second grant from the Michigan Translational Research and Commercialization Innovation Hub (MTRAC) for AgBio at MSU was awarded to Johnson and his team for their proposal, "Carbon Dioxide Laser Welding to Manufacture Transparent Microfluidic Devices." MTRAC provides resources for translational research projects related to agriculture and biology with high commercial potential in one or more bio-related industries. The Johnson team sought to identify a replacement for a solvent bonding method used to bond clear plastic sheets to clear polystyrene stock in the manufacture of low-cost and tunable microfluidic devices. Their preliminary data demonstrate the utility of using a standard CO2 laser cutter to weld clear flat plastic sheets to clear flat stock without the use of adhesives. The Johnson lab's need, rapid prototyping of cell culture devices, is just one application of this versatile and accessible approach. This developing technology is currently protected under a US provisional patent application that is being actively converted to a US patent application by MSU. The pending patent claims include a method of laser welding thermoplastics, agnostic of color using a CO2 laser for device manufacturing, The MTRAC grant will allow Johnson and his team to determine the domain of commercial applicability for this technology.

Both of these grants will further research goals on Project 2 of the MSU SRC which aims to bioengineer thyroid and liver microtissues and use them along with computational modeling to understand how Superfund-related chemicals cause toxicity. Johnson and his team also test chemicals and their mixtures for their ability to disrupt thyroid signaling, and then translate their findings to determine how chemical exposures might affect human populations. Together, these projects aim to support the shift away from animal testing toward human-derived in vitro models that is being prioritized by the NIH, FDA and EPA.

Annual Community Health Survey Results 2025

Each spring, the Community Engagement Core fields the Annual Community Health Survey. The survey—designed in collaboration with the Michigan Department of Health and Human Services and the Allegan, Macomb, and Saginaw County Health Departments—collects the major concerns that people living in these communities experience regarding their collective health. The findings are then used to guide MDHHS' health education efforts which, with the help of a Local Advisory Group, are redesigned to ensure they directly address salient community vulnerabilities.

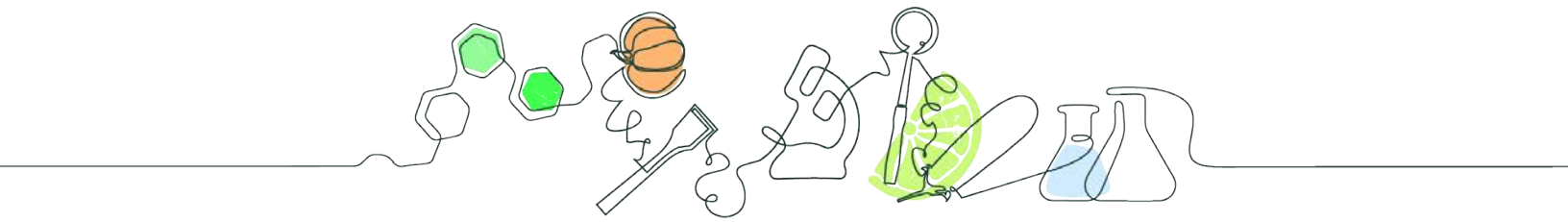
View the PDF links below to look at the 2025 survey results for each community:

Otsego Year 3 Findings

Saginaw Year 3 Findings

St. Clair Shores Year 3 Findings

Center for Research on Ingredient Safety News



2025 CRIS Science Symposium: Communicating Chemical Ingredient Safety for Today & Tomorrow

The 2025 Center for Research on Ingredient Safety Science Day held on September 3, 2025 at the MSU Union focused on effectively communicating the safety of chemical ingredients today and in the future.

If you were unable to attend, don't worry! You can still catch up on all the insightful sessions. Most are now available for you to watch on YouTube.

Please share them with any friends and colleagues who might benefit from the sessions.

Sessions inlcuded:

» **Joanne Slavin**, Ph.D., R.D.
University of Minnesota
Expertise: Nutrition science, dietary guidelines, public health communication
Talk Focus: Bridging the gap: Integrating ingredient safety into everyday nutrition messaging

» **Anne Chappelle**, Ph.D., DABT
SafeBridge Consultants
Expertise: Toxicology, chemical risk assessment, regulatory communication
Talk Focus: Risk, dose, and trust: Making chemical safety concepts make sense to non-experts

» **Jess Steier**, Dr.PH.
Unbiased Science
Expertise: Public health, podcast host, interdisciplinary science communication
Talk Focus: Storytelling that works, communicating ingredient safety in the digital age

» **Jill Adams**, Ph.D.
Washington Post
Expertise: Science journalism, editorial framing, media coverage of health, biomedical research, psychology, education, and the environment.
Talk Focus: Chemicals in the news: Ingredient safety through the lens of journalism and the click economy

» **John Besley**, Ph.D.
Michigan State University
Expertise: Science communication education, training scientists to engage public audiences
Talk Focus: Communicating effectively and strategically in the context of chemical ingredient safety

The symposium day concluded with a panel discussion with the 2025 speakers answering community questions. Thank you to all who participated and attended!

New Review - Seafood & Microplastics Safety

Microplastics have become a familiar part of conversations about pollution, plastics, and health. In recent years, many headlines have warned that eating seafood could expose us to plastic particles, which has led to some people's increased concern about the safety of fish and shellfish.

A new paper published in Environmental Science & Technology Letters and coauthored by CRIS director Norbert Kaminski, Ph.D., finds that, based on the current peer-reviewed scientific literature, seafood is less risky than many presume. The study finds that microplastics in seafood aren't the primary source of human exposure and that avoiding seafood due to plastic fears could do more harm than good.

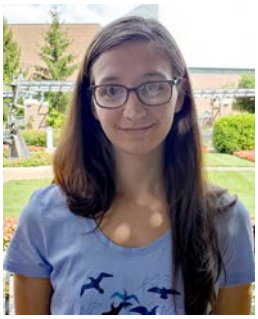
The paper provides more evidence supporting the safety of consuming seafood. Read the review paper here: https://pubs.acs.org/doi/10.1021/acs.estlett.5c00551.

Researchers analyzed how plastic contamination in food is studied and reported, and found a clear imbalance. More than 70% of research and media coverage about microplastics in food focuses on seafood, even though exposure from eating fish or shellfish is similar to that from other foods.

This narrow focus contributes to public perception, which impacts the belief that seafood is uniquely risky. In reality, the most significant source of microplastic exposure isn't food; instead, it is indoor air due to plastic in textiles used in upholstery, rugs and fabrics.

To continue reading the entire blog post on the new review, please visit: https://cris.msu.edu/news/new-evidence/new-review-seafood-microplastics-safety.

Recent EITS Graduates



Rachel Bauer
Pharmacology & Toxicology
Mentor, Courtney Carignan

Dr. Rachel Bauer received her Ph.D. after completing the dual major program in Pharmacology and Toxicology and Environmental Toxicology. Her dissertation was, *"Quantifying Associations of Per- and Polyfluoroalkyl Substances (PFASs) in Serum with Drinking Water Source and Functional Measures of Immunotoxicity."*

Bauer is now a toxicologist with the Michigan Public Health Institute (MPHI), contracting with Michigan Department of Health and Human Safety. Her current responsibilities include evaluating environmental data from chemically contaminated sites to determine if a public health hazard exists and then providing recommendations to protect public health.

Jacob Reynolds
Biomedical Engineering
Mentor, Brian Johnson

Dr. Jacob Reynolds received his Ph.D. after completing the dual major program in Biomedical Engineering and Environmental Toxicology. His dissertation was, *"Refinement of a Microphysiological Model of Orofacial Development for Chemical Testing."*

Reynolds is now working as a scientist for ToxStrategies in their health science practice out of their Asheville, North Carolina office. Reynolds supports multiple projects spanning both human and environmental health for a variety of different chemistries. His work is largely focused on extracting and interpreting the available data to inform on the state of the science, identify vulnerabilities, or elucidate potential mechanisms of action.

Nat Yawson
Pharmacology and Toxicology
Mentor, Jamie Bernard

Dr. Nat Yawson received his Ph.D. after completing the dual major program in Pharmacology and Toxicology and Environmental Toxicology. His dissertation was, *"Molecular Mechanisms of Obesity-driven Carcinogenesis: Implications for Skin Cancer and Multiple Myeloma."*

Yawson is now a Senior Scientist for Vital Rx Pharmacy. He works with multiple teams, including quality control, production, and research and development, to ensure product safety and efficacy. He also performs routine microbiological testing on raw materials, intermediates, and finished products to detect, identify, and quantify microorganisms. Yawson performs chemical analysis on raw materials, in-process samples, and finished products to ensure quality, safety, and compliance with regulatory standards using techniques like HPLC and spectroscopy.

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:

» **Chidinma Chukwukaeme**
Molecular, Cellular and Integrative Physiology
Mentor: Kin Sing Lee

» **Andrew Huang**
Plant, Soil & Microbial Sciences
Mentor: Hui Li

» **Julia Jamka**
Molecular, Cellular and Integrative Physiology
Mentor: Brian Gulbransen

» **Congying Wang**
Pharmacology and Toxicology
Mentor: Brian Johnson

» **Srijana Shrestha**
Genetics & Genome Sciences
Mentor: Rance Nault

» **Yujie Wang**
Plant, Soil and Microbial Sciences
Mentor: Hui Li

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

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

www.iit.msu.edu