

2018 ANNUAL REPORT



IIT @MSU

INSTITUTE FOR INTEGRATIVE TOXICOLOGY

MICHIGAN STATE
UNIVERSITY

IIT ANNUAL REPORT 2018

IIT HISTORY AND MESSAGE

- 4 A Tradition of Excellence
- 5 Message from Director Norbert Kaminski

HIGHLIGHTS

- 6 2018 Highlights
- 8 IIT Faculty Excel in 2018

EITS TRAINING PROGRAM

- 9 EITS Training Program
- 9 EITS 2018 Graduates
- 10 Graduate Spotlights
- 13 EITS Graduate Kyle Poulsen

FACULTY FEATURES

- 14 Dr. Cheryl Murphy
- 15 Dr. Masako Morishita
- 16 Dr. Rita Strakovsky

FACULTY PUBLICATIONS

- 17 Publications of IIT Faculty

PROFESSIONAL SERVICE

- 34 Professional Service of IIT Faculty

AFFILIATES

- 38 IIT Affiliated Faculty
- 39 Departments / Ph.D. Programs
- 39 Deans

Managing Editor: Writing and Design
Lauren St.John

Photos
MSU,
IIT Staff

IIT Staff

Norbert E. Kaminski, Ph.D., Director
John J. LaPres, Ph.D., Graduate Program Director
Amy Swagart, IIT Fiscal Officer
Kasey Baldwin, IIT Administrative Assistant
Adelle Simmons, EITS Graduate Secretary
Lauren St.John, Communications/Webmaster



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 30 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-degree Ph.D. program in environmental toxicology was offered in conjunction with several cooperating departments. The characteristics of the program were **unique** at that time as students were required to complete the Ph.D. requirements of a department of their choice in addition to the didactic requirements and toxicology research specified by the Center. The **quality** of this cross programmatic effort was recognized by the National Institutes of Health in 1989 with the award of a Training Grant from the National Institute for Environmental Health Sciences. This grant has been competitively renewed ever since, providing over 30 years of continuous funding. Graduates of MSU's toxicology program number over 200 and can be found in academia, industry, and governmental positions. ♡

MESSAGE from the DIRECTOR



2018 marked the fortieth 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 2018, several IIT faculty received nationally recognized awards for their achievements. Numerous IIT faculty were also featured on MSUToday, MSU's main news resource, for new and exciting advances in their research areas. Many of these articles were then picked up by major news outlets, expanding the reach of toxicology research at MSU. Myself and two other IIT faculty, Dr. Robert Roth and Dr. James Luyendyk, were honored to be asked to write chapter's for the ninth edition of toxicology's gold standard text: Casarett & Doull's Toxicology: The Basic Science of Poisons.

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 2018 Annual Meeting of the Society of Toxicology. Students also traveled to a wide variety of other meetings across the globe this year. Six students graduated from the EITS program in 2018 and have moved on to pursue careers in academia and industry.

This past year was the 30th consecutive year that the EITS program has enjoyed training grant support from the National Institute of Environmental Health Sciences.

It is also with great sadness that we said goodbye to a treasured colleague this year, Dr. Lawrence Fischer. Larry began his career at MSU in 1985 as the Director for the Institute of Environmental Toxicology (IET). During his nineteen-year tenure and under his leadership, toxicology research and graduate training at MSU became, and continues to be, recognized nationally and internationally for excellence. As Director of the IET he brought together investigators with diverse scientific backgrounds to establish coordinated research teams focused on various aspects of environmental toxicology. These research teams, led by Dr. Fischer, successfully competed for what is presently the longest standing program project center grant at MSU, which is currently in its thirtieth consecutive year of funding by the Superfund Research Program. Larry's legacy will live on here at MSU through his colleagues and past students for decades to come.

I trust that 2019 promises to be an equally exciting time for continued growth and success for toxicology at MSU.

A handwritten signature in blue ink that reads "Norbert E. Kaminski".

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

2018 IIT HIGHLIGHTS

This year's highlights showcase the accomplishments of not only the IIT, but also of the faculty and trainees involved in continuing to expand the quality and leadership of Michigan State University in academic toxicology.

IIT Affiliates Successful at 57th SOT Meeting in Baltimore

Students and faculty of the MSU Institute for Integrative Toxicology were excited to attend and present at this year's 57th annual Society of Toxicology (SOT) meeting held in San Antonio, Texas. The IIT's own, Dr. Patricia Ganey, presided over the events as President of the SOT this year.

The SOT annual meeting is the largest toxicology meeting and exhibition in the world, attracting more than

6,500 scientists from industry, academia and government from various countries around the globe. The meeting was held at the Henry B. Gonzalez Convention Center in San Antonio from March 11-15, 2018.

The following students and faculty affiliated with IIT received recognition: **Michael Rizzo, Adrianna Suazo, Kimberly A. Rivera-Caraballo, Dr. Lauren Hardy, Dr. Debrup Chakraborty, Dr. Sudin Bhattacharya, Dr. Jack Harkema, Dr. Courtney Sulentic, Dr. Barbara Kaplan, and Dr. James Luyendyk.**

The following EITS trainees received travel support from the IIT: **Peter**

Dornbos, Kelly Fader, Jeremy Gingrich, Joseph Henriquez, Monica Rios-Caballillas, Michael Rizzo, Vickie Ruggiero, Alexandra Turley, Kate Wierenga, and Brian Zhou.

The highlight of the week was the IIT Alumni and Friends Reception held in the President's Suite for all current and former students, postdocs, faculty and friends of Michigan State University. The evening reception was a welcome opportunity to catch up with old acquaintances and meet with new friends. The IIT looks forward to the next SOT Meeting in Baltimore, Maryland in March 2019. 🍷



Left: Dr. James Luyendyk and MSU IIT postdoctoral trainee, Lauren Hardy.

Right: Five past SOT Presidents from Michigan State University: Dr. James Bus, Dr. Norbert Kaminski, current SOT President Dr. Patricia Ganey, Dr. Jay Goodman, and Dr. Ken Wallace.

CRIS Hires Director of Science Communication



The Center for Research on Ingredient Safety (CRIS) is pleased to introduce Elisabeth Anderson, Director of Science Communication. CRIS is an academic, science-based center within

the Institute for Integrative Toxicology, that serves as a leading source for information on the safe use of chemical ingredients in consumer packaged goods including foods, beverages, cosmetics and household consumer products.

Elisabeth has extensive experience in communications, specializing in digital media and tools. In her most recent position, she served as the Communications Manager for Michigan State University Information Technology. In this role, Elisabeth was responsible for developing and managing communication strategies for MSU IT, writing and editing content for the MSU Community, implementing digital media campaigns and curating content for monthly newsletters.

Prior to her employment at MSU, Elisabeth held a variety of positions in the communications field. She spent three years at Ohio State University as the Digital Communications Specialist for the Office of Academic Affairs. There she served as the brand ambassador

for the Office of Academic Affairs and developed branding guidelines, as well as leadership skills, for the Discovery Themes initiative. Among her many responsibilities, she developed and implemented digital and traditional media strategies, overhauled and streamlined the Office of Academic Affairs website and developed digital media platforms.

CRIS and the IIT welcomes Elisabeth and looks forward to adding her experience and skillsets to the CRIS team. 🍷

IIT Hosts Seminar Series for Faculty and Students

The IIT was thrilled to host seven fantastic speakers in 2018 as part of the IIT Seminar Series:

- » **Dr. Jianrong Wang**, Michigan State University, spoke on, “Integrative Modeling of Regulatory Genomics and Epigenomics to Understand Human Disease Mechanisms,” on January 12, 2018.
- » **Dr. Jon Wambaugh**, U.S. EPA, spoke on, “Establishing Real World Context for High Throughput Toxicity Testing,” on February 9, 2018.
- » **Dr. Susan Hester**, U.S. EPA, spoke on, “Opening the Archives - Novel Methods to Advance Whole Transcriptomic Analyses of Archival Tissues,” on April 13, 2018.
- » **Dr. Tomas Guilarte**, Florida International University, spoke on, “TSPO: A Biomarker of neuroinflammation

and brain injury looking for a function,” on September 14, 2018.

- » **Dr. Edward Calabrese**, University of Massachusetts Amherst, spoke on, “What is the Future of Cancer Risk Assessment? Is LNT Dead? Is Hormesis Ready for Prime Time,” on October 12, 2018.
- » **Dr. Lance Blevins**, Michigan State University, spoke on, “Identification and Characterization of a Sensitive Immunologic Target of TCDD: CD5+ Innate-like B Cells,” on November 16, 2018.
- » **Dr. Sabrina Spencer**, University of Colorado-Boulder, spoke on, “Single-cell dynamics of the proliferation-quiescence decision,” on December 5, 2018.

The IIT is looking forward to hosting four more prestigious speakers this spring:

- » **Dr. Matthew Campen**, University of New Mexico, will speak on,

“Circulating Molecular Shrapnel: Identifying links between inhaled toxicants and neurological outcomes,” on January 11, 2019.

- » **Dr. Rita Strakovsky**, Michigan State University, will speak on, “Gestational exposure to endocrine disrupting chemicals and maternal steroid hormone status,” on February 8, 2019.
- » **Dr. Michael Honeycutt**, Texas Commission on Environmental Quality, will speak on, “Regulating Air Quality - Nothing Simple is Ever Easy: A Case Study with Ozone,” on April 12, 2019.
- » **Dr. Patricia Hunt**, Washington State University, will speak on a title yet to be announced, on May 6, 2019.

Hope to see you this spring for learning and networking! 🍷

MSU Superfund Program Helps Develop MI Safe Fish App with the State of Michigan



The Research Translation Core of the MSU Superfund Center continues to work diligently with the Michigan Department of Health and Human Services (MDHHS) to develop an app based off the MI Eat Safe Fish Guide available on the State of Michigan website.

The MDHHS test filets of fish taken from Michigan’s lakes and rivers to find the average amount of chemical contaminants in varying fish species at that location. They use this information to make recommendations on monthly fish consumption in their Eat Safe Fish Guide. The collaboration between MDHHS and the MSU Superfund Center will bring this information to more consumers in a user-friendly mobile app. The app is now available to download for Android devices in the Google Play Store by searching, “MI Safe Fish”. It will be in

the Apple App Store for iPhone users to download in the coming weeks.

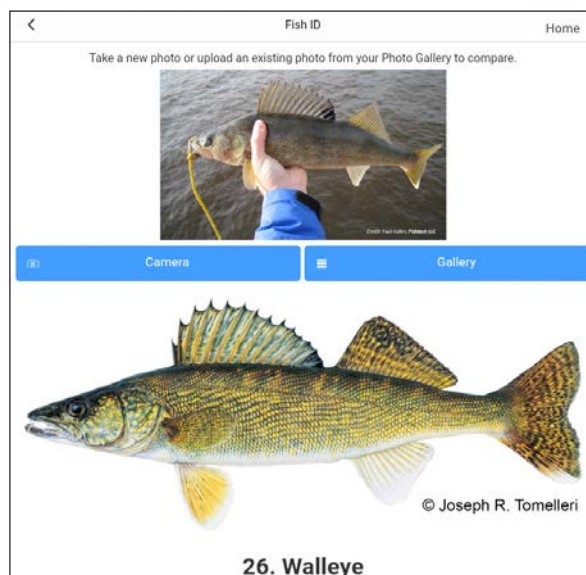
The MI Safe Fish app has eight categories:

- » **MI Serving** – Tool to help you determine the serving size of fish in relation to your body weight.
- » **Eat 8** – A visual guide to help you choose fish low in mercury from restaurants and grocery stores.
- » **Three Cs** – A visual guide to the three Cs of fish consumption – choose, clean and cook.
- » **Fish ID** – Upload a photo of your catch and the app will compare and

identify your fish. Or browse the thirty Michigan fish in the gallery to make your own comparisons.

- » **Chemical Risks** – Learn more about each of the chemicals identified in the Eat Safe Fish Guide.
- » **Eat Safe Fish Guide** – Download the Eat Safe Fish Guide for the region of Michigan you are fishing.
- » **FAQs** – Get the answers to the most commonly asked questions about the Eat Safe Fish Guide.
- » **About** – Learn about the app collaborators.

Drs. Brad Upham and Syed Hashsham from the MSU Superfund Center worked alongside Michelle Bruneau, Laura Gossiaux and Tom Mata from the State of Michigan Fish Advisory Program to bring the MI Safe Fish app to life. Collin Nicaise, Umama Fakher, and Maggie Williams from the MSU Superfund Program also contributed to the development of this app. The MSU Superfund Research Translation Core is proud to be involved in this project and hopes to work with other SRP Centers in the future to develop this type of app for their own regions across the country. 🍷



IIT FACULTY EXCEL IN 2018

Faculty Achievements 2018



Dr. Jack Harkema was awarded the 2018 Outstanding Mentor Award from the Society of Toxicologic Pathology at their annual Symposium in Indianapolis, Indiana on June 20, 2018.

Dr. Harkema also is one of only three veterinarians to be part of the first class of American Thoracic Society (ATS) Fellows. The ATS Fellow designation is a mark of distinction, conferring recognition on members for their accomplishments, dedication, and contributions to the Society, as well as to the fields of pulmonary, critical care, and sleep medicine.

From 2014–2017, Harkema served as the chair of the ATS Environmental, Occupational and Population Health Assembly and a member of the ATS Board of Directors. Harkema was also presented with the Val Vallyathan Award from the ATS Assembly on Environmental, Occupational, and Population Health. This award recognizes an individual who has made outstanding contribution to basic and translation science in environmental or occupational respiratory diseases.

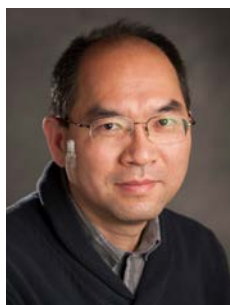


Dr. Dan Jones was recently appointed to the PFAS Scientific Advisory Committee. Dr. Jones joins five other scientists and toxicologists on the review panel that will recommend possible regulatory measures for per- and polyfluoroalkyl substances called PFAS or PFCs. The panelists were selected based on their expertise in the areas of epidemiology, toxicology, water quality, biochemistry and molecular biology. The panel will

objectively assess the scientific information surrounding the issue of health advisory levels, health outcomes, remediation and mitigation, and environmental pathways. Michigan hopes to be a leader in addressing PFAS contamination, which is being found in ever more areas around the state and country.



Dr. John Kaneene received the 2018 Ralph Smuckler Award for Advancing International Studies and Programs at MSU. This award recognizes a senior faculty member for their significant and lasting impact on the advancement of international scholarship, teaching and public service at MSU. Kaneene's research on infectious zoonotic diseases spans 20 countries and five continents over his 35-year career.



Dr. Hui Li was the recipient of the 2017 Jackson Soil Chemistry and Mineralogy Award. The honor, presented by the Soil Science Society of America, is given to a midcareer scientist who has made outstanding contributions to soil chemistry and mineralogy. Nominees are judged on four criteria: significance and originality of research, excellence in creative reasoning and skill in obtaining data, quality of teaching at the undergraduate or graduate level, and impact of the research on soil science and the larger society. Throughout his nearly 20 years in the field, Li has established himself as an expert in the environmental fate and transformation of chemicals of emerging concern, as well as organic contaminants and pesticides in soils and their impacts on ecosystems and human health. He has also made significant contributions to advancing the understanding of the molecular-scale mechanisms involved in sorption and transformations of pharmaceuticals and organic contaminants on soil mineral surfaces.



Research conducted by **Dr. Ilce Medina-Meza**, and funded by a 2017 CRIS research grant, was recently published in the journal, *Food and Chemical Toxicology*. Dr. Medina-Meza's paper, titled "The Role of Cholesterol Oxidation Products in Food Toxicity," was also featured in International Life Sciences Institute (ILSI) June 2018 Food Safety Briefs. The paper summarizes results from the CRIS funded grant entitled, "Assessment of exposure and risk associated with cholesterol oxidation product in food using dietary intake modeling."



Dr. Cheryl Murphy, co-edited, *A Systems Biology Approach to Advancing Adverse Outcome Pathways for Risk Assessment*, with Natàlia Garcia-Reyero Vinas. Released in 2018, the book focuses on The Adverse Outcome Pathway, an analytical construct that describes a sequential chain of causally linked events at different levels of biological organization that lead to an adverse health or ecotoxicological effect. While past efforts have focused on toxicological pathway-based vision for human and ecological health assessment relying on in vitro systems and predictive models, The Adverse Outcome Pathway framework provides a simplified and structured way to organize toxicological information. Within the book, a systems biology approach supplies the tools to infer, link, and quantify the molecular initiating events and the key events and key event relationships leading to adverse outcomes. ☘

EITS TRAINING PROGRAM

An overview of the current EITS training program and review of 2018 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 17 partnering graduate programs coupled with didactic and research training in toxicology by MSU IIT-affiliated faculty. Currently, 31 doctoral students are enrolled in the EITS program, distributed among several of our partnering PhD programs. Twenty-five of these students are in the Biomedical Track, five in the Environmental Track, and one student has entered in the new Food Toxicology and Ingredient Safety Track. Many of our current students received awards at the 2018 Annual Meeting of the Society of Toxicology (SOT) or from other organizations. Our students continue to demonstrate good citizenship by volunteering to serve on Society committees at the regional and national levels as well as within MSU. Students who graduated in the past year are typically in postdoctoral positions at various academic institutions in the U.S. and other countries.

The 2017-2018 academic year marked the 30th consecutive year that the program has enjoyed training grant support from the National Institute of Environmental Health Sciences (NIEHS). This grant provides support for seven predoctoral and two postdoctoral fellows each year. Generous supplemental funding from Dean Jeitschko of the Graduate School provides additional support for stipends and fellowships that enable students to travel to scientific meetings to present the results of their research.

During 2018 EITS students were able to attend seven toxicology-related seminars sponsored by the IIT. EITS students were also able to meet the distinguished lecturers and have one-on-one interactions with them over lunch. This year, the EITS program also hosted two “Mixer” events to encourage networking, collaboration and enrollment. Be on the lookout for these events to recur in 2019! 🍀

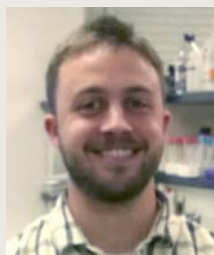
EITS GRADUATES 2018



Loan Cao

Food Science & Human Nutrition
Mentor, Leslie Bourquin

Evaluation of Arsenic Concentrations in Apple Products and its Potential Health Effects



Peter Dornbos

Biochemistry & Molecular Biology
Mentor, John LaPres

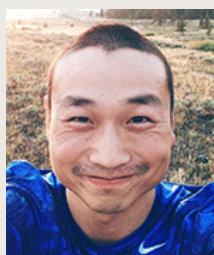
A Population-Guided Approach to Identify Genetic Modulators of TCDD-Elicited Toxicity



Kelly Fader

Biochemistry & Molecular Biology
Mentor, Timothy Zacharewski

The role of the Intestine-Liver Axis in TCDD-Elicited Non-Alcoholic Fatty Liver Disease in Mice



Pengchao Hao

Chemistry
Mentor, Ned Jackson

Electrocatalytic Hydrogenation of Monomeric, Dimeric and Polymeric Lignin Model Compounds with Raney Nickel: Chemistry, Mechanistic, and Product Toxicity Studies



Joseph Henriquez

Pharmacology & Toxicology
Mentor, Norbert Kaminski

Δ9-Tetrahydrocannabinol-mediated Suppression of the Interferon- α (IFN α) response by Plasmacytoid Dendritic Cells (pDC) and IFN α -mediated Activation of T Cells in Healthy and Human Immunodeficiency Virus (HIV) Infected Donors



Alexandra Turley

Pharmacology & Toxicology
Mentor, Cheryl Rockwell

The Role of Nrf2 in the Activation of Primary CD4 T Cells from Mice and Humans

GRADUATE SPOTLIGHTS

EITS graduates are sought for careers in industry, government and academia. They leave the program with extensive research training in a specific basic science discipline as well as in toxicology, preparing them to interact with multidisciplinary teams focused on the goal of solving current and preventing future threats to human, animal and environmental health.

Below we feature three recent graduates and their paths after graduation from the EITS program.



Jinpeng Li

Postdoctoral Fellow, Toxicology and Environmental Research and Consulting (TERC), The Dow Chemical Company

At a glance:

Department: Genetics

Mentor: Norbert Kaminski

Dissertation: “Aryl hydrocarbon receptor activation by 2,3,7,8-tetrachlorodibenzo-p-dioxin impairs human B lymphopoiesis”

Defended: Summer 2017

Significant Achievements During Graduate School:

- » 2017 Society of Toxicology Graduate Student Travel Award
- » 2016 AHR Conference Travel Award
- » 2016 Immunotoxicology Specialty Section Best Student Presentation Award, Society of Toxicology
- » 2016 American Association of Chinese in Toxicology and Charles River Best Abstract Award, Society of Toxicology
- » 2015 Graduate School Travel Grant, Michigan State University
- » 2014 Society of Toxicology Michigan Regional Chapter Best Poster

With a long held curiosity for how things work, Jinpeng Li knew a career in science was his future. After earning his Bachelors of Science in Biotechnology and Masters of Science in Plant Biology at Nanjing University in Nanjing, Jiangsu, China, Li came to the U.S. to become a graduate student in the Genetics Program at MSU. During this time, Li trained with Dr. Norbert Kaminski and completed his dissertation, “Aryl hydrocarbon receptor activation by 2,3,7,8-tetrachlorodibenzo-p-dioxin impairs human B lymphopoiesis.”

Today Li is a Postdoctoral Fellow in Toxicology and Environmental Research and Consulting (TERC) at the Dow Chemical Company. During Li’s Ph.D. training at MSU he worked on a collaborative research project with TERC and learned about TERC’s long-standing history of toxicological research. When the opportunity arose, Li was excited to join the TERC team as a postdoctoral fellow to learn more about toxicological research in industry and how research finds are applied to product safety assessment.

Now Li works to establish new toxicological assays that serve as an alternative to animal testing. The goal is to develop predictive models that can effectively assess the safety of chemicals in a time and cost-efficient manner, and therefore reduce or replace animal use in toxicological screening. As part of the TERC team, Li has been involved in several diverse research projects distinct from his previous training background.

Li looks forward to continuing his education at TERC in the methods of conducting toxicological research in an industry setting.

Li found his time as an EITS student invaluable to his career today, “I think the EITS graduate program has a great curriculum that comprehensively covers the fundamental aspects of toxicology, which is essential for me to quickly adapt to new territories in toxicology.” Li believes the research training during his Ph.D. provided the opportunity to improve his critical thinking, technical and communication skills, which has played a crucial role in his current position as a postdoctoral fellow. 🐾



Sophia Kaska

*Postdoctoral Researcher, Department of Medicinal Chemistry,
University of Kansas*

At a glance:

Department: Pharmacology & Toxicology

Mentor: Michelle Mazei-Robison

Dissertation: “Investigating the Role of Ventral Tegmental Area TORC2 in Stress and Stress-Induced Changes in Opiate Reward”

Defended: June 2016

Significant Achievements During Graduate School:

- » 2017 ASPET Washington Fellow American Society for Pharmacology and Experimental Therapeutics (ASPET)
- » 2017 Institute for Integrative Toxicology Travel Award (for travel to the 2017 Experimental Biology/ASPET meeting, Chicago, IL)
- » 2016-2017 Pre-Doctoral Fellowship in Pharmacology/Toxicology, Pharmaceutical Research and Manufacturers of America (PhRMA) Foundation
- » 2016 Institute for Integrative Toxicology Travel Award (for travel to the 2016 Society for Neuroscience meeting, San Diego, CA)
- » 2016 Second Place- Best Abstract/Poster Presentation, American Society for Pharmacology and Experimental Therapeutics Neuropharmacology Division, 2016 Experimental Biology meeting, San Diego, CA
- » 2016-2017 Student Trainee- ASPET Mentoring Network
- » 2015 College of Natural Sciences Travel Award (for travel to the 2015 Society for Neuroscience meeting, Chicago, IL)
- » 2015 ASPET Travel Award (for travel to the 2015 Experimental Biology/ASPET meeting in Boston, MA)
- » 2014 Center for Integrative Toxicology Travel Award (for travel to the 2014 Society for Neuroscience meeting, Washington, DC.)
- » 2013-2015 Trainee- Integrative Pharmacological Sciences Training Program, NIH T32 GM092715, Michigan State University, East Lansing, MI

Sophia Kaska grew up wanting to become a scientist. Science was always her favorite class and she especially loved participating in science fairs as a young student. After receiving her Bachelor of Science degree in Biochemistry from the University of Kansas, Kaska took a job as a Research Assistant in the lab of Dr. Bryan Copple. The time she spent there solidified her decision to pursue a research career and further her education.

Kaska came to MSU and studied with Dr. Michelle Mazei-Robison and received her Ph.D. in Pharmacology and Toxicology. Her dissertation, “Investigating the Role of Ventral Tegmental Area TORC2 in Stress and Stress-Induced Changes in Opiate Reward,” began with her interest in drug design and how the structure of a molecule affects its function. Today, Kaska is a Postdoctoral Researcher in the Department of Medicinal Chemistry at the University of Kansas. She chose the position based on her research interests and long-term interests in science policy and education. Under the tutelage of Dr. Thomas Prisinzano, Kaska works to understand rational, structure-based drug design and evaluates novel compounds for their activity at opioid receptors for the treatment of pain. She currently performs pharmacological characterization of compounds that are made in their laboratory. By understanding how these

compounds affect biological processes, Kaska can give proper feedback to chemists in the laboratory to help them determine how to modify the structures of their subsequent compounds in order to achieve their desired biological outcomes. The goal of this research is to ultimately be able to develop and optimize medications for desired outcomes, while also designing them to minimize or eliminate negative side effects.

Kaska’s time as Postdoctoral Researcher has been valuable in gaining her experience in performing in vitro studies. Kaska’s next goal after her postdoctoral years will be to pursue a position in the science policy field. Her experience will also allow her to search for policy or education jobs that encompass the broader field of biomedical research.

Kaska found her experience as an EITS student at MSU to be a solid starting foundation to her next steps. “My time as an EITS student helped me prepare for this position by giving me a wide background in pharmacology and toxicology research that I have been able to apply to what I’m currently studying and to also be able to communicate with a wide range of scientists outside of my specialty. This is especially true now that I’m the only biomedical researcher in a laboratory comprised of medicinal chemists. The opportunities that I’ve had to meet with outside seminar speakers have also developed my abilities to connect with and engage in conversations with just about any professional in the field, which has been important in my position.” 🍷



Joseph Zagorski

Scientist, Pediatric Oncology Translational Research Laboratory, Helen DeVos Children's Hospital

Most of Joseph Zagorski's immediate family, including both of his grandfathers, are involved in science in some way, shape or form (educators, chemists, etc.) so it was no surprise that Zagorski grew up loving science. After earning his Bachelors of Science in Biotechnology from Purdue University, Zagorski entered the Ph.D. program in Cell and Molecular Biology at MSU and later joined EITS. Zagorski trained with Dr. Cheryl Rockwell and completed his dissertation, "The Role of the Nrf2/Keap1 Signaling Pathway in the Early Events Following Jurkat T Cell Activation," in Fall of 2017.

Today Zagorski is a Scientist at the Pediatric Oncology Translational Research Laboratory at the Helen DeVos Children's Hospital (HDVCH) in Grand Rapids, Michigan. Zagorski's research at HDVCH is directed at finding novel treatment strategies for pediatric oncology patients. The laboratory specializes in solid pediatric tumors (not blood cancers). Their work is intended to directly lead to clinical trials for their patients. The laboratory Zagorski is part of is the

head of a 46 hospital consortium, so when their science leads to clinical trials, it casts a broad net, helping as many children as possible.

Zagorski said it was humbling to go to a completely new field after graduate school where he worked in immunotoxicology for six plus years, but he was excited for the challenge. "My time as an EITS student really gave me a great leg up in terms of understanding the complexities of pharmacokinetics and pharmacodynamics and how these processes play into whether a compound is going to result in a therapeutic response or a toxicity," said Zagorski. "It also really aided me in bring to this lab the continual questions of, "Is this the test we should be using to answer the question at hand? What are we really testing?"



At a glance:

Department: Cell & Molecular Biology

Mentor: Cheryl Rockwell

Dissertation: "The Role of the Nrf2/Keap1 Signaling Pathway in the Early Events Following Jurkat T Cell Activation"

Defended: Fall 2017

Significant Achievements During Graduate School:

- » 2014 Best Poster Presentation Travel Award, Society of Toxicology, Michigan Regional Chapter
- » 2014 Best Presentation by a Student Award, Society of Toxicology, Immunotoxicology Specialty Section
- » 2013 Best Poster Presentation Travel Award, Society of Toxicology, Michigan Regional Chapter
- » 2012-2014 NIH T32 Pharmacology Training Grant (competitive slot), Primary Investigator, Dr. James Galligan



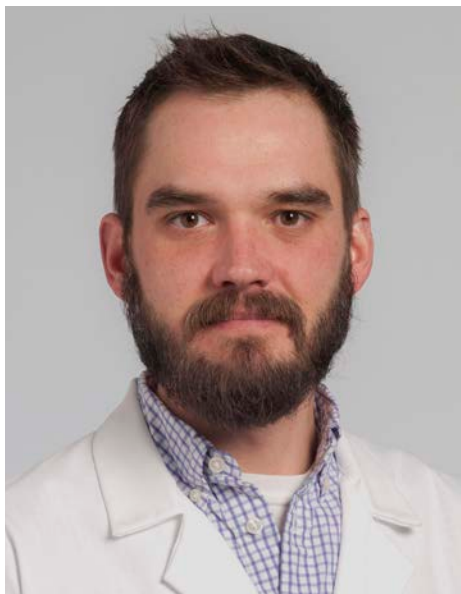
2018 Annual Research Evening

The IIT'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 December 6, 2018 in the Lincoln Room of the MSU Kellogg Center. The event included dinner, student posters and platform presentations.

The platform presentations for the evening were given by EITS graduate student, Kelly Fader, and postdoctoral student, Lauren Hardy. Kelly Fader, who trains with Dr. Timothy Zacharewski, spoke on, "Persistent Aryl Hydrocarbon Receptor Activation Abolishes Circadian Regulation of Hepatic Metabolic Activity in Mice." Lauren Hardy, who trains with Dr. James Luyendyk, spoke on, "The Clot Thickens: A Non-Traditional Mechanism of Fibrin(ogen) Deposition in Liver Disease."

Pictured at left are IIT Director Dr. Norbert Kaminski, Lauren Hardy, Kelly Fader, and EITS Graduate Director Dr. John LaPres.

EITS Graduate Kyle Poulsen at the Lerner Research Institute



Dr. Kyle Poulsen graduated from the Department of Pharmacology and Toxicology and the EITS program at MSU in 2013. Growing up with a fundamental curiosity of how the world around him worked, Poulsen followed a series of “right place, right time, right person” scenarios to his career in science today. Poulsen credits his time as an EITS student in showing him how diverse science can be, especially toxicology. “Moreover, the EITS program did a fantastic job of connecting students from several departments across the MSU campus, and as many of us know, collaboration with other scientists and laboratories is key to success in science,” said Poulsen.

After graduate school, Poulsen became a Postdoctoral Research Fellow at the Lerner Research Institute at the Cleveland Clinic Foundation under the tutelage of Dr. Laura Nagy. Choosing to go to the Lerner was mostly serendipitous said Poulsen. Dr. Nagy just happened to be visiting with his EITS graduate school mentors, Dr. Patricia

Ganey and Dr. Robert Roth, and Dr. Nagy was looking for a postdoc for her lab. Poulsen’s skillset and education, developed through MSU Pharm/Tox and the IIT, was a perfect fit with Dr. Nagy’s laboratory interests. Poulsen’s transition to the world-renowned medical institution was a bit overwhelming at first (his parking spot was $\frac{3}{4}$ mile from his lab!) but he found commonality and support from his labmates and other early and junior-level researchers within the department.

During Poulsen’s tenure at MSU and as a student in the EITS program, Poulsen found himself changing career goals from an industry setting to that of an academic scientist. His progression to an independent researcher at the Lerner Research Institute has enriched the future of his career. Poulsen has been able to work with leading researchers across institutes in the US and worldwide on a continuous basis. He has been fortunate to expand his technical skills and work with tissue from patients being treated at the Cleveland Clinic as well as in collaboration with other leading medical institutes, which has proven an invaluable resource in his health research. He has also developed lasting connections with mentors and peers that he hopes will continue to guide and improve his work for years to come. Finally, his time in Dr. Nagy’s lab proved the perfect place to learn to apply for NIH grants.

Today, Poulsen is in the first year of a K99/R00 award from the National Institute on Alcoholism and Alcohol Abuse (NIAAA) and hopes to start his own laboratory in the next two years. Poulsen’s research focuses on the mechanisms that cause Alcoholic Liver Disease in hopes to develop novel therapeutics and/or discover biomarkers for the disease. Chronic alcohol misuse is second only to tobacco in preventable morbidity worldwide and Alcoholic Liver Disease is the principle cause of death in patients

with Alcohol Use Disorder with no effective drugs for its treatment. Liver transplantation for end-stage patients is the only option, but costs over \$1 million USD and the supply of healthy livers for transplantation is always limited. Ultimately, working towards effective identification of ALD and/or developing new therapeutics for ALD patients would be a significant benefit to society. “Our work in the lab continues to challenge me as much as it enlightens me,” said Poulsen.

“If it’s finding the precise time-point or dose to analyze a signaling pathway, controlling for the many nuances of in vivo work, or observing the variations in our human patient cohorts; it all represents pushing the boundaries of what we knew about biology to hopefully improve health and quality of life in society.”

Recent Awards:

- » 2018 K99/R00 Pathway to Independence - “Hepatocyte-derived MIF: a key contributor to Alcoholic Liver Disease”
- » 2017 Pathobiology Chairman’s Award, Department of Pathobiology, Lerner Research Institute
- » 2017 Postdoctoral Travel Award, Cleveland Clinic Alumni Association
- » 2016 Ruth L. Kirschstein National Research Service Award (NRSA) Individual Postdoctoral Fellowship - “Role of macrophage migration inhibitory factor in an acutely severe model of alcoholic hepatitis”
- » 2016 Best Postdoctoral Poster Presentation, 36th Annual Cleveland Clinic Research Day

FACULTY FEATURES



Cheryl Murphy

Associate Professor, Fisheries and Wildlife

Cheryl Murphy might have been a ski instructor if she had not followed her love of fish to her career today.

Born in Canada and raised for 6 years in Greece next to the Mediterranean, Murphy spent much of her childhood around water - snorkeling and fishing. With a love for science, she began her college career at the University of Alberta planning to be a medical doctor, but soon realized she didn't enjoy it very much. After two years, she transferred to Dalhousie University in Nova Scotia and studied Marine Biology. Her experience there was eye-opening and she felt like, "This is what I am supposed to be doing." During a year off after her undergraduate degree, Murphy cycled through several odd jobs, finally being offered two jobs: a full-time ski instructor position at a resort or a part time job at the university working with fish. She chose the fish, and never looked back. While she earned her Master's degree at the University of Alberta in Cell Biology and Physiology, Murphy worked on electrophysiology with fish, recording data from their noses and figuring out what they smell. Specifically, she worked with the round goby and discovered that they could smell hundreds of different

chemicals that could all be collapsed into four different receptor categories. This reductionist type of science wasn't super appealing to Murphy, but what did spark her interest was the endocrine disruption phenomenon, where different chemicals could hit the same receptor and get a similar behavioral response. Her interest in toxicology took flight from there and she began to delve deeper into the big picture of science - modeling and synthesis.

After working as a lab technician at the University of Minnesota, Murphy moved on to Louisiana State University and received her Ph.D. in Oceanography and Coastal Sciences. While at LSU, she studied with a mentor who was an individual based modeler - someone who models individuals and figures out what their collective response means to a population. The last piece of her education fell into place at University of Toronto with a postdoctoral fellowship in the Department of Ecology and Evolutionary Biology where she learned more about life history and evolution and how these factors shape an organism's response to stress. When she came across an interdisciplinary position posting at MSU for a toxicologist with

a background in fisheries, Murphy felt like the position was written just for her. Consequently, she applied and was awarded the position.

Today, Murphy is an Associate Professor in the Department of Fisheries and Wildlife at MSU and her research program now incorporates the variety of topics she had throughout her education: physiology, modeling, life history, and evolution. Her main research focus presently is how do you scale information you collect at one level of biological organization to another one. The stressor or organism does not matter; she focuses on those connections between biological organization. Using mainly fish as a model organism, Murphy strives to synthesize information collected on individuals and uses this information to develop models that can accommodate thousands of species. After developing the models, other scientists are able to use them to modify and build upon to improve toxicity testing. Their results could eventually end up as recommendations for new environmental regulations.

During her time at Louisiana State, Murphy worked on this idea of scaling, trying to take one level or organization and translate it to a different level of organization that is relevant for management, and she does this using simulation models. Today, the EPA has labeled this framework as "Adverse Outcome Pathways" and Murphy is in the thick of working groups and panels assigned to develop this idea and move it forward. "I'm lucky to be part of this global group of people who are moving the framework forward. There is a paradigm shift happening in toxicology - it is evolving and changing and it is a really exciting time to be here. We are moving from traditional dose-response studies that use whole animals and test single chemicals, to more computational, in vitro, and in silico work. This is necessary because there are over 80,000 chemicals to test, not including combinations and interactions with other stressors, and these have to be tested on millions of species for proper ecological risk assessment."





Always fascinated by the chemical reactions surrounding daily life – photosynthesis, metabolism, cooking – Masako Morishita knew pursuing a career in science was in her future. An enthusiastic high school chemistry teacher lit a spark for chemistry in Morishita and when she crossed the Pacific Ocean to the U.S. as an exchange student, she decided to pursue a bachelor's degree in Chemical Engineering at the University of Michigan. One of her senior projects, to design an efficient refinery process, encouraged her curiosity about the relationships between environment, human health and the end products of chemical processes.

After earning her B.S. in Chemical Engineering, Morishita then went on to pursue her M.S. and Ph.D. in Environmental Health Sciences from U of M. Her experiences with her advisor and mentor, Dr. Jerry Keeler, shaped the course of her academic and research career tremendously. At the time, Dr. Keeler was working with MSU's own Dr. Jack Harkema to design a one-of-a-kind mobile air research laboratory to conduct community-based air pollution health effects studies. Dr. Keeler felt Morishita's engineering background and public health interest would fit nicely with a newly-funded project that would heavily utilize this amazing new facility, and so that's where Morishita completed

her doctoral research work. Dr. Keeler also introduced Morishita to the idea of interdisciplinary research before it was mainstream. "Interdisciplinary research to me is similar to playing music in an orchestra or a marching band," said Morishita. "It's a humbling and rewarding process in which you make sure that you provide your expertise, and a diverse array of collaborators does the same. When we all work together successfully, the outcome is amazing."

After working for several years at U of M as a Research Assistant Professor, being promoted to Research Associate Professor, and successfully directing the Trace Metals Laboratory for the U of M Environmental Health Sciences Core Center, Morishita decided to pursue a tenure track position and other research collaboration opportunities. When she was offered a public health researcher position at MSU in the Department of Family Medicine, Morishita leapt at the opportunity to play a critical role in broadening interdisciplinary collaboration and to work closely with health care professionals and statewide communities. Her longtime research collaborations with Dr. Bengt Arnetz, Dr. Jack Harkema, and Dr. James Wagner were also a tremendous influence on her decision to join MSU despite having an offer from another institution.

When Morishita came to MSU as an

Associate Professor in the Department of Family Medicine, she brought several grants with her including her first NIH-RO1 grant as the PI, under which she had assembled a team of experts from exposure assessment, clinical and cardiovascular medicine, epidemiology, nursing research and biostatistics. Around the world, airborne fine particulate matter (PM_{2.5}) is an important risk factor for cardiovascular and respiratory morbidity and mortality. Both large-scale national and personal-level interventions have the potential to reduce PM_{2.5} exposure and its adverse health effects. Just recently, Morishita and her team published the results of their study in the journal *JAMA Internal Medicine*. The research team found that a reduction in PM_{2.5} exposure via commercially-available portable air filtration systems can decrease systolic blood pressure by 3-4 mmHg, an amount similar to other lifestyle treatments for hypertension such as exercise or reduced salt intake. Given that a 1-mmHg reduction in systolic blood pressure could prevent an estimated 10,000 coronary heart disease deaths each year in the U.S. alone, the seemingly small improvement seen in this study may make a meaningful difference to many. Together with Dr. Robert Brook at U of M, Morishita has applied for a renewal grant to conduct a follow-up study with HEPA filters to verify whether the lower blood pressure persists for a longer period and to investigate mechanisms behind PM_{2.5}-induced cardiometabolic effects. Eventually, she hopes to conduct a long-term study to determine whether the filters not only help reduce blood pressure, but also lower the risk of heart attack and stroke. Morishita is now the Director of the MSU Science Exposure Laboratory and hopes to continue focusing on interventions and extending her future efforts in community-based health research, with a particular eye toward tackling environmental health disparity issues.





Rita Strakovsky

Assistant Professor, Human Nutrition

An interest in human health may be in Rita Strakovsky's blood. Strakovsky's mother started her career as a lab technician before becoming a nurse, and her grandmother was a urologist. It was no surprise then, that what interested Strakovsky most growing up was human health, disease prevention, and nutrition.

Strakovsky began her education at the University of Illinois as an undergraduate in the Molecular and Cellular Biology Program. She began college with the intention of one day being an obstetrician, but after really enjoying her lab and hands-on classes, she decided instead to pursue graduate school. At the urging of a friend, she considered nutrition, which seemed like the perfect application of molecular biology towards preventing diseases and promoting human health. Having access to one of the best Molecular Nutrition programs in the country, Strakovsky stayed on at University of Illinois and earned her Ph.D. in Nutritional Sciences and became a Registered Dietitian. At the conclusion of her Ph.D. training, an opportunity arose where she could apply her training in maternal nutrition and epigenetics to reproductive toxicology. She would be able to apply her knowledge of the molecular mechanisms that regulate metabolism to toxicological animal studies investigating the effects

of endocrine disrupting chemicals on metabolic health. This postdoctoral opportunity with several collaborators, including her Ph.D. mentor, seemed to be the perfect fit, and so she chose to stay at the University of Illinois one more time. "Every time I wanted to try something new and different, the opportunity was there," said Strakovsky of her time at University of Illinois. As a T32 postdoctoral fellow in Endocrine, Developmental and Reproductive Toxicology, Strakovsky worked mostly at the bench, but became interested in applying her findings to large-scale population studies.

The director of her T32 training program was eventually funded the Children's Environmental Health Research Center at the University of Illinois, which studies the effects of exposure to bisphenol A, phthalates and other chemicals found in plastics and personal care products on neurological and reproductive development. In addition to conducting several animal studies, the Children's Center also began recruiting a large pregnancy and birth cohort (I-KIDS). Strakovsky joined the I-KIDS team because she was very interested in expanding her knowledge of large-scale human population studies and learning how cohorts are recruited and maintained. Strakovsky's mentor encouraged her to write an NIH K99/R00 grant to

expand on aims of the I-KIDS study. After applying for and receiving the K99/R00 award, Strakovsky spent two more years at the University of Illinois asking the question, "Do endocrine disrupting chemicals impact maternal hormones, thereby impacting the fetus?" When it came time to look for a faculty position, a land grant institution was Strakovsky's top priority. She liked the land grant system and the approach of giving back that is inherent in land grant institutions and "for whatever reason, it felt like home." Being in a nutrition department was another deciding factor for Strakovsky, so when a position became available in the Department of Food Science and Human Nutrition at MSU for someone with expertise in lipids, it felt like a great opportunity. The strong toxicology presence and EITS program at MSU were also a deciding draw to the job.

Now in her second year of her R00 at MSU, Strakovsky's research focuses on understanding why the relationships between environmental disruptors and fetal outcomes exist. More specifically, she seeks to understand whether endocrine disruptors can disrupt maternal hormones or metabolic pathways in pregnancy, thereby affecting fetal growth and development. Rather than measure the outcome in the infant directly, Strakovsky is most interested in studying the mechanisms in the mother. Additionally, given her expertise in metabolic health during pregnancy, Strakovsky studies whether maternal adiposity and/or body fat distribution are independent "endocrine disruptors" during pregnancy. This is important because she also seeks to understand whether women who enter pregnancy at a higher weight or with excess adipose tissue may be more susceptible to the effects of the chemicals she studies.

Pregnant women are constantly bombarded with information about what is and what is not safe during pregnancy. Strakovsky's goal as a researcher is to contribute to the body of evidence that would allow public health experts to make useful and manageable health recommendations for pregnant women. "If we understand what changes are happening in a woman's body, we can understand what things are scary and what things are not." 🍀

FACULTY PUBLICATIONS

During the 2017-2018 academic year, 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 July 1, 2017 to June 30, 2018.

Amalfitano, Andrea

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Andrechek, Eran R.

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To B, Andrechek ER (2018). Transcription factor compensation during mammary gland development in E2F knockout mice. *PLoS One.* 13(4):e0194937. PubMed PMID: 29617434.

Annis MG, Ouellet V, Rennhack JP, L'Esperance S, Rancourt C, Messon AM, Andrechek ER, Siegel PM (2018). Integrin-uPAR signaling leads to FRA-1 phosphorylation and enhanced breast cancer invasion. *Breast Cancer Res.* 20(1):9. PubMed PMID: 29382358.

Hollern DP, Swiatnicki MR, Andrechek ER (2018). Histological subtypes of mouse mammary tumors reveal conserved relationships to human cancers. *PLoS Genet.* 14(1):e1007135. PubMed PMID: 29346386.

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Bernard, Jamie J.

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Benham V, Bernard JJ (2018). Why does a high-fat diet increase cancer risk? *Future Oncol.* 14(7):583-588. PubMed PMID: 29411646.

Chakraborty D, Benham V, Jdanov V, Bullard B, Leal AS, Liby KT, Bernard JJ (2018). A BET Bromodomain Inhibitor Suppresses Adiposity-Associated Malignant Transformation. *Cancer Prev Res (Phila).* 11(3):129-142. PubMed PMID: 29246955.

Chakraborty D, Benham V, Bernard JJ (2018). Elucidating the role of adipose tissue secreted factors in malignant transformation. *Adipocyte.* 7(1):45-48. PubMed PMID: 29095087.

Chakraborty D, Benham V, Bullard B, Kearney T, Hsia HC, Gibbon D, Demireva EY, Lunt SY, Bernard JJ (2017). Fibroblast growth factor receptor is a mechanistic link between visceral adiposity and cancer. *Oncogene.* 36(48):6668-6679. PubMed PMID: 28783178.

Ogrodzinski MP, Bernard JJ, Lunt SY (2017). Deciphering metabolic rewiring in

breast cancer subtypes. *Transl Res.* 189:105-122. PubMed PMID: 28774752.

Bernstein, Alison I.

McGee D, Smith A, Poncil S, Patterson A, Bernstein AI, Racicot K (2017). Cervical HSV-2 infection causes cervical remodeling and increases risk for ascending infection and preterm birth. *PloS one.* 12(11):e0188645. PubMed PMID: 29190738.

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Buchweitz, John P.

Buchweitz JP, Carson K, Reboloso S, Lehner A (2018). DDT poisoning of big brown bats, *Eptesicus fuscus*, in Hamilton, Montana. *Chemosphere.* 201:1-5. PubMed PMID: 29505918.

Fitzgerald SD, Martinez J, Buchweitz JP (2018). An apparent case of brodifacoum toxicosis in a whelping dog. *J Vet Diagn Invest.* 30(1):169-171. PubMed PMID: 29145778.

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Trosko, James E.

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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 activities below are from July 1, 2016 to June 30, 2017.

Bernard, Jamie J.

- » Secretary/ Treasurer, Carcinogenesis Specialty Section, Society of Toxicology
- » Grant reviewer, PhRMA Foundation
- » Grant reviewer, Strategic Partnership
- » Michigan Society of Toxicology (SOT) Secretary/Treasurer
- » Current Concepts in Toxicology Committee Member for SOT

Bernstein, Alison I.

- » Reviewer: Physiology and Behavior, BMC Genomics, Journal of Neuropathology & Experimental Neurology, Frontiers in Neurology, Frontiers in Neuroscience

Bhattacharya, Sudin

- » President, Michigan SOT Regional Chapter
- » Secretary, SOT Computational Toxicology Specialty Section

Bourquin, Leslie D.

- » Chair, NSF International Global Food Safety Advisory Council
- » Advisory Panel Member, World Bank Global Food Safety Partnership
- » Consumer Goods Forum, Global Food Safety Initiative, GFSI Technical Committee Member and Vice Chair of Global Markets Primary Production Technical Working Group
- » Technical Advisory Network Member, Food Safety Preventive Controls Alliance
- » Editorial Board, Foods Journal

Bursian, Steven J.

- » Member, Health Advisory Board of NSF International

Ewart, Susan L.

- » Reviewer, Microbiology and Infectious Diseases Research Committee (MID), National Institutes of Health
- » Reviewer, Stimulating Access to Research in Residency (StARR) (R38) ZAll AMC-A MICommittee, National Institutes of Health/ NIAID

Ganey, Patricia E.

- » Editorial Board, Journal of Toxicology and Environmental Health
- » Editorial Board, Toxicology
- » Councilor, International Union of Toxicologists for the SOT
- » Past President, Society of Toxicology

Goodman, Jay I.

- » Editorial Board, Toxicology
- » Associate Editor, Regulatory Pharmacology and Toxicology
- » Member, Board of Directors, Toxicology Forum
- » Member of the Nominating Committee, Society of Toxicology

Gulbransen, Brian D.

- » Chair of 2019 American Neurogastroenterology and Motility Society (ANMS) Young Investigator Forum, Chicago, IL, USA
- » Session Chair, Digestive Disease Week (DDW) 2018: Enteric Neurobiology Section: Cell and Molecular Biology

- » Chair of Digestive Disease Week (DDW) 2018 Abstract Review; American Gastroenterological Association (AGA); Enteric Neurobiology Section: Cell and Molecular Biology (Including Neurons, Glia, ICC, Smooth Muscle and Stem Cells)
- » Michigan Physiological Society Membership and Fundraising Committee
- » Michigan Physiological Society Awards Committee
- » American Physiological Society GI & Liver Physiology Section Trainee Development Committee
- » American Society of Neurochemistry (ASN) membership committee
- » Michigan State University Institutional Animal Care and Use Committee (IACUC)
- » Chair, Michigan State University Department of Physiology Research Committee
- » Chair, Michigan State University Neuroscience Program Search Committee
- » Michigan State University Department of Physiology Research Committee
- » Michigan State University Neuroscience Program Graduate Advisory Committee
- » Michigan State University Neuroscience Program Comprehensive Exam Committee, Chair of Translational Committee
- » Editor: Neurogastroenterology and Motility, Experimental Physiology, Purigenic Signalling, Frontiers Autonomic Neuroscience, Frontiers in Cellular Neuroscience
- » Ad-hoc reviewer for numerous journals

- » 2018 – 2021 Crohn's and Colitis Foundation National Scientific Advisory Committee (NSAC), Research Awards Committee
- » Crohn's and Colitis Foundation of Canada Grant in Aid Review Panel
- » Ad-hoc grant reviewer for the UK Biotechnology and Biological Science Research Council (BBSRC)
- » Ad-hoc grant reviewer for the French National Research Agency ANR (Pathophysiology evaluation committee)
- » Ad-hoc grant reviewer for the Wellcome Trust, UK

Harkema, Jack R.

- » Councilor, Executive Committee, Society of Toxicologic Pathology
- » Member, Editorial Board, Journal of Toxicologic Pathology
- » Member, Board of Trustees, American Thoracic Society
- » Chair, Environmental, Occupational and Population Health Assembly, American Thoracic Society
- » Standing Member (appointed by US EPA Administrator), Clean Air Science Advisory Committee

Hayes, A. Wallace

- » Invited speaker: BIA 10-2474 (FAAH Inhibitor). 2018. 25th Seminar Series "Classic Examples in Toxicologic Pathology, European Society of Toxicologic Pathology and University of Veterinary Medicine, Hannover, Germany, 2/23/18
- » Chairperson, Workshop Session: Deliberations in Regulatory Safety Assessment of Food Substances in Early Life, Society of Toxicology, San Antonio, TX, 3/15/18
- » Invited Speaker, Risk of Mixtures Should Be Assessed on a Case-by-Case Basis Depending on the Available Data. In Roundtable Session: Is a Common Mechanism of Action Essential to Conduct a Cumulative Risk Assessment or Just Nice to Have. Society of Toxicology, San Antonio, TX, 3/14/18
- » Invited Speaker, Dose in Infant Exposure Matters in Safety As-

essment. In Workshop Session: Deliberations in Regulatory Safety Assessment of Food Substances in Early Life, Society of Toxicology, San Antonio, TX, 3/15/18

- » Chairperson, SOT FDA Colloquia on Emerging Toxicological Science: Challenges in Food and Ingredient Safety. Can Alternatives Inform the Risk Assessments of Mixtures in Food? FDA, College Park, MD, 3/27/18
- » Invited speaker, Reassessing the Two-year Rodent Carcinogenicity Bioassay from an History Point of View. 2018 Food Packaging Summit, Baltimore, Maryland, 6/12/18
- » Chairperson and Speaker. Proposed In Silico Approach for Mixtures in New Testing to Assess Potential Health Impact of Exposure to Chemical Mixtures. Eight International Conference of Asian Society of Toxicology (ASIATOX2018) Pattaya, Thailand, 6/18/18
- » Chairperson and Speaker. Proposed Alternative Approaches for Mixtures of Foods. Toxcon 2018
- » 23rd Interdisciplinary Toxicology Conference, Congress Center Hotel Academia, Stara Lesna, The High Tatras, Slovakia, 6/22/18

Hollingworth, Robert M.

- » Officer, Agrochemicals Division, American Chemical Society

Kaminski, Norbert E.

- » Chair, External Review Committee for the Interdisciplinary Program in Toxicology at Texas A&M University
- » NIEHS National Advisory Environmental Health Sciences Council
- » 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, National Academy of Sciences, Institute of Medicine Committee on the Health Effects of Marijuana

- » Editorial Board, Toxicology

LaPres, John J.

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

Leininger, Gina M.

- » Ad hoc Reviewer: Diabetes, Journal of Neuroscience, Nature Communications, Nature Medicine, Neuropeptides, Neuropharmacology, Scientific Reports
- » Society Service: The Obesity Society Annual Program Committee
- » Abstract Reviewer: The Endocrine Society, The Obesity Society, The American Diabetes Association
- » Grant Reviewer: NIDDK Fellowships Panel

Li, Ning

- » Section Editor, Drug and Chemical Toxicology
- » Manuscript Reviewer: Toxicology Letters, Atmospheric Environment, Journal of Allergy and Clinical Immunology, Science of the Total Environment, Allergy

Liby, Karen T.

- » Editorial Board, AACR Cancer Prevention Research
- » (ASPET) Summer Undergraduate Research Fellowship (SURF) director at MSU
- » Reviewer, AAAS Research Competitiveness Program Review of King Abdulaziz City for Science & Technology proposals
- » Member, PREVENT Program Scientific Review Panel
- » Member, AACR Breast Cancer Research Grants Scientific Review Committee
- » External reviewer, Swiss Cancer League
- » External reviewer, UT Health San Antonio Nathan Shock Biology of Aging Center Pilot Project Grant Proposal

- » Ad hoc reviewer, NCI R21/R03 NCI Clinical and Translational Exploratory/Developmental Studies Review Panel

Luyendyk, James P.

- » Standing member, XNDA Study Section
- » Councilor, Michigan Regional Chapter, SOT
- » Co-Chair, SOT Committee for Diversity Initiatives
- » Junior Councilor, Mechanisms Specialty Section, Society of Toxicology
- » Editorial Board, Journal of Thrombosis and Haemostasis
- » Editorial Board, Toxicological Sciences

McCabe, Laura

- » Women in Bone and Mineral Research Committee, American Society of Bone and Mineral Research
- » FASEB Science Policy Committee, FASEB
- » Grant Program Council and Operating Committee For Cores, Michigan Diabetes Research and Training Center/Translational Research
- » Faculty Steering Committee and FDP Executive Committee, Federal Demonstration Partnership
- » Chair, Science Policy Committee, American Physiological Society
- » Animal Care and Experimentation Committee, American Physiological Society
- » SPC Chair Member, Council, American Physiological Society
- » Associate Editor, Journal of Cellular Biochemistry, Molecular Biology Reports, World Journal of Diabetes
- » Editorial Board, Physiological Reviews
- » Grant Review Panels: NIH Skeletal Biology Development and Disease Study Section Member, NIH ZDK1 GRB-B MI LRP Review, European Calcified Tissue Society – External Grant Reviewer

Medina Meza, Ilce G.

- » Editorial Board, Food Research International

Masako, Morishita

- » Study Section Peer Reviewer: NIEHS P42 Superfund Hazardous Substance Research and Training Program, ZES1 LKB-K, IAM
- » Study Section Peer Reviewer: NIEHS P42 Superfund Hazardous Substance Research and Training Program, 2017/01 ZES1 LKB-K (S), Special Emphasis Panel

Murphy, Cheryl A.

- » Steering Committee, High-Throughput Screening and Environmental Risk Assessment, SETAC North America
- » Associate Editor, Ecotoxicology

Paneth, Nigel S.

- » External Advisory Committee, University of Pennsylvania MPH Program
- » Scientific and Editorial Board, Supercourse in Epidemiology, University of Pittsburgh
- » Scientific Advisory Group, Norwegian Mother and child Cohort (MoBa) and Danish National Birth Cohort (DNCB) combined cerebral palsy study (MOBAND)
- » Executive Committee, ECHO Study (Environmental Influences on Child Health Outcomes), NIH, 2016-2018
- » External Advisor, Screening to Improve Health in Very Premature Infants in Europe (SHIPS) Study, INSERM, Paris, funded by European Commission, 2015- present

Petroff, Brian K.

- » Section Chief, Endocrinology, MSU Veterinary Diagnostic Laboratory

Robison, A.J.

- » Reviewer, Molecular Neuropharmacology and Signaling

Rockwell, Cheryl E.

- » Editorial Board, Molecular Pharmacology
- » Editorial Board, Pharmacological Research
- » Associate Editor, BMC Pharmacology & Toxicology
- » Ad hoc member, Systemic Injury by Environmental Exposure Study Section

Rosenman, Kenneth D.

- » Co-Leader, Occupational Health Work Group, Conference of State and Territorial Epidemiologists
- » Secretary, Board of Directors of the Michigan Occupational and Environmental Medical Association
- » Member, Michigan Pesticide Advisory Committee

Roth, Robert A.

- » Editorial Board, Journal of Toxicology and Environmental Health
- » Associate Editor, Journal of Pharmacology and Experimental Therapeutics
- » Member/Consultant, Technical Committee on the Application of Genomics to Mechanism-based Risk Assessment, ILSI, Health and Environmental Sciences Institute (HESI)
- » Member, NIH Study Section: Xenobiotic and Nutrient Disposition and Action
- » Member, Endowment Fund Board, Society of Toxicology
- » External Advisory Committee, Curriculum in Toxicology, University of North Carolina at Chapel Hill
- » External Advisory Committee, Graduate Program in Pharmacology, University of Kansas Medical Center

Rowlands, Craig

- » Member, US EPA Science Advisory Committee on Chemicals (SACC)
- » Member, US EPA TSCA PBT Panel
- » Member, Board of Directors, Johns Hopkins University, Center for Alternatives to Animal Testing (CAAT)

Sikarskie, James G.

- » Member, AVMA Committee on Environmental Issues

Tiedje, James M.

- » Bioscience External Science Advisory Committee, Berkeley National Laboratory
- » Class Chair, National Academy of Sciences
- » Science Advisory Committee, Denmark's CENPERM (Cntr for Permafrost change in Greenland) Project
- » Appointed by NAS to the U.S. National Committee for Soil Science
- » Co-Chair of Amer Soc Microbiol Coalition on Antimicrobial Resistances
- » Chair of the 4th Intl Symposium on Environmental Dimensions of Antibiotic Resistance (EDAR-4)
- » External Review Comm of Microbiology and immunology Dept, Montana State Univ
- » Chaired Moore Foundation Review of its Marine Microbial Ecology Program
- » Member of Simons foundation Bioscience Advisory Committee
- » Steering Comm member of NMDC (Natl Microbiome Data Collaborative)

Upham, Brad L.

- » Associate Editor, Journal of Toxicology
- » Associate Editor, BioMed Research International
- » Elected Officer: Member-at-Large (IVACS), Society of In Vitro Biology

Veiga-Lopez, Almudena

- » Chair, Graduate Student Affairs & Curriculum Committee, Department of Animal Sciences, Michigan State University
- » Reviewer, Scientific Reports, Toxicological Sciences, Environmental Pollution, Reproductive Toxicology, Endocrinology, Human Reproduction, Biology of Reproduction, Molecular Reproduction

and Development, Journal of Ovarian Research, Fertility & Sterility

- » Ad hoc Abstract Reviewer, Endocrine Society Annual Meeting
- » Ad hoc Grant Reviewer, Michigan Alliance for Animal Agriculture Pilot Grants
- » Ad hoc Grant Reviewer, NIH Pathway to Independence Award Study Section (PA-18-397/8), National Institutes of Environmental Health (NIEHS/NIH).
- » Symposium Organizer, Diving deep: mechanisms of endocrine disruptors in pregnancy and relevant biomarkers, International Society of Exposure Science and the International Society for Environmental Epidemiology (ISEE-ISEE 2018), August 2018
- » Symposium Organizer, Endocrine Disruptors and Obesity-related Outcomes: Windows of Susceptibility in Women's Health, Obesity Society Annual Meeting, November 2018

Wagner, James G.

- » Associate Editor, Inhalation Toxicology
- » Editorial Board, Particle and Fibre Toxicology
- » President, Cardiovascular Toxicology Specialty Section, Society of Toxicology
- » Member, Finance Committee, Society of Toxicology
- » Member, Program Committee, Environmental, Occupational and Population Health; American Thoracic Society
- » Member, Committee for Threshold Limit Values for Chemical Substances (TLV-CS); American Conference of Governmental Industrial Hygienists (ACGIH)
- » Reviewer, NIOSH/CDC World Trade Center Cooperative Research Agreements ZOH1 NXT(52) PAR-16-098

Wu, Felicia

- » Member, MSU Presidential Search Committee

- » Area Editor for Health Risk Assessment, Risk Analysis
- » Section Editor for Economics and Policy, World Myco-toxin Journal
- » Consulting Editor for Risk Communication, Archives of Environmental and Occupational Health
- » Member, Computational Task Force, World Health Organization (WHO) Foodborne Disease Burden Epidemiology Reference Group

Zacharewski, Timothy R.

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

Zhang, Wei

- » Associate Editor, Canadian Journal of Soil Science, Journal of Environmental Quality
- » Guest Editor, Vadose Zone Journal
- » Chair, SSSA Soil Physics and Hydrology Division Mentoring Committee
- » Committee Member, AGU Unsaturated Zone Technical Committee, ASABE NRES-21 Hydrology Group
- » Member of Multistate Research Project W3188: Soil, Water, and Environmental Physics Across Scales
- » Member of Multistate Research Project NC1187: The Chemical and Physical Nature of Particulate Matter Affecting Air, Water and Soil Quality
- » Secretary General, International Symposium on Agro-Environmental Quality, Nanjing, China

IIT AFFILIATED FACULTY

Andrea Amalfitano, Professor, Microbiology & Molecular Genetics, Pediatrics

Eran R. Andrechek, Assistant Professor, Department of Physiology

William D. Atchison, Professor, Pharmacology & Toxicology

Jamie J. Bernard, Assistant Professor, Pharmacology & Toxicology

Matthew P. Bernard, Assistant Professor, Pharmacology & Toxicology

Alison I. Bernstein, Assistant Professor, Translational Science & Molecular Medicine

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

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

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

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

Steven J. Bursian, Professor, Animal Science

Stephan A. Carey, Assistant Professor, Small Animal Clinical Sciences

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

Karen Chou, Associate Professor, Animal Science

Bryan L. Copple, Associate Professor, Pharmacology & Toxicology

Susan L. Ewart, Professor, Large Animal Clinical Sciences

Patricia E. Ganey, Professor, Pharmacology & Toxicology

Jay I. Goodman, Professor, 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, Edwin Willits Associate Professor, Civil & Environmental Engineering; Adjunct Associate Professor, Plant, Soil & Microbial Sciences, and the Microbial Ecology Center

A. Wallace Hayes, IIT Adjunct Faculty, Senior Science Advisor, Spherix Consulting

Colleen C. Hegg, Associate Professor, Pharmacology & Toxicology

Robert M. Hollingworth, Professor Emeritus, Entomology

James E. Jackson, Professor, Chemistry

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

Norbert E. Kaminski, Director, Institute for Integrative Toxicology; Professor, Pharmacology & Toxicology, Cell & Molecular Biology

John B. Kaneene, University Distinguished Professor and Director, Center for Comparative Epidemiology

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

Kin Sing Lee, Assistant Professor, Pharmacology & Toxicology

Gina M. Leininger, Assistant Professor, Physiology, Neuroscience Program

Hui Li, Associate Professor, Plant, Soil & Microbial Sciences

Ning Li, Assistant Professor, Pathobiology & Diagnostic Investigation

Karen T. Liby, Associate Professor, Pharmacology & Toxicology

David T. Long, Professor, Geological Sciences

Keith J. Lookingland, Associate Professor, Pharmacology & Toxicology

James P. Luyendyk, Associate Professor, Pathobiology & Diagnostic Investigation

Jane F. Maddox, Assistant Professor, Pharmacology & Toxicology

Burra V. Madhukar, Associate Professor, Pediatrics & Human Development

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

Michelle Mazei-Robison, Assistant Professor, Physiology, Neuroscience Program

Laura R. McCabe, Professor, Physiology

J. Justin McCormick, University Distinguished Professor, Microbiology & Molecular Genetics, Biochemistry & Molecular Biology

Masako Morishita, Associate Professor, Family Medicine

Thomas P. Mullaney, Professor, Pathobiology & Diagnostic Investigation

Cheryl A. Murphy, Associate Professor, Fisheries & Wildlife

Lawrence Karl Olson, Associate Professor, Physiology

Nigel S. Paneth, University Distinguished Professor, Epidemiology, Pediatrics

James J. Pestka, University Distinguished Professor, Microbiology & Molecular Genetics, Food Science & Human Nutrition

Brian K. Petroff, Associate Professor, MSU Veterinary Diagnostic Laboratory, Pathobiology & Diagnostic Investigation

Thomas J. Pinnavaia, University Distinguished Professor, Chemistry

A.J. Robison, Assistant Professor, Physiology, Neuroscience Program

Cheryl E. Rockwell, Associate Professor, Pharmacology & Toxicology

Kenneth D. Rosenman, Professor, Medicine

Robert A. Roth, Professor, Pharmacology & Toxicology

J. Craig Rowlands, Adjunct Professor, Institute for Integrative Toxicology

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

Rita S. Strakovsky, Assistant Professor, Human Nutrition

Greg M. Swain, Professor, Chemistry

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

James M. Tiedje, University Distinguished Professor, Plant, Soil & Microbial Sciences, Microbiology & Molecular Genetics

James E. Trosko, Professor Emeritus, Pediatrics & Human Development

Bruce D. Uhal, Professor, Physiology

Brad L. Upham, Associate Professor, Pediatrics & Human Development

Almudena Veiga-Lopez, Assistant Professor, Animal Science

Thomas C. Voice, Professor, Civil & Environmental 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

Wei Zhang, Assistant Professor, Plant, Soil & Microbial Sciences, Environmental Science & Policy Program

Matthew J. Zwiernik, Assistant Professor, Animal Science; Director, Wildlife Toxicology Laboratory

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

Integrative Biology

Microbiology & Molecular Genetics

Neuroscience

Pathobiology & Diagnostic Investigation

Pharmacology & Toxicology

Plant, Soil, & Microbial Sciences

Physiology

Deans

Birgit Puschner, College of Veterinary Medicine

Ronald L. Hendrick, College of Agriculture and Natural Resources

Leo Kempel, College of Engineering

Norman J. Beauchamp, Jr., College of Human Medicine

Andrea Amalfitano, College of Osteopathic Medicine

Phillip Duxbury, College of Natural Science

Douglas Buhler, Director, AgBioResearch



Institute for INTEGRATIVE TOXICOLOGY

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

Phone 517.353.6469
Fax 517.355.4603
E-mail: tox@msu.edu