

IIT @MSU

INSTITUTE FOR INTEGRATIVE TOXICOLOGY



2017
ANNUAL REPORT

MICHIGAN STATE
UNIVERSITY

IIT ANNUAL REPORT 2017

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A **TRADITION** of EXCELLENCE

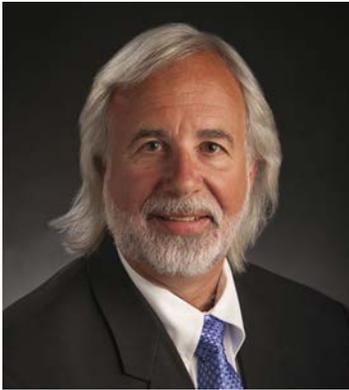
The Michigan State University Institute for Integrative Toxicology (IIT) is a multidisciplinary academic unit that supports and coordinates research and graduate education activities for faculty interested in various aspects of **toxicology**. The Institute is a **successor** to the Institute for Environmental Toxicology and the Center for Environmental Toxicology, the latter founded in 1978. While the name of the unit has changed over the years to denote changes in the **leadership** and academic position, the mission has been the same. For over 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 29 years of continuous funding. Graduates of MSU's toxicology program number over 200 and can be found in academia, industry, and governmental positions. ♡

MESSAGE from the DIRECTOR



This past year has been an exciting time of change and growth for the IIT. We now boast seventy-four affiliated faculty members from over twenty academic departments and seven different colleges across campus. These faculty conduct toxicology-related research spanning investigations of environmental (air, water, soil), occupational, food-borne and pharmaceutical agents. This year I was pleased to invite Dr. Alison Bernstein, Dr. Courtney Carignan, Dr. Kin Sing Lee, Dr. Karen Liby, Dr. Masako Morishita and Dr. Rita Strakovsky to join the IIT ranks. A number of our faculty also received campus and national awards in 2017, a testament to the level of research productivity, education and service our faculty achieve on a yearly basis.

The graduate program in Environmental and Integrative Toxicological Sciences (EITS) has come under new leadership this year. After 13 years of service, Dr. Robert Roth has decided to step down from his roles as EITS graduate program director and principal investigator of the NIEHS training grant. His role in these programs have been a foundation to their success and his service will forever be greatly appreciated. Over the past sev-

eral months, Dr. Roth has worked with Dr. John LaPres in the succession of these duties. Dr. LaPres will be leading our upcoming training grant renewal process and we look forward to working with him to continue to expand and develop our EITS graduate program. EITS students were very successful this year at the annual SOT meeting as well as at several other meetings held throughout the year. Nine EITS students completed their Ph.D.'s in 2017 and have moved on to new opportunities in academia or industry at the next level.

We look forward to 2018, the fortieth anniversary of the IIT, as a time for continued growth and success.

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

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

2017 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 56th SOT Meeting in Baltimore

Students and faculty of the MSU Institute for Integrative Toxicology were well represented at this year's 56th annual Society of Toxicology (SOT) meeting in Baltimore, Maryland with numerous abstracts presented and many special honors awarded.

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. This year's meeting was held March 12-16, 2017.

The following students in the MSU-IIT's Environmental and Integrative Toxicological Science (EITS) training program received awards or honors: **Kelly Fader**, **Rance Nault**, **Jiajun (Brian) Zhou**, **Joseph Henriquez**, **Kevin Baker**, **Rosa Jaiman** and **Melissa Bates**.

Undergraduate student, **Isabella M. Reichardt**, also received an award.

Two MSU-IIT affiliated scientists received prestigious Colgate-Palmolive Awards. IIT faculty member, **Almudena Veiga-Lopez**, received the Colgate-Palmolive Grant for Alternative Research for her project, "Novel 3D Microfluidic Chip for Placental Toxscreening." 2011 EITS graduate, **Peer Karmaus**, now with St. Jude Children's Research Hospital in Memphis, Tennessee, received the Colgate-Palmolive Postdoctoral Fellowship Award in *In Vitro* Toxicology for his project, "Assessing Xenobiotic Perturbation of Immunity at the Single Cell Level Using Human CD4⁺ Naïve T Cells."



Top: Almudena Veiga-Lopez, Ph.D., receives her Colgate-Palmolive Grant for Alternative Research.



Bottom: Peer Karmaus, Ph.D. receives his Colgate-Palmolive Postdoctoral Fellowship Award in *In Vitro* Toxicology.



Protein Involved in Blood Clotting Stimulates Liver Repair

IIT affiliated faculty member, Dr. James Luyendyk and a team of researchers including EITS alumni, Dr. Anna Kopec and Dr. Nikita Joshi, have uncovered a new pathway in the body that stimulates liver repair. Using an experimental model of high-dosage acetaminophen, the team found that liver injury activated blood clotting, which then stimulated liver repair.

The study, "Fibrin(ogen) drives repair after acetaminophen-induced liver injury via leukocyte $\alpha M\beta 2$ integrin-dependent upregulation of *Mmp12*," was published in the *Journal of Hepatology* in April.

"This pathway of repair has never been described before and could lead to new strategies to promote liver repair," said Luyendyk. "Tissue injury is tightly connected to the activation of blood clotting, meaning this new pathway could be very important in treating liver damage not just by acetaminophen overdose, but other causes as well."

While the liver's ability to repair is well documented, in some cases, the process can be insufficient or break down, and can lead to failure of the organ and requirement of a liver transplant. "Discovery of drugs that can promote repair of the already injured liver would address an important unmet need," Luyendyk said.

Ganey Begins SOT Presidential Term

IIT-affiliated faculty member, Dr. Patricia Ganey is now President of the SOT. In 2017-2018 she will lead SOT Council in focusing on a strategy to coordinate the mentoring activities within the Society, strengthening the global partnership with colleagues in Asia, and launching interactions with other biomedical societies to foster a greater appreciation of the value of the discipline of toxicology.



Above: EITS Graduate Director Dr. John LaPres, Peter Dornbos, Ya-Hui Chang, Jinpeng Li, and IIT Director Norbert Kaminski.

EITS Research Evening Celebrates Student and Faculty Achievements

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 November 13, 2017 in the Lincoln Room at the MSU Kellogg Center. The event included dinner, student posters and platform presentations. Three EITS graduate students presented the platform presentations.

Ya-Hui Chang, working in the lab of Dr. Hui Li, spoke on, "Uptake, Accumulation and Metabolism of Chemicals of Emerging Concern in Vegetables." Chang is a doctoral student in the Department of Plant, Soil and Microbial Sciences and has focused her graduate research on how the factors of compound physicochemical properties, plant physiology and transpiration stream affect pharmaceutical accumulation and transport in plants. She also works on the identification of pharmaceutical metabolites in plants using LC-QTrap-MS/MS system.

Peter Dornbos, working in the lab of Dr. John LaPres, spoke on, "A Mouse Population-Based Approach to Identify Novel Genetic Modulators of TCDD-Mediated Immunosuppression." Dornbos is a doctoral student in the Biochemistry and Molecular Biology Program and has focused his graduate research on using population-based mouse models to identify novel genetic-modulators of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)-induced toxicity. Results from this work will aid in understanding of the mechanism of toxicity as well as potentially identifying genetic variants that may be more susceptible to TCDD-induced toxicity in the human population.

Jinpeng Li, recent EITS graduate from the lab of Dr. Norbert Kaminski, spoke on, "Aryl Hydrocarbon Receptor (AHR) Activation by 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) Impairs Human B Lymphopoiesis." Li recently accepted a position as a Post-doctoral Fellow in Toxicology and Environmental Research and Consulting (TERC) at the Dow Chemical Company. His research is focused on developing alternative models to facilitate predictive toxicology.

This year, a short presentation was made to Dr. Robert Roth for his dedicated service as the EITS Graduate Director for the past 13 years. Over the past several months, Dr. Roth has worked with IIT-affiliated faculty member, Dr. John LaPres, to show him the ropes in preparation of assuming the role of EITS program director and principal investigator of the NIEHS MSU training grant.

Next year's Annual Research Evening will take place on December 6, 2018 at the MSU Kellogg Center. 📍

Three MSU SRP Laboratories Collaborate

Three laboratories affiliated with the MSU Superfund Program are collaborating to investigate the bioavailability of dioxins when bound to activated carbon - the laboratories of Dr. Norbert Kaminski (Project 1), Dr. Stephen Boyd (Project 6), and Dr. Syed Hashsham (Project 4).

The focus of this ongoing collaboration is on characterizing the properties of activated carbon for the purpose of environmental remediation. The collaborative laboratory experiments utilize a mammalian mouse model. Boyd's group prepared and then orally administered microporous activated carbon adsorbed with dioxins (TCDD). To test the bioavailability of the TCDD, Kaminski's laboratory assessed modulation of the immune system, a hallmark of TCDD toxicity. Hashsham's laboratory analyzed the changes in the composition of the microorganisms (i.e., gut microbiome) within the GI tract.

The results from these collaborative experiments show that microporous activated carbon does successfully sequesters TCDD to minimize bioavailability as evidence by a loss of TCDD biological activity in the mouse model. 📍



Above: The laboratories of Dr. Norbert Kaminski, Dr. Stephen Boyd, and Dr. Syed Hashsham joined together for an experiment focusing on characterizing the properties of activated carbon for the purpose of environmental remediation for the MSU Superfund Project.

6 FACULTY JOIN IIT in 2017

The MSU IIT was pleased to add six new affiliated faculty members in 2017: Dr. Alison Bernstein, Dr. Courtney Carignan, Dr. Kin Sing Lee, Dr. Karen Liby, Dr. Masako Morishita and Dr. Rita Strakovsky.



Alison Bernstein

Assistant Professor, Translational Science and Molecular Medicine

Dr. Bernstein received her B.A. in Biological Basis of Behavior from the University of Pennsylvania in 2000, her Ph.D. in Molecular Genetics and Genomics from Washington University in St. Louis in 2009, and was a postdoctoral fellow studying Neuroscience, Neuroepigenetics and Neurotoxicology at Emory University from 2009 to 2016.

Dr. Bernstein's current research focuses on how epigenetic modifications mediate neurotoxicological effects and gene-environment interactions underlying sporadic neurodegenerative diseases. Although these diseases are generally diseases of the aged, the neurodegenerative process begins long before clinical diagnosis. Thus, exposures that occur early in life may contribute to sporadic forms of disease by directly affecting the vulnerability of neurological systems. Epigenetic modifications are thought to imprint environmental experiences on the genome, resulting in stable alterations in phenotype. Thus, linking epigenetic changes with functional outcomes will help to elucidate the mechanisms underlying sporadic neurodegenerative diseases and further our understanding of the complex relationship between toxicity, epigenetics and neuronal vulnerability.

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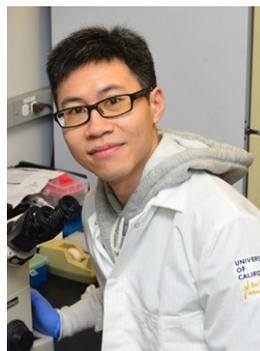
Courtney Carignan

Assistant Professor, Food Science and Human Nutrition, Pharmacology & Toxicology

Dr. Carignan received her B.S. in Biological Sciences from Rutgers University in 2004, her Ph.D. in Environmental Health from Boston University School of Public Health in 2013, and was a postdoctoral fellow at Dartmouth College and then at the Harvard T.H. Chan School of Public Health from 2013 to 2017.

Dr. Carignan is an environmental exposure scientist and epidemiologist whose research helps protect reproductive and child health by investigating exposure to mixtures of ingredients and contaminants in consumer products, drinking water and food. She has conducted biomonitoring and health studies for a wide range of populations including infertile couples, pregnant women, infants, new mothers, office workers, gymnasts, and communities exposed to contaminated drinking water. This research has contributed to public health interventions aimed at reducing exposures to

flame retardants, perfluoroalkyl substances, and arsenic. Broad implications of her work are the importance of considering multiple exposures, preconception as a sensitive window of development, and the need for improved strategies to avoid regrettable substitution.



Kin Sing Lee

Assistant Professor, Pharmacology and Toxicology

Dr. Lee received his B.S. in Chemistry from Hong Kong University of Science and Technology in 2003, his Ph.D. in Chemistry from Michigan State University in 2010, and was a postdoctoral fellow studying Medicinal Chemistry and Chemistry Biology at the University of California at Davis from 2010 to 2016.

Dr. Lee is broadly interested in using chemical biology methods to study the interactions between dietary lipids (what we eat), environmental chemicals (what we are exposed to) and human health (our body) at the molecular level. He is particularly interested in studying the molecular mechanisms by which the dietary omega-3 (DHA or EPA) to omega-6 (e.g. soybean oil) ratio affects human health and human responses to environmental toxicants. It has been shown that these fatty acids affect human health partly through their metabolites and one of the major metabolites derived from the dietary lipids are the corresponding epoxides. Both omega-3 and omega-6 fatty acid epoxides are potent signaling molecules and play an important role in inflammation, blood pressure regulation, pain perception and angiogenesis. However, how they initiate their biological effects remain unknown. The tools and the methods developed not only will help us better understand how these dietary lipids modulate human health but also could potentially be new therapeutics for different diseases.



Karen Liby

Associate Professor, Pharmacology and Toxicology

Dr. Liby received her B.S. in Biology from Hillsdale College in 2000, her M.S. in Human Anatomy from Palmer College in 1997, her Ph.D. in Cell and Molecular Biology from University of Cincinnati College of Medicine in 2002, and was a postdoctoral fellow studying Pharmacology and Toxicology at Dartmouth

Medical School from 2003 to 2007.

The goals of Dr. Liby's research are to 1) learn how inflammation and the immune system contribute to carcinogenesis and 2) develop effective drugs that intervene in this process for the prevention or treatment of cancer. Cigarette smoke contains hundreds of known toxins, and smoking remains the leading cause of preventable cancer. Carcinogens found

in cigarette smoke and related chemicals are used to initiate or accelerate cancer in some of their *in vivo* models. Synthetic triterpenoids, retinoids (ligands for the retinoid X receptor), HDAC (histone deacetylase) inhibitors, and bromodomain inhibitors are all potent anti-inflammatory agents. These novel drugs are effective in experimental models of estrogen-receptor negative (ER-) breast cancer, lung cancer and pancreatic cancer. Identifying molecular biomarkers and investigating the importance of the immune system for the biological activity of these compounds are ongoing areas of study in the Liby laboratory.



Masako Morishita
Associate Professor, Family Medicine

Dr. Morishita received her B.S.E. in Chemical Engineering in 1994, her M.S. in Environmental Health Sciences in 1998, and her Ph.D. in Environmental Health Sciences in 2003, all from the University of Michigan.

Dr. Morishita's research focuses on exposure science including improving physicochemical characterization of indoor and outdoor air-

borne particulate matter, quantification of biological burden and biomarkers of trace elements and metals, and emission source identification using receptor modeling—all of which are essential for human/animal exposure assessment and toxicological/epidemiological studies in multidisciplinary research projects. She incorporates measurement and analytical tools to understand the sources and fates of nanoparticles and ambient air pollutants, and their potential impacts to the environment and human health. She is currently leveraging her exposure science expertise to conduct intervention studies focusing on the reduction of personal exposure to fine particulate matter and adverse cardiovascular responses in urban communities, protecting the health and quality of life of the elderly and other vulnerable populations. She seeks to continue extending her future efforts in community-based environmental health research, focusing on interventions that mitigate exposure and improve health outcomes.



Rita Strakovsky
Assistant Professor, Human Nutrition

Dr. Strakovsky received her B.S. in Molecular and Cellular Biology in 2005, her R.D. in 2011, her Ph.D. in Nutritional Sciences in 2011, all from the University of Illinois, Urbana-Champaign. She completed postdoctoral experiences with the University of Illinois' NIEHS/EPA Children's Environmental Health Research Center.

Dr. Strakovsky's current research focuses on the maternal determinants of fetal development and offspring health. She is interested in studying how the maternal metabolic milieu communicates the maternal experience with the developing fetus, specifically focusing on the interactions between maternal obesity and environmental exposures. She has worked extensively in rodent pregnancy models to study the effects of maternal diet or exposure to environmental endocrine disrupting chemicals (EDCs) on the epigenetic regulation of

energy metabolism in offspring. Driven by findings from these studies, her current research in a human pregnancy cohort has two primary aims: 1) To assess the relationship between gestational exposure to several phthalates/phenols and pregnancy estrogen and testosterone status. An additional goal of this aim is to determine whether maternal adiposity and/or body fat distribution modify the above relationships; and 2) To determine whether exposure to these same chemicals alters the fetal supply of long-chain polyunsaturated fatty acids (LC-PUFAs) or the supply of other lipid classes critical for fetal development (using a lipidomics approach). An additional question within this aim is whether the aforementioned relationship between EDC exposures and estrogen status mediates the proposed relationships between EDCs and LC-PUFAs/lipids. Strakovsky's long-term goal is to leverage data from the human cohort to inspire questions in animal models, and to utilize animal models to unravel the mechanisms behind the findings in pregnant women and their babies. 🌟

FACULTY ACHIEVEMENTS



Dr. Norbert Kaminski, Professor, Pharmacology and Toxicology, Cell, was awarded the George H. Scott Memorial Award at the 43rd Annual Summer Meeting of the Toxicology Forum, held July 10-12, 2017 in Annapolis, Maryland. Dr. Kaminski gave the George Scott Award Lecture at the meeting on, "*Role of the Aryl Hydrocarbon Receptor in Human Stem Cell to B Cell Lineage Commitment.*"



Dr. Brian Gulbransen, Associate Professor, Physiology, Neuroscience Program, was one of five in 2017 to be named an MSU Foundation Professor, a designation given to outstanding faculty who demonstrate excellence in research and teaching, while enhancing the prominence of the institution.



Dr. Karen Liby, Associate Professor, Pharmacology and Toxicology, was the winner of the College of Osteopathic Medicine's 2017 Early Promise of Research Excellence Award.

EITS TRAINING PROGRAM

A history of the EITS training program along with news on the future on the program and its leadership.

The doctoral training program in Environmental and Integrative Toxicological Sciences (EITS) originally began as the “Multidisciplinary Doctoral Program in Environmental Toxicology.” The program started in 1982 shortly after the founding of the original IIT, the Institute for Environmental Toxicology (IET). The unique dual major program required students to be accepted into one of several partnering basic science programs as well as into the Multidisciplinary Doctoral Program in Environmental Toxicology. The students completed a broad set of toxicology-related courses and toxicology-related thesis research in conjunction with the requirements of their partnering program. The flexible dual major approach ensured that each student received in-depth, excellent training in a basic science discipline of his/her choice as well as training in toxicology. About 40 faculty representing more than a dozen disciplinary departments participated in the program when it was initiated. Partnering departments covered a wide range of disciplines including those in the biological sciences, agricultural sciences, medical sciences and engineering.

The doctoral program grew rapidly. By 1986, with the number of faculty participants reaching 70, there was interest in expanding the program to attract students with even broader backgrounds. To accommodate these students, the doctoral program was divided into two curricular tracks: a Toxicology Track and an Environmental Track, each with a separate set of course requirements. The Toxicology track was designed for doctoral students in the biomedical disciplines and the Environmental Track for those with less mammalian biology background. Backgrounds of students in the latter track included chemistry, engineering and environmental law. Most recently, a third track was developed in Food Toxicology and Ingredient Safety, which was designed for students with

an interest in understanding the risks associated with food and consumer product ingredients.

The quality of the EITS interdisciplinary doctoral program was recognized by the National Institutes of Health with the award of a Training Grant in Environmental Toxicology from the National Institute of Environmental Health Sciences, which has been continually funded since 1989. This grant provides stipend support for 7 predoctoral and 2 postdoctoral fellows each year. Universities compete nationally for training grants from the NIEHS, and the longstanding support by this NIH institute testifies to the excellence that the EITS program has maintained over the years in training graduate students and postdoctoral fellows, many of whom have become leaders in the field of toxicology.

This year, the EITS doctoral training program and the NIEHS-funded training grant have come under new leadership. Dr. Robert Roth, after 13 years as the graduate program director of EITS and principal investigator of the NIEHS training grant, has decided to retire from these roles. His service to these programs has been instrumental in the ongoing success of both endeavors.



“Leading the EITS program has been a passion and an honor for me at MSU. The faculty mentors, support from the Graduate School and NIEHS and especially the enthusiastic, outstanding trainees have made my term as Director a pleasure. I look forward to continued

involvement with the EITS program and to following the developing careers of our graduates.”

Over the past several months, Dr. Roth has worked with IIT-affiliated faculty member, Dr. John LaPres, on succession of the duties of EITS program director and principal investigator of the training grant. Dr. LaPres is a professor in the Department of Biochemistry and Molecular Biology and also director of the BioMolecular Science Gateway doctoral student recruiting effort on campus. Dr. LaPres had this to say about his new roles,



“I am very excited about the opportunities and challenges that come along with being the director and PI

of the training grant. I am also honored to be given the position. Given the strength and collegiality of the toxicology faculty here at MSU, and a little help from Bob, I think the transition should be smooth. My major focus will be maintaining the strength of the EITS and its excellent track record in training top-tier toxicologist. Another goal I have is to expand upon recent changes began by Drs. Kaminski and Roth in terms of providing students with more information about career development, grant writing, and networking.”

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.



Ashwini Phadnis-Moghe

Study Director and Contributing Scientist in Immunotoxicology, Department of Immunology and Immunotoxicology, Covance Laboratories, Inc.

Ashwini Phadnis-Moghe began her road to a scientific career during her time as an

undergraduate student in India, where her teachers made her question, read and understand scientific literature and instilled an enthusiasm for science. “I received a lot of exposure in my initial years through summer research projects undertaken spanning a wide range of areas from microbiology to cancer biology. With each new project, my background was strengthened and I realized the value of multi-disciplinary approaches to solving problems,” said Phadnis-Moghe.

Her next step after graduating with her Bachelors and Masters of Science in Microbiology was to head to MSU to begin her Ph.D. at Michigan State University in the Genetics Program. She also became an EITS student under the direction of Dr. Norbert Kaminski. Phadnis-Moghe gives credit to the EITS program for providing her with a strong footing in toxicology with the annual seminar series giving her exposure to different areas within toxicology where toxicologists were contributing. She also made use of the strong alumni network as well as the many travel support opportunities to travel to scientific meetings across the country such as the SOT Annual Meeting. “Above all, the mentoring from faculty collectively helped

facilitate an all-round experience, which has been monumental in my career.”

Now Phadnis-Moghe works at Covance Laboratories as a Study Director and as a Contributing Scientist for Immunotoxicology. The work that she does can broadly be described as ‘pre-clinical drug safety and development’ and deals with pharmaceuticals or new therapeutics that must go through safety testing before reaching the clinic. She is specifically involved in understanding the toxic effects of these new drugs on the immune system and suggests experimental designs to monitor the toxicities. She analyzes the data obtained, interprets the findings and writes reports which are then used to file information about the new drug with the FDA, thus contributing towards the larger goal of bringing safer therapeutics to the market.

She chose to work at a contract research organization due to the breadth of exposure available in toxicology. She enjoys the dynamic and challenging work environment along with the work-life flexibility. “Being trained as an immunotoxicologist through my Ph.D. and postdoctoral research, I identified my passion in immunotoxicology. I had a chance at Covance to be a part of a young group with enthusiastic and dedicated mentors who were keen on establishing a new ‘Immunology and Immunotoxicology’ department. Since I have joined, I have worked on numerous studies and have been exposed to multiple challenges such that no two days have been alike!” said Phadnis-Moghe. ☺

At a glance:

Department: Genetics

Mentor: Norbert Kaminski

Dissertation: “Mechanisms underlying 2,3,7,8-tetrachlorodibenzo-p-dioxin-mediated suppression of B cell activation and differentiation”

Defended: February 2014

Significant Achievements During Graduate School:

- » Council of Graduate Students Travel Award - 2013
- » Dr. Harihara Mehendale Endowment Fund Best Abstract Award, ASIO-SIG, SOT - 2012
- » Immunotoxicology Specialty Section Best Student Presentation Award, SOT - 2012
- » Graduate Student Travel Award, SOT - 2012
- » Michigan Chapter of SOT Graduate Student Best Poster Award - 2011
- » MSU Graduate School Summer Fellowship - 2008



Nikita Joshi

*Postdoctoral Fellow
Department of Pulmonary and Critical Care, Northwestern University*

Nikita Joshi grew up with a fascination for the various sciences and so far, has based her academic pursuit on the single objective of a career in research: “A passion of contributing effectively to intriguing puzzles of science and its impact on the environment and humans by offering not only plausible explanations but also feasible solutions.” She attributes her family for instilling in her the value of education and virtues of hard work, perseverance and diligence.

After earning her Bachelors of Science and two separate Masters of Science degrees, Joshi became a graduate student in the Department of Pharmacology and Toxicology at MSU and became an EITS student under the mentorship of Dr. James Luyendyk. During this time, she was involved in multiple research projects aimed at understanding the mechanisms whereby coagulation proteins are involved in the pathogenesis of chronic hepatic fibrosis and acute liver injury. Joshi commented, “The nature of the myriad research projects that Jim involved me in, gave me the experience of thinking innovatively and conducting investigative studies aimed at understanding the mechanistic basis and the pathways involved in the progression of liver injury and fibrosis.” Her EITS training fostered her ability to problem solve, find alternative ways to approach a problem and to troubleshoot when difficulties arose with data interpretation or technical execution, which is inevitable in scientific research. She found all these experiences invaluable in preparing her for her next step as a postdoctoral research fellow at Northwestern University in the Department of Pulmonary and Critical Care, under the mentorship of Drs. Scott Budinger and Alexander Misharin.

Joshi now works to understand the immune mechanisms underlying the pathogenesis of various acute and chronic pulmonary injuries and diseases,

including but not limited to influenza, particulate matter exposure, fibrosis and aging. The commitment of the department to pulmonary injury and fibrosis research is what drew Joshi to the position initially. “I believe that beginning my career with this postdoctoral position will set me on the right path in where I want to go next as I aspire to be trained and gain experience in a challenging research environment that would utilize my skills and education and provide room for growth in a field that is distinct from my graduate training,” said Joshi.

One of the projects Joshi is currently involved in aims to understand signaling in the lung induced by particulate matter, which remains a major public health concern. Their work investigates how exposure to particulate matter air pollution mediates various pulmonary diseases, such as pulmonary fibrosis and COPD, in order to develop therapies for patient-use. Joshi is also interested in understanding the pathophysiology of influenza A infection (flu) and acute lung injury. The underlying mechanisms by which flu infection induces acute lung injury and acute respiratory distress syndrome is unknown. The lab’s research aims to determine how the lung environment along with immune and inflammatory cells contributes to the development of acute lung injury during influenza A infection. Understanding these mechanisms will be invaluable in developing therapies for preventing and treating these conditions and will greatly reduce morbidity and mortality.

Joshi is excited to continue her work at Northwestern, “I am involved in cutting edge research projects that use novel techniques such as single-cell RNA transcriptomics to answer important and relevant questions that can have huge impacts on human health.” ♡

At a glance:

Department: Pharmacology & Toxicology

Mentor: James Luyendyk

Dissertation: “Hepatoprotective functions of the hemostatic system in experimental xenobiotic-induced biliary injury”

Defended: June 2016

Significant Achievements During Graduate School:

- » Society of Toxicology (SOT) Outstanding Graduate Student Leadership Committee Award -2016
- » Carl C Smith Graduate Student Award (3rd place), Mechanisms Specialty Section (MSS) of SOT - 2016
- » 1st place, Best Oral Talk (PhD student), 25th annual Phi Zeta Research day, MSU - 2015
- » 1st place, Best Oral Talk at the Fall Meeting of the Michigan Chapter of Society of Toxicology - 2015
- » Best Oral Talk (2nd place), 42nd annual Pharmacology Research Colloquium - 2015
- » Carl C Smith Graduate Student Award (2nd place), Mechanisms Specialty Section of SOT - 2015
- » Dr. Laxman Desai Graduate Student Best Abstract Award, Society of Toxicology, Association of Scientists of Indian Origin Special Interest Group (ASIO SIG) - 2015
- » Graduate Student Travel Award, Society of Toxicology, 2015
- » Marcos Rojkind American Society for Investigative Pathology (ASIP) Trainee Travel Award, Experimental Biology meeting - 2014
- » Michigan State University Institute for Integrative Toxicology Travel Award, Society of Toxicology meeting - 2013



Ashley Maiuri (McCord)

Postdoctoral Fellow & Associate Toxicology Consultant, Integrated Development Solutions (INDS), Inc.

When Maiuri began her undergraduate college education at the University of Michigan, she was planning to study to become a social worker. Halfway through her undergraduate degree, a work-study experience in the lab of a toxicology researcher opened her eyes to the many career opportunities available in science. With encouragement from the graduate students in the lab, Maiuri applied to graduate school for a Ph.D. in toxicology and began down her new path at MSU.

Studying in the lab of Dr. Robert Roth, Maiuri completed the EITS program and defended her dissertation, “*Drug-Cytokine Cytotoxic Interaction: Relationship to Idiosyncratic, Drug-Induced Liver Injury*”. Her next move was to the lab of Dr. Heather O’Hagan at Indiana University where she studied the mechanisms underlying how inflammation in the colon causes epigenetic alterations associated with colorectal cancer. Specifically, her work involved using a mouse model of inflammation-induced colon tumorigenesis to determine if mismatch repair proteins contribute to inflammation-induced epigenetic alterations. Her research led to a publication, “*Mismatch Repair Proteins Initiate Epigenetic Alterations During Inflammation-Driven Tumorigenesis*,” in the journal **Cancer Research**. Maiuri said, “Even though the research focus in my post-doc lab was significantly different from my Ph.D. research, I was able to apply much of what I learned in graduate school to the project and in the process learn an entirely new set of tools and concepts.”

In June of 2017, Maiuri joined the team at INDS, Inc. as a postdoctoral trainee. What attracted her to the position was that it was not a typical laboratory/research-based postdoctoral position. INDS, Inc. provides consulting services in the area of nonclinical drug development. Their clients are pharmaceuticals companies (large and

small) and they deal with projects at all stages of the drug development process (discovery to clinical development). Just some of the specific consultant areas include toxicology study design, data analysis and summarization to support pharmaceutical development, and risk assessment of pharmaceutical impurities and degradants. Maiuri commented, “So far, I really love the work I am doing at INDS, Inc. and I feel that what I am doing currently is exactly what I want to be doing for my long term career. Since we work with so many different companies I am continuously learning about exciting new therapies that are currently undergoing development. I also get to directly apply my skills and training in toxicology on an everyday basis.” So far, Maiuri has found that consulting in the area of nonclinical drug development is exciting, fun and rewarding. Every day she learns about new interesting projects and gets to work within a team atmosphere to creatively problem-solve.

Maiuri has found that the research she did as an EITS student has been extremely relevant to her work now as a toxicology consultant in pharmaceutical development, “The coursework I took as an EITS student provided me with knowledge in the area of toxicology that I am regularly applying on a day to day basis at my new position.” 🍀

At a glance:

Department: Pharmacology & Toxicology

Mentor: Robert Roth

Dissertation: “Drug-Cytokine Cytotoxic Interaction: Relationship to Idiosyncratic, Drug-Induced Liver Injury”

Defended: June 2015

Significant Achievements During Graduate School:

- » Ronald and Sharon Rogowski Fellowship for Food Safety and Toxicology - 2015
- » Graduate Student Award, In Vitro and Alternative Methods Specialty Section, Annual SOT meeting - March 2016
- » Dissertation Completion Fellowship, Graduate School, MSU - January 2015 - May 2015
- » Graduate Fellowship, Department of Pharmacology and Toxicology, MSU - September 2014 - December 2014
- » Student Travel Award, Institute for Integrative Toxicology, MSU, to support three weeks of travel and research at The Hamner Institute for Health Sciences in Research Triangle Park, NC - June 2014
- » Graduate Student Award, In Vitro and Alternative Methods Specialty Section, Annual SOT meeting - March 2014
- » Institute for Integrative Toxicology NIEHS Training Grant, RC061248 - August 2013 - August 2014
- » Integrative Pharmacological Sciences Training Grant, T32 GM092715 - August 2011 - July 2013
- » MSU Graduate School Fellowship, August 2010 - July 2011

EITS Graduate Haitian Lu

Succeeds in Industry



Dr. Haitian Lu graduated from the EITS program at MSU in 2010 and has since made a very interesting career as an industry toxicologist. He recently accepted a position as the Principal Scientist, R & D Manager for Pepsi Company, based at their global headquarters in New York. He now leads safety assessment for the global beverage category, and also participates in accidental, scientific and trade associations to address safety related issues of critical ingredients for Pepsi Co.

He began his career after graduate school at Dow Agro Sciences, based in Indianapolis as a Senior Toxicologist. There, he provided toxicology expertise to support registration and re-registration of pesticide products. After two years he moved on to Givaudan, the leading flavor and fragrance company in the world. He spent five years as a

Toxicology and Ingredient Registrations Senior Manager. In this role, Lu led safety assessment for new and existing ingredients for use in consumer products. He also led registration activities for ingredients as new chemicals around the world, mainly focusing on Asia Pacific and North America. He had the unique experience of working in Shanghai, China for a significant amount of time. There he worked with the local team and regional businesses to develop programs and infrastructure internally to address the emerging regulatory challenges of that particular region.

From his time as an undergraduate student, earning a degree in Environmental Science with a focus on biology, his interest in the interface between biology and chemistry was fostered and guided. He has always felt a strong pull to the applicable side of science - leading him to an interest for graduate school in toxicology and pharmacology, the interface between biology and chemistry. He was drawn to toxicology for its inherent applicable side - it is an applied science that is very relevant to our daily lives. The evaluation of novel chemistry and new technologies to make sure they are safe for people, interested him from the very beginning.

As an EITS student, Lu credits the EITS program for setting up the foundation of his career. The EITS program taught him to research and critically review data. He appreciated the strong emphasis on presentation of your research to various audiences - professors, peers, funding agencies, industry/collaborators - he feels it was critical in getting him to where his career is today. Lu said, "It's not only about research, it's not only about doing good experiments, but it's also about how to present well and how to get highly complex scientific data/conclusions presented in a very

succinct and compelling way to diverse audiences." He also credited the EITS program for its strong interdisciplinary and collaborative mindset,

“The program being interdisciplinary and also being on a campus that is very strong in collaboration and overall exposure to various areas of research allows you to develop a collaborative mindset and have the opportunity to see the research going on around you - it gives you a broader perspective.”

Lu also credits his strong mentor-mentee relationship with his graduate advisor, Dr. Norbert Kaminski, for a big role in his growth as a toxicologist. "I do think besides my broad training under the EITS program, my training in his lab played a very significant role in making me who I have become professionally. The openness, the focus on not only good research, but how to present your research, and just the way his training program operated, played a very big role in my own development." He is thankful still today for the ongoing strong mentor relationship. ☺



Brandon Armstrong

Fisheries & Wildlife
Mentor, Cheryl Murphy

“Using computational models to scale sublethal effects of stressors to adverse population outcomes in fish”



Melissa Bates

Food Science & Human Nutrition
Mentor, James Pestka

“Prevention of Environmental-Toxicant Triggered Autoimmunity by Consumption of the ω -3 Polyunsaturated Fatty Acid, Docosahexaenoic Acid”



Isola Brown

Pharmacology & Toxicology
Mentor, Brian Gulbransen

“Enteric Glial Cell Regulation of Oxidative Stress and Immune Homeostasis During Gastrointestinal Inflammation”



Juliette Brown

Pharmacology & Toxicology
Mentor, Gina Leininger

“The Role of Lateral Hypothalamic Neurotensin Neurons in Adaptive Energy Balance”



Ya-Hui Chuang

Plant, Soil & Microbial Sciences
Mentor, Hui Li

“Uptake, Accumulation and Metabolism of Chemicals of Emerging Concern in Vegetables”

Rosa Jaiman

Neuroscience
Mentor, William Atchison

“Mechanisms of MeHg-induced astrocyte toxicity: A comparative study between cerebellar and cortical astrocytes”



Sophia Kaska

Pharmacology and Toxicology
Mentor, Michelle Mazei-Robison

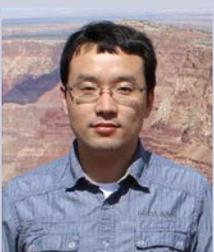
“Investigating the Role of Ventral Tegmental Area TORC2 in Stress and Stress-Induced Changes in Opiate Reward”



Theresa Lansdell

Pharmacology & Toxicology
Mentor, John Goudreau

“The Role of Parkin in Maintaining Proteasome Activity Following Acute Neurotoxic Insult”



Jinpeng Li

Genetics
Mentor, Norbert Kaminski

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



Denis Male

Food Science
Mentor, Felicia Wu

“Challenges Facing Foodborne Mycotoxin Regulation and Public Health Consequences of Aflatoxin Exposure in Children Under 5 Years”



Brittany Winner

Pharmacology & Toxicology
Mentor, John Goudreau

“UCH-L1 as a Susceptibility Factor for Nigrostriatal and Mesolimbic Dopamine Neurons after Neurotoxicant Exposure and Aging”

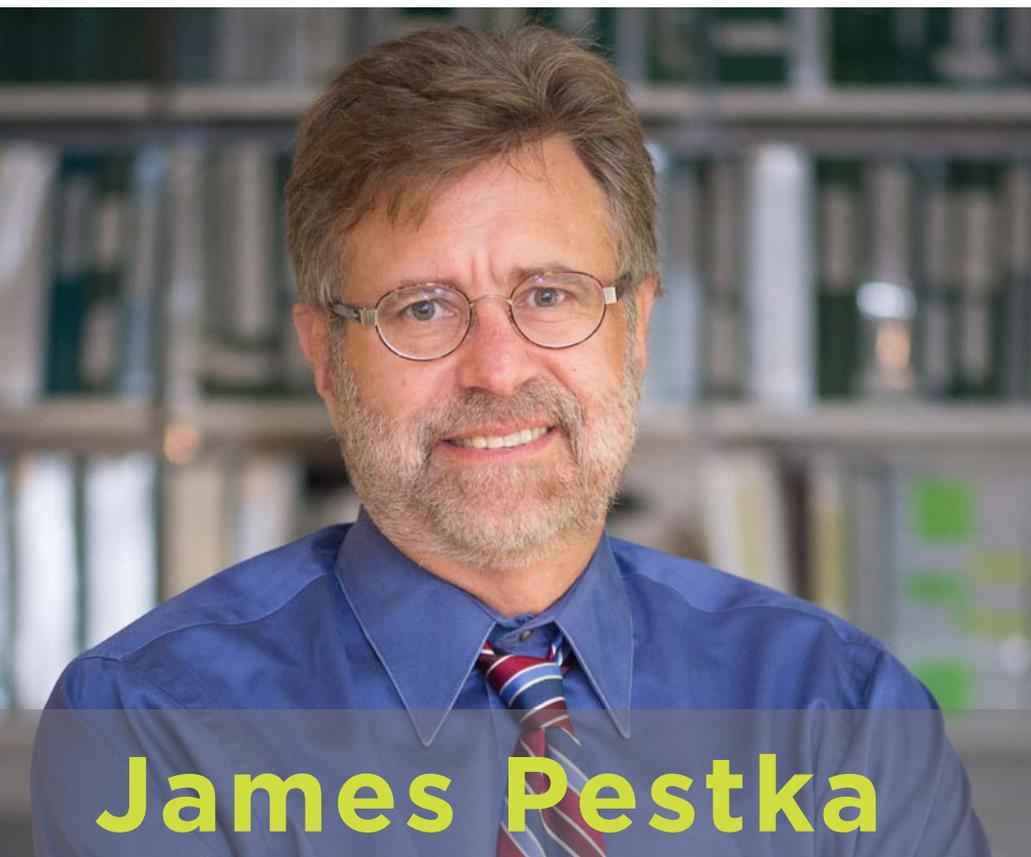


Joseph Zagorski

Cell & Molecular Biology
Mentor, Cheryl Rockwell

“The Role of the NRF2/KEAP1 Signaling Pathway in the Early Events Following Jurkat T Cell Activation”

EITSP Graduates



James Pestka

University Distinguished Professor, Food Science & Human Nutrition, Microbiology & Molecular Genetics

Dr. James Pestka's first science-related memories were peering through old microscopes that his father brought home from his job at the American Optical Company in Buffalo, New York. From then on, he was hooked on science. After receiving his BA in Biology from the State University of New York College at Buffalo, Pestka went on to Cornell University for his Ph.D. He majored in Microbiology and took minors in Immunology and Biochemistry. He chose Immunology based on the recommendation of a fellow graduate student who told him it was the coming thing. He was pleased to discover his colleague was right and found himself fascinated by this area of research.

After an NIEHS postdoctoral traineeship and a postdoctoral experience at the University of Wisconsin, he became very interested in toxicology. His next move was to Michigan State University

as a faculty member in the Food Science and Human Nutrition department. He was also excited to join the newly founded, Center for Environmental Toxicology, now known as the IIT. Pestka's first research at MSU involved studying the immunochemical detection and immunotoxic effects of fungal toxins. His detection research led to the founding of the Neogen Company in 1983 which now has over 1200 employees across 5 continents. In 1984 he received a NIEHS grant to look at the potential immunotoxic effects of vomitoxin (also called deoxynivalenol). There had been a lot of anecdotal research reported in literature that toxins of this class – the trichothecenes – were immunosuppressive. Pestka began to look at how this toxin could potentially affect immune function in a mouse model. "We were surprised to find that the toxin was not immunosuppressive but was immunostimulatory and could actually stimulate inflammation and autoimmunity in the mice." In particular, vomitoxin induced an autoimmune disease called IgA ne-

phropathy, which is one of the most common types of glomerulonephritis in the world. And that began his interest in toxin-induced autoimmunity. Pestka continued to receive funding from NIH to understand how and why vomitoxin caused autoimmunity. In particular he began to look at ways of intervening in that disease by conducting a study where his team fed omega-3 fatty acid-containing fish oil to mice with toxin-induced IgA nephropathy. They observed that the omega-3s were beneficial in suppressing the disease. He and his colleagues went on to study the mechanisms through which that suppression occurs for several years.

In 2008, Pestka joined other MSU researchers to study whether omega-3 fatty acids would have any effect on another autoimmune disease, lupus. Lupus is a chronic autoimmune disease and its cause is unknown; many scientists believing that lupus develops in response to a combination of factors including genetics, hormones and environmental factors. Together with Dr. Jack Harkema and postdoctoral student Dr. Melissa Bates, Pestka investigated how diet and exposure to an environmental toxicant lupus and other autoimmune diseases. Their current research has shown that consuming an omega-3 fatty acid called DHA, or docosahexaenoic acid, can stop a known trigger of lupus. They discovered that when lupus was triggered by crystalline silica, a toxic mineral also known as quartz, DHA blocked the activation of the disease. The study looked at the effect of DHA on lupus lesions in the lungs and kidneys of female mice that were already genetically predisposed to the disease. "When the animals were put on a diet of DHA...the silica-induced lesions in these animals were almost completely alleviated," said Harkema. They have found DHA to not only be effective at preventing the onset of lupus but also in suppressing the symptoms of lupus. Part of the team's long term research plans would be to maintain these mice on DHA and determine how long they can prevent the onset of lupus. Pestka's team is also hopeful a clinical trial may be involved in their future research.

Today, Pestka plans to continue this research with a new \$2.3 million NIH

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Cheryl Rockwell

Associate Professor, Pharmacology & Toxicology

Cheryl Rockwell has been interested in science for as long as she can remember. Even early on in high school she knew she was interested in biomedical research or environmental science and so chose to attend the University of Michigan to study chemistry. After taking several chemistry classes at the college level she soon realized her real interests focused on biochemistry and biology. Graduating from U of M in 1994 with an undergraduate degree in Biology, she knew she wanted to go on and earn a graduate degree but was unsure of what to focus on so decided to work in industry for a while to gain some perspective. With a position in an analytical lab that analyzed air, water and soil samples, she looked for a variety of different environmental contaminants depending on what the client required. After several years working in the lab and taking a few graduate level courses along the way, she decided to go to graduate school for pharmacology after a

recommendation from a pharmacologist co-worker. She attended MSU and studied Pharmacology and Toxicology under the direction of Dr. Norbert Kaminski. She followed up her time at MSU with two postdoctoral positions. The first was at the University of Missouri – Kansas City, where she worked in an immunology lab that focused on the role of the proteasome in innate immune cell function. A year and a half later she moved to the University of Kansas Medical Center, where her husband was a faculty member at the time. She joined the lab of Dr. Curt Klaassen where she became interested in the immunomodulatory role of the stress-activated transcription factor Nrf2. She experimented with different chemicals to activate Nrf2, including tert-butylhydroquinone (tBHQ) which is a common food additive. After running a pilot study that showed her the potential of the research, she began to dedicate her research full time to tBHQ.

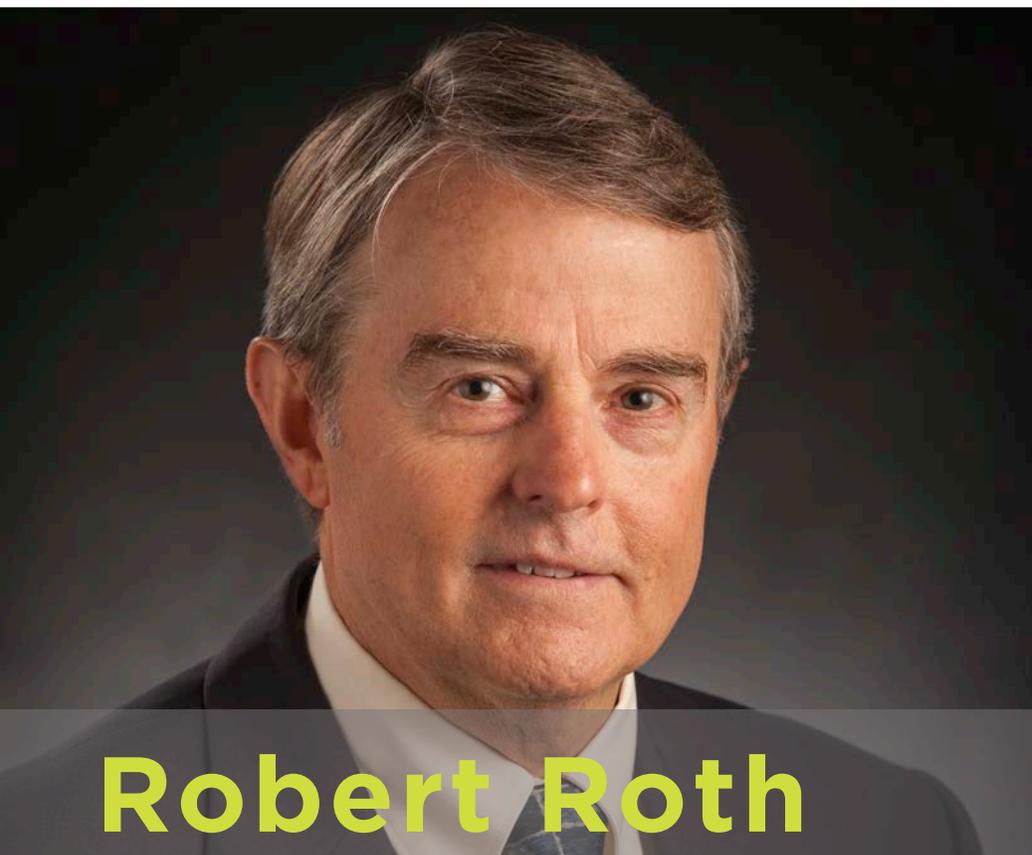
During her postdoctoral years, she made it a high priority to write a competitive transitional grant and worked

very hard to generate the preliminary data to do just that. She submitted a couple postdoctoral fellowships, and while they did not receive funding, they provided precious feedback she then applied to her transitional grant application. She was successful on the first attempt and received a K99-R00 award, which allowed her to look for faculty positions along with her husband. The stars aligned and both returned to her home state of Michigan as faculty at MSU.

She next set her sights on the coveted Outstanding New Environmental Scientist (ONES) Award from the National Institute of Environmental Health Sciences. As she gathered the last pieces of data she thought would make her application really strong, the ONES program was dismantled. She submitted her work instead as a regular R01 and then the following year, when the ONES program was reestablished, she submitted an application. Both were denied, but she gained valuable feedback and criticism she took to heart for her next ONES application and was rewarded for her efforts by being chosen as one of five applications awarded that cycle. The ONES award is a \$1.5 million, five year grant that supports researchers in the formative stages of their careers who are conducting cutting-edge research to study how the environment influences human health. “The ONES award has been a huge difference maker in this lab,” said Rockwell. She has been able to hire more people with experience and expertise and most importantly has been able to purchase a flow cytometer. Her lab is now able to measure 12 colors and 14 parameters. Rockwell said, “It has really changed the kinds of question we can ask in here. The flow cytometer has allowed us to be at the forefront in looking at some of these rare immune cell populations.”

Rockwell’s research has shown that tBHQ causes T cells, a critical part of the body’s immune system, to increase production of proteins that can promote allergies to such foods as nuts, milk, eggs, wheat and shell fish. Normally, the T cells release proteins, known as cytokines, that help fight immune invaders, but when tBHQ was introduced in laboratory models, the T cells released a

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Robert Roth

Professor, Pharmacology & Toxicology

As a senior chemistry major at Duke in 1967, Roth faced a difficult decision with graduation on the horizon - likely be drafted for the Vietnam War or continue his education by attending graduate school. Deciding he was very much against the war, Roth sought out graduate school and initially planned to study biochemistry. After applying several places, a chair at Johns Hopkins wrote back to him explaining that their training grant had not been renewed and the program couldn't accept graduate students that year, but his name had been passed on to a toxicologist in Environmental Medicine there. Having no idea what toxicology even was, Roth met with the toxicologist at John Hopkins and ended up choosing him as his graduate advisor. "What really appealed to me about toxicology was that it was a basic science but you could see an application of it down the road," said Roth.

Roth followed his graduate degree

in environmental toxicology from Johns Hopkins with postdoctoral experience at Yale University School of Medicine. Finishing up his postdoc, he wrestled with whether he wanted to go into industry or academia. Somewhat unsure, he decided to go into academia thinking that it would be easy to make the jump to industry from there if he changed his mind down the road. After applying and interviewing several places, it came down to two attractive options: coming to MSU or going to another toxicology-focused institution. He sought out the advice of a colleague who worked for the other institution but had trained at MSU, and he unequivocally said, "Go to MSU, it is a great place to be." And the rest, as they say, is history. Roth consequently chose MSU and began his time as an MSU faculty member at the "new" Life Sciences building with a big lab and a \$10,000 startup package. His first research was comparing the ability of the liver and lung, mostly in perfused organ preparations, to metabolize drugs. He soon wanted to move more into

mechanistic toxicology, and his next focus was a grant in lung vascular injury from the plant toxin, monocrotaline.

Roth credits MSU with being a good place to develop professionally. He has stayed all these years because he has been able to attract outside grant support almost the entire time, the teaching loads have not been overwhelming and he has been able to recruit quality graduate students and postdoctoral fellows. The terrific trainees in his lab over the years have been critical contributors to the research success that he has enjoyed. In addition, the highly collaborative atmosphere at MSU allowed him to conduct research in areas that interested him - when he found himself treading into areas in which he was not an expert, there were always other faculty with relevant expertise who were excited to collaborate. "I think the collaborative atmosphere here has been really terrific. And that remains true today; it is one of the reasons I have stayed." Roth was around when the first iteration of the Institute for Integrative Toxicology was formed and was also involved in the initial application of the Superfund project. Through the years, he developed a strong interest in graduate education and was asked to head the Admissions and Policy Committee for the training program of the IIT. When then IIT director Larry Fisher retired, Roth was asked to become the Graduate Director of the EITS Program, and held that position for 13 years.

The unexpected result of a somewhat wayward experiment led Roth down the path of his current research, the role inflammation has on toxic responses in the liver. Along with his spouse and collaborator, Patti Ganey, he spent a number of years examining how an inflammatory response can sensitize liver of animals to the effects of toxic chemicals. Thinking about where this might have practical value, Roth began to consider that the interaction of the inflammatory response with hepatotoxic chemicals might be what underlines some idiosyncratic (rare-occurring) reactions in the liver. With that in mind, Roth and Ganey were able to develop the first animal models of idiosyncratic hepatotoxicity, in which drug administration along with concurrent inflam-

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...Pestka continued from page 16

grant and with the help of an \$1.5 million endowment from the Robert and Carol Deibel family. Deeply affected by lupus, the Diebel family hopes their funds will propel Dr. Pestka's research even fur-

ther. Dr. Pestka is excited for his future at MSU and the opportunities to keep collaborating with great minds across campus. Over the course of his career, Dr. Pestka has collaborated with 22 different units on campus and 88 other

entities around the world. "I've stayed at MSU because of all the wonderful opportunities to collaborate; there are no barriers to collaboration here. The IIT is certainly a factor that has kept me here." ☘

...ROCKWELL continued from page 17

different set of cytokines that are known to trigger allergies to some foods. Rockwell is now trying to understand, why do the T cells start behaving in a way that can potentially promote allergy? Her research has shown that the activation of Nrf2 by tBHQ in T cells upregulates a transcription factor, GATA-3, that is important for driving the cell to become

an allergy-promoting Th2 cell. The lab also believes that they have a grasp on the molecular mechanism by which occurs - they have identified several possible Nrf2 binding sites in the GATA-3 gene and have found Nrf2 can actually bind to these sites.

With her ONES grant, Rockwell is also studying how other chemicals (arsenic and cadmium) may trigger the

same Nrf2 signaling pathway and share the same immunomodulatory effects that tBHQ models. The future results of her ONES work could impact future regulation of chemicals like tBHQ, arsenic, and cadmium, especially for sensitive populations of people with already altered immune system function. ☘

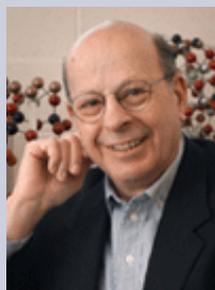
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mation caused pronounced liver injury. Their work led to the identification of cytokines and other factors that drove the liver injury. Those results in rodents led to finding that idiosyncrasy-associated drugs synergize with cytokines to damage hepatocytes in culture. Now their work is largely in cell culture, and Roth and Ganey are currently working on an in vitro assay that could be used

by pharmaceutical companies to predict which drug candidates might be more likely to have this idiosyncrasy liability. Most recently, their assay has received a provisional patent and has been licensed to a contract research organization, which is working with them to market it to pharmaceutical companies. The assay could save companies millions of dollars in failed clinical trial costs and could have an impact on human health

by preventing drugs with the propensity to cause idiosyncratic reactions from reaching the market. "For most of my career, I have just been interested in pursuing questions that fascinate me, and I was able to get grants and pursue those interests. The older I become, the more I seem to want to see something arise from my work that could have practical impact." ☘

FACULTY ACHIEVEMENTS



Dr. Thomas Pinnavai, Professor Emeritus of Chemistry, was named 2016 - 2017 AAAS Fellow by the American Association

for the Advancement of Science. Pinnavaia was recognized for distinguished contributions to the field of inorganic materials chemistry, particularly for innovative synthesis of mesophases via supramolecular assembly and the intercalation of lamellar solids.



Dr. Jay Goodman, Professor, Pharmacology and Toxicology, was elected to serve on the Society of Toxicology's Nominating Committee

in 2017-2018.



Dr. Gina Leininger, Assistant Professor, Physiology and the Neuroscience Program, received the Teacher-Scholar Award from

The College of Natural Science.



Dr. Linda Mansfield, University Distinguished Professor, Large Animal Clinical Sciences, Microbiology and Molecular Genetics, and **Dr. Jack Harkema**, University Distinguished Professor, Pathobiology and Diagnostic Investigation, have been named the inaugural Albert C. and Lois E. Dehn chairs for the Michigan State University College of Veterinary Medicine, funded by a \$12.6 million dollar donation.

FACULTY PUBLICATIONS

During the 2016-2017 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, 2016 to June 30, 2017.

Amalfitano, Andrea

- Quiroga D, Aldhamen YA, Godbehere S, Harding L, Amalfitano A (2017). Decreased Vector Gene Expression from E2b Gene-Deleted Adenovirus Serotype 5 Vaccines Intensifies Proinflammatory Immune Responses. *Clin Vaccine Immunol.* 24(6). PubMed PMID: 28381403.
- Fracasso G, Falvo E, Colotti G, Fazi F, Ingegnere T, Amalfitano A, Doglietto GB, Alfieri S, Boffi A, Morea V, Conti G, Tremante E, Giacomini P, Arcovito A, Ceci P (2016). Selective delivery of doxorubicin by novel stimuli-sensitive nano-ferritins overcomes tumor refractoriness. *J Control Release.* 239:10-8. PubMed PMID: 27524282.
- Rastall DP, Seregin SS, Aldhamen YA, Kaiser LM, Mullins C, Liou A, Ing F, Pereria-Hicks C, Godbehere-Roosa S, Palmer D, Ng P, Amalfitano A (2016). Long-term, high-level hepatic secretion of acid α -glucosidase for Pompe disease achieved in non-human primates using helper-dependent adenovirus. *Gene Ther.* 23(10):743-752. PubMed PMID: 27367841.

Andrechek, Eran R.

- Jhan JR, Andrechek ER (2017). Effective personalized therapy for breast cancer based on predic-

tions of cell signaling pathway activation from gene expression analysis. *Oncogene.* 36(25):3553-3561. PubMed PMID: 28135251.

- Rennhack J, To B, Wermuth H, Andrechek ER (2017). Mouse Models of Breast Cancer Share Amplification and Deletion Events with Human Breast Cancer. *J Mammary Gland Biol Neoplasia.* 22(1):71-84. PubMed PMID: 28124185.

- Jhan JR, Andrechek ER (2016). Stat3 accelerates Myc induced tumor formation while reducing growth rate in a mouse model of breast cancer. *Oncotarget.* 7(40):65797-65807. PubMed PMID: 27589562.

- Miller LD, Chou JA, Black MA, Print C, Chifman J, Alistar A, Putti T, Zhou X, Bedognetti D, Hendrickx W, Pullikuth A, Rennhack J, Andrechek ER, Demaria S, Wang E, Marincola FM (2016). Immunogenic Subtypes of Breast Cancer Delineated by Gene Classifiers of Immune Responsiveness. *Cancer Immunol Res.* 4(7):600-10. PubMed PMID: 27197066.

- Turpin J, Ling C, Crosby EJ, Hartman ZC, Simond AM, Chodosh LA, Rennhack JP, Andrechek ER, Ozcelik J, Hallett M, Mills GB, Cardiff RD, Gray JW, Griffith OL, Muller WJ (2016). The ErbB2 Δ Ex16

splice variant is a major oncogenic driver in breast cancer that promotes a pro-metastatic tumor microenvironment. *Oncogene.* 35(47):6053-6064. PubMed PMID: 27157621.

Atchison, William D.

- Bailey JM, Colón-Rodríguez A, Atchison WD (2017). Evaluating a Gene-Environment Interaction in Amyotrophic Lateral Sclerosis: Methylmercury Exposure and Mutated SOD1. *Curr Environ Health Rep.* 4(2):200-207. PubMed PMID: 28397096.

- Colón-Rodríguez A, Hannon HE, Atchison WD (2017). Effects of methylmercury on spinal cord afferents and efferents-A review. *Neurotoxicology.* 60:308-320. PubMed PMID: 28041893.

- Tsai T, Yuan Y, Hajela RK, Philips SW, Atchison WD (2017). Methylmercury induces an initial increase in GABA-evoked currents in *Xenopus* oocytes expressing α (1) and α (6) subunit-containing GABA(A) receptors. *Neurotoxicology.* 60:161-170. PubMed PMID: 27720918.

Bernstein, Alison I.

- Dunn AR, Stout KA, Ozawa M, Lohr KM, Hoffman CA, Bernstein AI, Li Y, Wang M, Sgobio C, Sastry N, Cai H, Caudle WM, Miller GW (2017). Synaptic vesicle glycoprotein

2C (SV2C) modulates dopamine release and is disrupted in Parkinson disease. *Proc Natl Acad Sci U S A.* 114(11):E2253-E2262. PubMed PMID: 28246328.

- Cliburn RA, Dunn AR, Stout KA, Hoffman CA, Lohr KM, Bernstein AI, Winokur EJ, Burkett J, Schmitz Y, Caudle WM, Miller GW (2016). Immunohistochemical localization of vesicular monoamine transporter 2 (VMAT2) in mouse brain. *J Chem Neuroanat.* pii: S0891-0618(16)30095-3. PubMed PMID: 27836486.

- Lohr KM, Chen M, Hoffman CA, McDaniel MJ, Stout KA, Dunn AR, Wang M, Bernstein AI, Miller GW (2016). Vesicular Monoamine Transporter 2 (VMAT2) Level Regulates MPTP Vulnerability and Clearance of Excess Dopamine in Mouse Striatal Terminals. *Toxicol Sci.* 153(1):79-88. PubMed PMID: 27287315.

Bhattacharya, Sudin

- Jagannathan L, Jose CC, Tanwar VS, Bhattacharya S, Cuddapah S (2017). Identification of a unique gene expression signature in mercury and 2,3,7,8-tetrachlorodibenzo-p-dioxin co-exposed cells. *Toxicology Research.* 6:312-323. DOI: 10.1039/C6TX00432F.

Boyd, Stephen A.

Chen Z, Zhang W, Wang G, Zhang Y, Gao Y, Boyd SA, Teppen BJ, Tiedje JM, Zhu D, Li H (2017). Bioavailability of Soil-Sorbed Tetracycline to *Escherichia coli* under Unsaturated Conditions. *Environ Sci Technol*. 51(11):6165-6173. PubMed PMID: 28525258.

Boyd SA, Sallach JB, Zhang Y, Crawford R, Li H, Johnston CT, Teppen BJ, Kaminski NE (2017). Sequestration of 2,3,7,8-tetrachlorodibenzo-p-dioxin by activated carbon eliminates bioavailability and the suppression of immune function in mice. *Environ Toxicol Chem*. PubMed PMID: 28370362.

Tian H, Gao J, Li H, Boyd SA, Gu C (2016). Complete Defluorination of Perfluorinated Compounds by Hydrated Electrons Generated from 3-Indole-acetic-acid in Organomodified Montmorillonite. *Sci Rep*. 6:32949. PubMed PMID: 27608658.

Zhang S, Liu Q, Gao F, Li X, Liu C, Li H, Boyd SA, Johnston CT, Teppen BJ (2017). Mechanism Associated with Kaolinite Intercalation with Urea: Combination of Infrared Spectroscopy and Molecular Dynamics Simulation Studies. *Journal of Physical Chemistry*. 121:402-409. DOI: 10.1021/acs.jpcc.6b10533.

Bursian, Steven J.

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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.

- » 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

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
- » Advisory Council Member, International Food Protection Training Institute (IFPTI)
- » Technical Advisory Network Member, Food Safety Preventive Controls Alliance
- » Editorial Board, Foods Journal

Boyd, Stephen A.

- » Consultant, Michigan Farm Bureau (regarding PCB uptake by soybeans)
- » Member and Past Chair, Technical Assistance Group, Pine River Superfund Citizen Task Force (Velsicol Superfund Site)
- » Consulting Editor, Soil Science

Bursian, Steven J.

- » Editorial Board, Journal of Toxicology
- » Member, Health Advisory Board of NSF International

Carignan, Courtney C.

- » Board of Directors, Society of Environmental Toxicology and Chemistry North Atlantic Chapter
- » Ad-hoc reviewer for Chemosphere, Environment International, Environmental Science and Technology, International Journal of Environmental Research and Public Health, and Science of the Total Environment
- » Scientific Advisor, ATSDR Community Advisory Panel for Pease Tradeport
- » Member, Air Force Restoration Advisory Board for Pease Tradeport
- » Member, Rapid Response Network
- » Science Advisory Council, Environmental Health Strategy Center
- » Member, Navigation Guide Work Group
- » Co-organizer, Complex Mixtures Working Group

Copple, Bryan L.

- » Study section member, Hepatobiliary Pathophysiology (HBPP)

Ewart, Susan L.

- » Reviewer and Standing Committee Member, National Institutes of Health; Allergy, Immunology, and Transplantation Research Committee (AITC)

Ganey, Patricia E.

- » Editorial Board, Journal of Pharmacology and Experimental Therapeutics
- » Editorial Board, Journal of Toxicology and Environmental Health
- » Editorial Board, Toxicology
- » Member, SOT Finance Committee
- » Chair, SOT Scientific Program Committee
- » Councilor, International Union of Toxicologists for the SOT
- » President, Society of Toxicology

Goodman, Jay I.

- » Editorial Board, Toxicology
- » Associate Editor, Regulatory Pharmacology and Toxicology
- » Member, Board of Directors, Toxicology Forum

Gulbransen, Brian D.

- » Michigan Physiological Society Membership and Fundraising Committee, 2017-present
- » Michigan Physiological Society Awards Committee, 2017-present
- » Chair of 2017 Great Lakes Glia Conference session entitled "Gut-Glia Communication".
- » Chair of 2017 American Neurogastroenterology and Motility Society (ANMS) Young Investigator Forum
- » Digestive Disease Week 2017 Research Forum chair: Enteric Neurobiology: Cell and Molecular Biology.
- » Vice Chair of Digestive Disease Week (DDW) 2017 Abstract Review; American Gastroenterological Association (AGA); Enteric Neurobiology Section: Cell and

- Molecular Biology (Including Neurons, Glia, ICC, Smooth Muscle and Stem Cells)
- » Experimental Biology Featured Topic Chair: Neuroglial Interactions in Health and Disease (American Physiological Society: EB 2017)
- » National Institutes of Health SPARC Grant Review Panel, July 2016
- » FNM 2016 Joint International Meeting (Federation of Neurogastroenterology and Motility Meeting) Abstract Review Panel
- » Digestive Disease Week (DDW) 2016 Abstract Reviewer; American Gastroenterological Association (AGA); Enteric Neurobiology Section: Cell and Molecular Biology (Including Neurons, Glia, ICC, Smooth Muscle and Stem Cells)
- » American Physiological Society GI & Liver Physiology Section Trainee Development Committee, 2015-present
- » American Society of Neurochemistry (ASN) membership committee, 2014-present
- » Experimental Biology Session Chair: Neuro-immune interactions in the gut (American Physiology Society; EB 2016)
- » American Society of Neurochemistry (ASN) Session Chair: Unmyelinated and unappreciated: novel roles for non-myelinating peripheral glia (ASN meeting 2016)
- » Member of the American Neurogastroenterology and Motility Society (ANMS), American Gastroenterological Society (AGA), Michigan Physiological Society (MPS) and American Physiological Society (APS)
- » Editor, Purinergic Signalling, Frontiers Autonomic Neuroscience, Frontiers in Cellular Neuroscience, Experimental Physiology, Neurogastroenterology and Motility
- » Assistant Chair SPARC/B55 Review Panel (NIH/CSR), 2017
- » National Institutes of Health SPARC Grant Review Panel, 2016 - present

- » Ad-hoc grant reviewer for the UK Biotechnology and Biological Science Research Council (BBSRC), 2013-present
- » Ad-hoc grant reviewer for the French National Research Agency ANR (Pathophysiology evaluation committee), 2013-present
- » Ad-hoc grant reviewer for the Wellcome Trust, UK

Harkema, Jack R.

- » Chair, Environmental, Occupational and Population Health Assembly, American Thoracic Society
- » Councilor, Executive Committee of the Society of Toxicologic Pathologists
- » Editorial Board, Journal of Experimental and Toxicologic Pathology
- » Editorial Board, Journal of Toxicologic Pathology
- » Member, EPA Clean Air Science Advisory Committee
- » Member, Board of Directors, American Thoracic Society (ATS)

Hayes, A. Wallace

- » Editor-in-Chief: Food and Chemical Toxicology; Ocular and Cutaneous Toxicology
- » Editor: Americas, Human and Experimental Toxicology
- » Member, Globalization Committee, American Board of Toxicology
- » Member, US Food and Drug Administration, Food Advisory Committee
- » Invited Speaker, Workshop on GRAS Determinations, International Society of Regulatory Toxicology and Pharmacology, Washington, DC.
- » Member, Board of Directors, Toxicology Forum
- » Member, Expert Panel, International Special Dietary Foods Industries. European Food Safety Agency. Parma, Italy, September 14-16, 2016
- » Hearing Expert in Working Group, Substances in Foods for Infants. European Food Safety Agency,

Parma, Italy, 2016

- » Invited speaker, Glyphosate Task Force (GTF) Symposium. Genotoxicity. 52th Congress, EUROTOX, Seville, Spain, September 5, 2016
- » Member, External Advisory Committee, Center for Research on Ingredient Safety, Michigan State University
- » Co-Chair/Speaker, Workshop Session: Global Perspectives on Safety, Regulatory and Risk Assessment of Food Additives or Contaminants. XIV International Congress of Toxicology in conjunction with the X Mexican Congress of Toxicology. Merida, Mexico. October 4, 2016
- » Invited Speaker, Glyphosate Webcast, Overview of Glyphosate Animal Carcinogenicity Studies, November 9, 2016
- » Member, Organizing Committee, 41st First Annual Winter Meeting, Toxicology Forum, Washington, DC February 6-8, 2017.
- » Co-chair/moderator. Evolution of the Mode of Action Framework: Building Confidence and Consistency. Toxicology Forum, Washington D.C. February 6, 2017
- » Course Director and Professor. Current Trends in General Toxicology and Food Safety. Centre for Genetic Engineering and Biotechnology, La Havana, Cuba, June 15-16, 2017
- » Keynote Lecture. The Importance of In Vitro Testing in Support of Safety Testing for Neurotoxicological Endpoints. State of the Art in NonClinical Models for Neurodegenerative Diseases. Varadero, Cuba. June 21, 2017

Hegg, Colleen C.

- » Reviewer, NIH NIDCD Fellowship Application review
- » Co-Chair, Judging, College of Veterinary Medicine Phi Zeta Research Day
- » Advocate in Science, Susan G. Komen for the Cure
- » Officer, SOT Stem Cell Specialty Section

Hollingworth, Robert M.

- » Editorial Board, Insecticide Resistance Newsletter
- » Officer, Agrochemicals Division, American Chemical Society
- » Member, National Research Council Panel to Review California Department of Pesticide Regulation's Risk Assessment Procedures

Jackson, James E.

- » Member, American Chemical Society
- » Member, National Academy of Inventors
- » Member, Michigan Green Chemistry Round Table
- » Member (and past chair), Meridian Township Environmental Commission
- » Member, Brownfield Redevelopment Authority, Meridian Township, MI

Jones, A. Daniel

- » Review Editor, *Frontiers in Plant Metabolism and Chemodiversity*
- » Founding Executive Board Member, Metabolomics Association of North America

Kaminski, Norbert E.

- » Chair, External Review Committee for the Interdisciplinary Program in Toxicology at Texas A&M University
- » Past President, Society of Toxicology
- » 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*

Lee, Kin Sing

- » Reviewer of *Bioorganic and Medicinal Chemistry Letter*

Leininger, Gina M.

- » Ad hoc Reviewer: *Frontiers in Endocrinology*, *Frontiers in Neuroendocrine Science*, *Frontiers in Neuroscience*, *Molecular Metabolism*, *Molecular Psychiatry*, *Neuropharmacology*, *Neuroscience Letters*, *PLOS One*, *Psychoneuroendocrinology*, *Scientific Reports*
- » Society Service: The Endocrine Society Annual Meeting Steering Committee
- » Abstract Reviewer: The Endocrine Society, The Obesity Society, The American Diabetes Association
- » Grant Reviewer: NIDDK Fellowships Panel

Li, Hui

- » Chair, Soils and Environmental Quality Division, Soil Science Society of America, 2017

Li, Ning

- » Manuscript Reviewer: *Toxicology Letters*, *Drug and Chemical Toxicology*, *Indoor Air*, *Environmental Research*, *Journal of Allergy and Clinical Immunology*, *ACS Nano*, *Journal of Cancer Biology and Research*

Liby, Karen T.

- » Editorial Board, AACR Cancer Prevention Research
- » Guest co-editor for special issue entitled "Nrf2 as an emerging therapeutic target?" in *Oxidative Medicine & Cellular Longevity*
- » American Society for Pharmacology and Experimental Therapeutics
- » (ASPET) Summer Undergraduate Research Fellowship (SURF) director at MSU
- » External reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant
- » External reviewer, NCI R21/R03

SEP7 Special Emphasis Panel study section Swiss National Science Foundation

Mansfield, Linda S.

- » Appointed as Albert C. and Lois E. Dehn Endowed Chair
- » Study Section Member, National Institutes of Health, National Institute of Allergy and Infectious Diseases Branch, Standing NIH Study Section, Immunity and Host Defense Study Section (IHD), Scott Jakes SRO
- » Member: Society for Mucosal Immunology, American Society for Microbiology, Conference of Research Workers in Animal Diseases, American Association of Veterinary Immunologists, World Association for the Advancement of Parasitology, American Association for the Advancement of Science, American Veterinary Medical Association, Michigan Veterinary Medical Association, American Association of Veterinary Parasitologists

Mazei-Robison, Michelle

- » Study Section Member, Harnessing genome editing technologies to functionally validate genetic variants in substance use disorders, ZDAI JXR-G
- » Study Section Member, Molecular Neuropharmacology and Signaling study section

Masako, Morishita

- » Study Section Peer Reviewer: NIEHS P42 Superfund Hazardous Substance Research and Training Program, ZESI LKB-K, IAM (August 2016)
- » Study Section Peer Reviewer: NIEHS P42 Superfund Hazardous Substance Research and Training Program, 2017/01 ZESI LKB-K (S), Special Emphasis Panel (September 2016)

Murphy, Cheryl A.

- » Associate Editor, *Ecotoxicology*
- » Working Group, Principal Leader,

“Dynamic models to link molecular perturbations to individual impacts for ecological risk assessment of chemicals”, sponsored by the National Institute for Mathematical and Biological Synthesis (NIMBioS)

- » Member of the Pellston Workshop “Advancing the Adverse Outcome Pathway Concept – An International Horizon Scanning Approach” held from April 2-7, 2017, Cornwall, Ontario, Canada.
- » Steering Committee Member for Society for Environmental Toxicology and Chemistry Focus Topic Meetings “High Throughput Screening and Ecological Risk Assessment - State of the Science and Emerging Applications” to be held in North Carolina in January 2018
- » Organizer of session “Systems Modeling Approaches for Ecotoxicology to Link Molecular Responses to Ecosystem Effects” as Society for Environmental Toxicology and Chemistry North America, 36th Annual Meeting, Orlando, FL, November 2016

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 (DNCCB) 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.

- » NIH Study Section Member, Neurobiology of Motivated Behavior

Rockwell, Cheryl E.

- » Editorial Board, Molecular Pharmacology
- » Editorial Board, Pharmacological Research
- » 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, National Academies Institute of Medicine’s Committee on Developing a Smarter National Surveillance System for Occupational Safety and Health in the 21st Century

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

Tiedje, James M.

- » National Resource Council Committee on “Incorporating 21st Century Science into Risk-Based Evaluations”
- » Science Advisory Committee, Environmental Molecular Sciences Lab, Pacific Northwest National Laboratory
- » Science Advisory Committee, Joint Genome Institute
- » Bioscience External Science Advisory Committee, Berkeley National Laboratory
- » Treasurer and Executive Committee, American Society for Microbiology
- » Class Chair, National Academy of Sciences
- » Chair, Genome Canada’s Large Scale Applied Research Program
- » Chair, the Biosciences Capability Review at Los Alamos Natl Lab
- » 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-Chaired the review of the Ecosystems Center at MBL
- » Co-Chair of Amer Soc Microbiol Coalition on Antimicrobial Resistances
- » Chair of the 4th Intl Symposium on Environmental Dimensions of Antibiotic Resistance (EDAR-4)
- » Named William Mong Distinguished Lecturer at Hong Kong Univ
- » Awarded Honorary Professor, Institute of Soil Science, Chinese Academy of Science, Nanjing

Upham, Brad L.

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

- » Invited Speaker: Webinar to the National Institute of Environmental Health's "FishNet Webinar Series" on September 26, 2016. Title of presentation: "MI Safe Fish". A presentation on the development of a mobile app for fish advisories, safe fish consumption.
- » Invited Speaker: Webinar to the National Institute of Environmental Health's monthly meeting for the Research Translation and Community Engagement Cores of the Superfund Research Program (SRP) Centers on September 8, 2016. Title of presentation: Engaging with the Community through Community Advisory Groups
- » Invited speaker for a symposium titled "Expert's Corner" at the "In Vitro Biology Meeting", 6/11/17, Raleigh, NC. Title of presentation: "Gap Junctional Intercellular Communication, the Archetypal Cell Phone of Tissues, Is an Excellent Biomarker for Assessing Environmental Stressors and Chemopreventive Compounds"
- » Invited Speaker for the Neonatology Unit of Sparrow Hospital, Lansing, MI, March 14, 2017. Title of presentation: "Overview of the MSU P42 Superfund Research Center Program."
- » Invited Speaker for the Neonatology Unit of Sparrow Hospital, Lansing, MI, November 15, 2016. Title of presentation: "Cell signaling mechanisms: Importance in tissue development and their role in the detection, prevention, and therapy of human diseases."
- » Faculty Representative, Hearing Body for MSU-College of Human Medicine academic and disciplinary issues, 2016

Veiga-Lopez, Almudena

- » Graduate Student Affairs & Curriculum Committee, Department of Animal Sciences, Michigan State University
- » Recruitment Committee, NICHD T32 Reproductive and Developmental Sciences Training Program, 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

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, Continuing Education Committee, Society of Toxicology
- » 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
- » Reviewer, NIH:NIEHS Superfund SRP P42, ZES1 LKB-K (S) 2017/01
- » External Peer Review, Health Canada, Human Health Risk Assessment for Gasoline Exhaust

Wu, Felicia

- » 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 – Systemic Injury by Environmental Exposure (SIEE) Study Section, ZRG1 DKUS C Special Emphasis Panel
- » Member, National Institutes of Health/NIEHS – Outstanding New Environmental Scientist (ONES) Study Section
- » External Reviewer, Promotion & Tenure, New York University

Zhang, Wei

- » Associate Editor, Canadian Journal of Soil Science, Journal of Environmental Quality
- » Committee Member, SSSA Soil Physics and Hydrology Division Mentoring Committee
- » 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

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, Assistant 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, Large Animal Clinical Sciences

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

John E. Linz, Professor, Food Science & Human Nutrition, Microbiology & Molecular Genetics

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, Assistant 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

John Baker, 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 (*Interim*)
Cheryl Sisk, College of Natural Science (*Interim*)
Douglas Buhler, Director, AgBioResearch



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