

2020 ANNUAL REPORT



IIT@MSU

INSTITUTE FOR INTEGRATIVE TOXICOLOGY

MICHIGAN STATE
UNIVERSITY

IIT ANNUAL REPORT 2020

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A **TRADITION** of EXCELLENCE

The Michigan State University Institute for Integrative Toxicology (IIT) is a multidisciplinary academic unit that supports and coordinates research and graduate education activities for faculty interested in various aspects of **toxicology**. The Institute is a **successor** to the Institute for Environmental Toxicology and the Center for Environmental Toxicology, the latter founded in 1978. While the name of the unit has changed over the years to denote changes in the **leadership** and academic position, the mission has been the same. For over 40 years, toxicology at Michigan State has provided **excellence** in training graduate students, facilitating research, and providing service to the State of Michigan when needed. The successes generated in these endeavors have resulted in **recognition** of Michigan State as a leader in academic toxicology.

The Center for Environmental Toxicology was initiated primarily to **assist** the State of Michigan with environmental contamination issues such as those arising from the PBB (polybrominated biphenyls) incident in the early 1970s. That unfortunate event was initiated by the accidental

contamination of feed for dairy cattle with PBBs. These dioxin-like chemicals and dioxin itself remain a major topic of research at Michigan State University.

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

MESSAGE from the DIRECTOR



While 2020 has been a year unlike any other, the Institute for Integrative Toxicology has continued to thrive in education, research and collaboration.

Our faculty have continued to conduct excellent research, successfully competing for grant funding, attending scientific meetings virtually, and receiving news coverage on their newest

discoveries. Our affiliated faculty have now grown to seventy-nine specialists conducting toxicology-related research spanning investigations pertaining to the environment (air, water, soil), occupational setting, as well as food and putative therapeutic agents. This year the IIT welcomed adjunct faculty members: Dr. Lyle Burgoon, Dr. Rory Conolly, and Dr. Peer Karmaus. We also celebrated the retirement of Dr. Steven Bursian, professor in the Department of Animal Science. A group of our faculty also helped form the new Center for PFAS Research on campus. This multidisciplinary group is linking their expertise in an effort to understand more about PFAS and its effects on health and the environment.

Our students have adapted amazingly to the various temporary regulations due to the pandemic and have successfully continued their research and education under less than optimum circumstances. Many have attended virtual meetings, presented their research and earned awards this year, as they have so successfully done in prior years.

Our affiliated center under the IIT umbrella, the Center for Research on Ingredient Safety (CRIS), has had a productive 2020 as well. CRIS continues to conduct research on the safety of chemical ingredients in consumer products. A major focus for our center during the current year has been on cannabidiol (CBD), due to the interest of our CRIS members. Since CRIS was not able to host an in-person CBD-Science Symposium, as part of our annual meeting, we transformed the symposium into a virtual event to great success. CRIS also leveraged its expertise and the center's agility to connect with the larger community on ingredient safety topics to help combat misinformation and provide the public with information that is supported by the current state-of-the-science. CRIS' actions grew its audience in 2020 and these new individuals will help us engage with the community on ingredient safety concerns that matter to them.

Lastly, a large cadre of our faculty continue to be extremely productive in their research activities and engagement with community and regulatory agencies related to work on dioxin and dioxin-like compounds as part of our NIH funded Superfund Research Center grant. Exciting research ideas and plans are underway for the coming year of our program.

The IIT welcomes 2021 with hopes of continued success in the coming year.

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

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

2020 IIT HIGHLIGHTS

While this was a year like no other, the faculty and trainees of the IIT continued to expand the quality and leadership of Michigan State University in academic toxicology through their numerous accomplishments.

IIT-Affiliated Faculty Help Form New Center for PFAS Research

Six IIT-affiliated faculty members, Drs. **Cheryl Murphy**, **Sudin Bhat-tacharya**, **Courtney Carignan**, **A. Daniel Jones**, **Hui Li**, and **Brian Teppen**, have recently joined forces with nine other researchers across campus to form the Center for PFAS Research. This group, with knowledge spanning diverse fields across campus, are linking their expertise in an effort to understand more about PFAS and its effects on health and the environment. Per- and polyfluoroalkyl substances (PFAS) are a class that includes at least 4,000 chemicals. Many of these have been used in fire-fighting foams for fuel fires, water and stain-resistant coatings for furniture, carpeting, footwear, textiles, paper food packaging and more. Unlike the case for nearly all other organic pollutants, PFAS in soil and water are not degraded by biological or biogeochemical processes.

The Center for PFAS Research, in collaboration with MSU AgBioResearch, will serve as a hub for academic, public health, state, federal, and industry research endeavors surrounding PFAS and emerging contaminants. The main goals of the Center for PFAS Research are to quantify and communicate PFAS risks, and mitigate their impacts on human health, agriculture and natural resources. Researchers at the Center will

aim to quantify exposure and risk for humans, livestock, crops, fish and wildlife as well as develop and test remediation strategies and technologies. A number of researchers will also be exploring safer PFAS alternatives. Investment into PFAS research is timely and appropriate because there are no focused and coordinated efforts to explore PFAS impact on agricultural and natural resources in the U.S. There is also a significant investment by the state of Michigan (estimated at \$50 million so far) into PFAS-related issues, which is well above the current federal level, and more than any other state in the U.S.

The Center will use an organized framework to unite researchers across disciplines to tackle this complex ecological and agricultural problem. Tapping into MSU's vast knowledge base, research disciplines engaged with the Center will include biologists, toxicologists, risk assessors, computer scientists, modelers, mathematicians, chemists, physicists, ecologists and engineers as well as exposure, data and social researchers. Center for PFAS Research Director and IIT-affiliated faculty member, Dr. Cheryl Murphy, is looking forward to bringing even more expertise on board with the Center as their funding and research gets underway. "The

PFAS problem is very complicated, but we are excited to tap into the vast array of expertise across campus that could help us tackle this problem. MSU is the perfect place to launch such a center"

On January 10, 2020, the U.S. House of Representatives passed the PFAS Action Act which designates certain PFAS as hazardous substances. If this Act is enacted, and PFAS are declared hazardous substances, then under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, aka Superfund), significant remediation funds become accessible for PFAS. The Center for PFAS Research will facilitate MSU's readiness for when PFAS are declared hazardous substances, so that MSU can quickly respond to funding opportunities and provide sound science to support the risk assessment of particular PFAS compounds.

To learn more about the Center for PFAS Research at MSU, please visit:

<https://www.canr.msu.edu/news/msu-announces-new-center-for-pfas-research>

<https://www.canr.msu.edu/pfas-research/index> 📄

MSU NIEHS R25 Training Grant Renewed for 5 Years

The NIEHS R25 Training Grant, "First Time Summer Research Experience in Environmental Health Sciences," lead by IIT-affiliated faculty members, **Dr. William Atchison** and **Dr. James Luyendyk**, was recently renewed for an additional 5 years.

The summer research program in environmental health and toxicology

provides opportunities for underrepresented minority (URM) students to receive first time mentored introductory experiences in laboratory research. The 12 week beginning research experience is coupled with professional development activities aimed at improving both verbal and written scientific communication, introduction to research career oppor-

tunities in environmental health, and training on ethical conduct of research. The ultimate goal of the program is to encourage URM students to enroll in Ph.D. programs in environmental health or allied biomedical sciences and the training they receive during the program prepares the student for a more extensive subsequent research experience. 📄

Nault & MSU Superfund Team Publish Exciting Developments in Single-Cell RNA Sequencing



Newly appointed Assistant Professor in the Department of Biochemistry and Molecular Biology and EITS alumnus, **Rance Nault**, in collaboration with a team of MSU Superfund

scientists including **Kelly Fader**, **Sudin Bhattacharya** and **Timothy Zacharewski**, recently published exciting research on single-cell RNA sequencing. The paper, “Single nuclei RNA sequencing assessment of the hepatic effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin,” was published in August 2020 in the journal, *Cellular and Molecular Gastroenterology and Hepatology*.

The liver is composed of several different cell types working together to maintain normal function. Exposure to chemicals, drugs, and supplements can modulate these normal processes, and in some cases even lead to toxicity and disease. Traditionally, evaluation of how foreign compounds modify gene expression is achieved by averaging

their levels in a tissue sample and as a result some cell type specific responses can be lost. As innovative technologies are emerging to allow the measurement of gene expression levels in a single cell or nucleus, the objective of the study by Nault was to demonstrate its application for characterizing the cell-specific effects of the persistent environmental contaminant 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, aka dioxin). Nault and his team showed that single-nuclei RNA sequencing can be used to demonstrate shifts in cell populations.

Single-cell RNA sequencing is most commonly performed on freshly collected tissues. In typical toxicology study designs multiple doses are used to establish safety of chemicals, drugs, and supplements. The number of samples, coupled with the severe effects observed at higher doses, present a significant hurdle in the use of this technology. The work by Nault shows that by using nuclei isolated from frozen livers, it is possible to identify known responses caused by dioxin exposure, as well as gain novel insight into how specific cell populations respond.

Demonstration of the feasibility and value of a single-nuclei RNA sequencing

approach was a first critical step for investigating more complex study designs. Future efforts by Nault and the team of MSU Superfund researchers will explore the use of this technology to characterize the cell-specific sensitivity upon exposure to liver toxicants in order to better understand the development and progression of non-alcoholic fatty liver disease.

Nault’s research was generated under Project 3, “TCDD-Elicited Steatosis: The Role of Aryl Hydrocarbon Receptor Regulation in Lipid Uptake, Metabolism, and Transport,” and Core A, “Computational Modeling of Mammalian Biomolecular Responses,” of the MSU Superfund Project. Led by Dr. Zacharewski, Project 3 explores the adverse effects of dioxin and related compounds, commonly found Superfund contaminants, on liver metabolism and function. By using innovative technologies such as single-nuclei RNA sequencing, this MSU Superfund team is able to gain further insight on the role of aryl hydrocarbon receptor (AhR)-mediated changes in lipid metabolism which leads to the accumulation of fat, inflammation, and scarring of liver tissue. 🌱

Three New Adjunct Faculty Join IIT in 2020



Dr. Lyle Burgoon
IIT Adjunct Faculty Member

Dr. Burgoon is an EITS alumnus and is currently the Director at the Center for Existential Threat Analysis and Leader of Bioinformatics and Computational Toxicology at the US Army Engineer Research and Development Center.

Dr. Burgoon has recently started a research program focused on metascience applied to toxicology -- specifically, studying how defects in study designs, pseudoreplication and sample bias are contributing to the replication crisis in toxicology, and how these defects impact safety/risk assessments, policies, and drug/chemical regulations.



Dr. Rory Conolly
IIT Adjunct Faculty Member

Dr. Rory Conolly has been a long-standing collaborator with the IIT, having served as the Leader of the Computational Core of the MSU Superfund project for many years.

Conolly’s research interests include: (1) biological mechanisms of the dose-response and time-course behaviors that determine how exposures to toxicants result in adverse health effects; (2) the use of biologically based computational modeling to study these mechanisms; and (3) the application of these models to quantitative dose-response assessment. Dr. Conolly has extensive experience in physiologically based pharmacokinetic (PBPK) modeling and in computational modeling of multistate carcinogenesis.



Dr. Peer Karmaus
IIT Adjunct Faculty Member

Dr. Karmaus is an EITS alumnus and is currently a staff scientist at the National Institute of Environmental Health Sciences.

Karmaus’ current research involves signaling pathways, metabolic changes, and cellular features that define cell fate. Within this area, the focus is on three overarching ideas: 1. How a cell’s environment affects its ability to support cell fate decisions; 2. How signaling pathways connect with a cell’s ability to sense metabolite/energy levels and how this mechanism may be perturbed by the availability of metabolites; 3. How heterogeneity within seemingly homogenous cell populations contributes to cell fate and function.

EITS TRAINING PROGRAM

An overview of the current EITS training program and review of 2020 activities.

The Environmental and Integrative Toxicological Sciences (EITS) graduate program continues to be one of the premier toxicology training programs in the U.S. This MSU training program administered by the IIT is a “dual major” format that emphasizes excellent basic science training from one of our 17 partnering graduate programs coupled with didactic and research training in toxicology by MSU IIT-affiliated faculty. Currently, 30 doctoral students are enrolled in the EITS program, distributed among several of our partnering PhD programs. Twenty-three of these students are in the Biomedical Track, five in the Environmental Track, and two students are currently enrolled in the new Food Toxicology and Ingredient Safety Track. Many of our current students received awards at the 2020 Annual Meeting of the Society of Toxicology (SOT) or from other organizations. Our students continue to demonstrate good citizenship by volunteering to serve on Society committees at the regional and national levels as well as within MSU. Students who graduated in the past year have accepted postdoctoral positions at various academic institutions in the U.S. and other countries or began careers at some of the largest corporations in the country.

The National Institute of Environmental Health Sciences (NIEHS) Training Grant, that the IIT has received with continuous funding since 1989, continued in 2020. The training grant offers stipend support for 7 predoctoral and 2 postdoctoral fellows each year. Universities compete nationally for training grant support from NIEHS. The longstanding support by NIH of the MSU-IIT is a testament to the excellence that the EITS program has maintained over three decades in training graduate students and postdoctoral fellows, many of whom have become leaders in the field of toxicology. 🍎

EITS GRADUATES 2020



Kevin Baker

Pharmacology and Toxicology
Mentor, James Luyendyk

Mechanisms Regulating Tissue Factor: Factor Via-Dependent Coagulation in Liver Disease



Robert Freeborn

Pharmacology and Toxicology
Mentor, Cheryl Rockwell

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



Jianzhou He

Plant, Soil and Microbial Sciences
Mentor, Wei Zhang

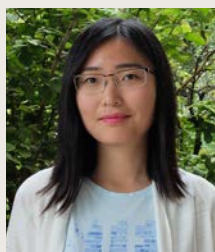
Environmental Application and Implication of Engineered Nanomaterials in Soil, Water and Plant Systems



Sean Nguyen

Cell & Molecular Biology
Mentor, Margaret Petroff

Placental Extracellular Vesicle Trafficking in Murine Pregnancy



Yike Shen

Plant, Soil and Microbial Sciences
Mentor, Wei Zhang

Antibiotic Resistance and Bacterial Microbiome in Lettuce-Soil Systems



Di Zhang

Pharmacology and Toxicology
Mentor, Karen Liby

Applying Synthetic Chemistry and Nanoparticle Delivery to Enhance Drug Efficacy and Reduce Toxicity for Cancer Prevention and Treatment

GRADUATE SPOTLIGHTS

EITS graduates are sought for careers in industry, government and academia. Below we feature four alumni and their paths after graduation from the EITS program.



Yogesh Saini

Associate Professor, Comparative Biomedical Sciences, School of Veterinary Medicine, Louisiana State University

At a glance:

Department: Genetics

Mentor: John LaPres

Dissertation:

“The roles of hypoxia inducible factors in lung development and cobalt-induced lung injury”

Defended: Fall 2009

Significant Achievements During Graduate School:

- » The Roger O. McClellan Research Award for doctoral research excellence at the Society of Toxicology Conference, 2010
- » Dissertation Completion Fellowship (Fall 2009) from Genetics Program, MSU
- » Graduate Research Award “First Place” in Metal Specialty Section at the Society of Toxicology Conference, 2009
- » Dissertation Completion Fellowship from Graduate School, MSU, 2009
- » Junior Investigator Travel Fellowship from The New York Academy of Sciences to attend “Hypoxia and Consequences: From Molecule and Malady” meeting, The New York Academy of Sciences, 2009

Scientific questions – the why, when, where and how – have always intrigued Yogesh Saini and helped lead him down a research-focused career path following his veterinary training. After earning his Bachelors of Veterinary Sciences and Animal Husbandry from Himachal Pradesh Agricultural University, Saini earned his Masters of Veterinary Sciences with Honors from G. B. Pant University of Agriculture and Technology. He came to MSU in 2005 to earn his Ph.D. in Genetics with a dual major in Environmental Toxicology. Saini trained with Dr. John LaPres and completed his dissertation, “The roles of hypoxia inducible factors in lung development and cobalt-induced lung injury,” in the fall of 2009.

Being a trained veterinarian, Saini’s goal was always to work in a veterinary school. However, after his DVM in 2001, he decided to pursue a research-oriented career. Saini’s lung biology and toxicology training at the doctoral and postdoctoral level provided him with outstanding opportunities for career-development and scientific understanding and played a critical role in defining his long-term career goals – to develop a better understanding of cellular and molecular players that are key to the pathogenesis of genetic and environmental lung diseases. Currently, Saini is an Associate Professor at Louisiana State University School of Veterinary Medicine.

Saini’s research group is focused on studying cellular and molecular pathways of chronic lung diseases including cystic fibrosis, asthma and COPD. They use a variety of transgenic and

cell-specific gene knockout mice models of lung inflammation caused by genetic causes or environmental exposures. Particularly, Saini’s lab is interested in immune cell-types called macrophages and how they interact with other cells in the lungs to modulate inflammatory processes. Saini believes that detailed understanding of how a disease process starts is critical in the development of therapeutic strategies. “Currently, significant knowledge gap exists on ‘Why, When, Where, and How’ a disease process initiates,” commented Saini. “Addressing these questions is essential if we really want to cure deadly diseases that may affect animals and humans during their lifetime. My research aims to fill some of the knowledge gaps relevant to inflammatory lung diseases.”

Saini has felt fortunate to be part of the team at LSU and has enjoyed launching his independent research program there and growing further in his career-development process. Saini believes the training and mentoring support during graduate school is the most critical factor behind the success of any graduate student. “I received a tremendous amount of mentoring support from my mentor (Dr. John LaPres) and co-mentors (Drs. Harkema, Roth, Ewart, Jones),” said Saini. “I have no hesitations in saying that my current success was orchestrated by my training environment at MSU. My enrollment in the EITS program was a turning point in my graduate training as that is when I got a chance to work with collaborative and multidisciplinary EITS research faculty.” 🌟

- » Travel Fellowship, CIT to attend Society of Toxicology Conference, 2009
- » Student/Postdoctoral-Young Investiga-

tor Merit Award by Association of Scientists of Indian Origin (ASIO) at the Society of Toxicology Conference, 2009



Agnes Karmaus

Senior Toxicologist, Integrated Laboratory Systems, LLC

At a glance:

Department: Biochemistry and Molecular Biology

Mentor: Timothy Zacharewski

Dissertation: "Triazine-mediated disruption of BLTK1 Leydig cell steroidogenesis"

Defended: Summer 2013

Significant Achievements During Graduate School:

- » Published 12 peer-reviewed manuscripts, 6 as first author
- » Gave 3 invited talks at international meetings
- » SOT Reproductive & Developmental Tox. Specialty Section Grad Poster Contest, 2013, 2012
- » MSU Center for Integrative Toxicology Travel Award, 2013, 2012, 2011, 2010
- » Barnett Rosenberg Endowed Research Assistantship 2013
- » ILSI North America 2012 Summer Fellowship
- » MSU College of Natural Sciences Dissertation Continuation Fellowship, 2012
- » SOT Colgate-Palmolive Award Student Research Training in Alternative Methods, 2012
- » SOT Student Travel Award, 2012
- » MSU Research Enhancement Award, 2011
- » MSU Travel Awards: CNS 2011, BMB 2010, MSU 2011
- » SOT Michigan Chapter Poster Contest, 2010

Dr. Agnes Karmaus' relentless passion for science began in the seventh grade with a fantastic science teacher who inspired her curiosity. After earning her Bachelor of Science with Honors in Biochemistry from the University of Guelph, Karmaus came to MSU to earn her Ph.D. in Biochemistry and Molecular Biology with a dual major in Environmental Toxicology. Karmaus trained with Dr. Timothy Zacharewski and completed her dissertation, "Triazine-mediated disruption of BLTK1 Leydig cell steroidogenesis," in the summer of 2013.

Today, Karmaus is a Senior Toxicologist at Integrated Laboratory Systems, LLC (ILS), a contract research organization. Her role as a Study Director at ILS allows Karmaus to integrate her experience with animal studies and in vitro work from graduate school with her computational capabilities learned during her postdoctoral education at the U.S. EPA National Center for Computational Toxicology to best understand how to leverage any data. Karmaus' goal is to participate in the development of next generation toxicological methods and at ILS, Karmaus works toward this every day with clients who have this goal in mind. Most of Karmaus' projects emphasize the development of alternative methods for toxicity testing to refine, reduce, and one day replace the use of animals in toxicity testing. Using computational modeling as well as developing cell-based testing systems she aims to answer specific mechanistic questions to further the understanding of chemical-mediated toxicity. One of Karmaus' major roles is in supporting the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM), which allows her to participate in helping government agencies review and establish alternatives to animal testing approaches.

Karmaus enjoys her work at ILS because every client and project brings a new challenge within her specific expertise and makes her work exciting. She values the flexibility to work with clients to shape and pursue projects. "I

feel that our work makes a significant impact to modernize toxicity testing," said Karmaus.

As an EITS student, Karmaus was exposed to a great variety of research and realized what diverse needs and applications fall under the realm of toxicology. Several awards and fellowships earned during this time allowed her to chase after her interests and landed her in the world of Tox21 and ToxCast high-throughput screening. This opened doors to the alternative methods development and predictive toxicology area she currently works in. "I have had the luxury of being able to make a career by following my interests when something really resonates with me," said Karmaus. "I feel that this makes me particularly engaged and passionate about my work, and luckily it has worked out so far!"





Isola Brown

Associate Program Director, M.S. Program in Physiology, University of Michigan

At a glance:

Department: Pharmacology and Toxicology

Mentor: Brian Gulbransen

Dissertation: "Enteric Glial Cell Regulation of Oxidative Stress and Immune Homeostasis During Gastrointestinal Inflammation"

Defended: Summer 2017

Significant Achievements During Graduate School:

- » National Research Service Award (NRSA) Individual Predoctoral Fellowship from the NIH, 2016-2017
- » Predoctoral Fellow - Institute for Integrative Toxicology (IIT) NIEHS Training Grant (5T32ES007255) in Environmental Toxicology, 2015
- » Best Graduate Student Oral Presentation at the 2017 International Gap Junction Conference, 2017
- » Best Graduate Student Oral Presentation Award at the 2017 Michigan Physiological Society Meeting, 2017
- » Emerging Leader Graduate Student Award from the Black Faculty Staff and Administrators Association at Michigan State University, 2017
- » IIT Student Travel Award from MSU, 2017, 2016, 2015, 2014
- » American Physiology Society (APS) Minority Travel Award 2017, 2016, 2015, 2014
- » AGEP Scholar Award from MSU Graduate School, 2016, 2015, 2014
- » Michigan State University Graduate School Writing Fellow, 2015-2016

An early passion for math and science fueled Dr. Isola Brown's education and career towards her current role, where she can share her love of science with the next generation. After earning her Bachelor of Science degrees in Chemistry and Biochemistry from the University of Pennsylvania, Brown came to MSU to earn her Ph.D. in Pharmacology and Toxicology with a dual major in Environmental Toxicology. She trained with Dr. Brian Gulbransen and completed her dissertation, "Enteric Glial Cell Regulation of Oxidative Stress and Immune Homeostasis During Gastrointestinal Inflammation," in the summer of 2017.

Today, Brown is the Associate Program Director of the M.S. Program in Physiology at the University of Michigan, where she teaches and advises program students. As Associate Program Director, her work covers two primary sets of tasks: teaching and student advising. During the fall and winter terms, she teaches courses in Physiology and Neuroscience to M.S. Program students. Additionally, she co-directs a year-long Physiology seminar course for program students where they develop their end-of-program Capstone papers and conduct a hypothesis-driven investigation of a physiological topic of their choice. The second part of Brown's job involves advising students as they prepare applications for health profession programs (such as medicine or dentistry) or other future employment. Lastly, Brown also has responsibilities associated with program administration such as reviewing applications for incoming students, and the development of new courses for program students.

Brown's work in the M.S. Program directly aligns with her long-term career interests in teaching and student mentoring and advising, and student success outcomes. She was drawn to this role at Michigan for two reasons. Firstly, the Molecular and Integrative Physiology department at University of Michigan has a strong academic, research, and educational history in the field of Physiology, and was an ideal

place to continue her teaching career. Secondly, after completing her postdoc at the University of Virginia, she was interested in returning to the Midwest and the state of Michigan (even if she had to start saying Go Blue!).

In the year and a half since Brown accepted her role as Associate Program Director, she has been able to pursue in-classroom teaching, direct student mentoring and a wealth of new opportunities she hadn't planned on. "In addition to its initial attractions, my position has presented me with opportunities to develop new courses, cultivate skills in academic program administration, and broaden my advising portfolio. Truly, no two days are the same. Because our program is a one-year program, I am fortunate to meet a new cohort of 30-35 students each Fall term, learning from them individually as I teach."

Brown discussed two key areas in which her time as an EITS student has been crucial to her success in her current position – public speaking and understanding broad scientific disciplines. The many student speaking opportunities EITS offered at conferences and research evenings helped Brown develop her public speaking skills which directly translated into her comfort in lecturing to her students today. The interdisciplinary nature of the EITS program and the IIT forced Brown to interact and network with a wide variety of colleagues, working in all areas of science. She became skilled at quickly understanding and critically thinking about a broad scope of scientific topics, as presented by other EITS students. Today, these skills allow Brown to effectively mentor her current M.S. program students on their capstone projects. Often, students choose to investigate areas of Physiology that Brown is not an expert in. However, the critical thinking skills she developed as an EITS student allow her to easily understand their work and guide them on their scientific investigative journey.





Peter Dornbos

Postdoctoral Research Fellow, The Broad Institute of MIT and Harvard, Harvard Medical School, and Boston Children's Hospital

At a glance:

Department: Biochemistry and Molecular Biology

Mentor: John LaPres

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

Defended: Fall 2018

Significant Achievements During Graduate School:

- » Biochemistry and Molecular Biology Outstanding Graduate Student Research Award, 2018
- » Michigan State University NIEHS Training Grant (T32 ES007255), 2015-2018
- » Michigan State University Institute for Integrative Toxicology Travel Award (SOT), 2018
- » Michigan State University Dr. Richard U. and Claire M. Byerum Endowed Fellowship, 2017
- » Michigan State University Institute for Integrative Toxicology Travel Award (SETAC), 2017
- » Michigan State University Institute for Integrative Toxicology Travel Award (SOT), 2015, 2016, 2017
- » NIEHS Superfund Research Program - Best Graduate Student Poster Award in Biomedical Sciences, 2014

Dr. Peter Dornbos grew up in a household where science was a constant daily occurrence. Dornbos' father has a Ph.D. in Botany and loved to give his children daily lessons and lectures on biology, chemistry and ecology - "Dornbos University" as the children liked to call it. These daily lessons led to Dornbos' appreciation for science and sparked his desire to learn and follow his own interests in the sciences. After earning his Bachelor of Science degree in Biology from Calvin College, Dornbos earned his Master of Science in Toxicology from the University of Michigan. He came to MSU in 2014 to earn his Ph.D. in Biochemistry and Molecular Biology with a dual major in Environmental Toxicology. Dornbos trained with Dr. John LaPres and completed his dissertation, "A Population-Guided Approach to Identify Genetic Modulators of TCDD-Elicited Toxicity," in the fall of 2018.

Today, Dornbos is a postdoctoral fellow affiliated with the Broad Institute of MIT and Harvard, Boston Children's Hospital, and Harvard Medical School (HMS). During his graduate studies, Dornbos focused on genetic differences across mouse strains and was interested in moving into population-based human genetics. He chose the Broad Institute and HMS for their strong history in human genetics, population-based epidemiology, and drug discovery. Dornbos is interested in pursuing a tenure track faculty position and being at an academic institute provides the opportunity to publish research and apply for funding when the time comes.

In genetics, there are two main branches of genetic variation - common variation and rare variation. Dornbos is most interested in developing methods to assess the impact of rare variation using next-generation sequencing approaches. More specifically, he is interested in coding variation that disrupts protein function and, thereafter, impacts metabolic phenotypes that have key links to disease, such as cholesterol levels in the blood. "The beautiful thing about rare genetic variation found directly in a gene is that, when found to

impact a phenotype, it is causally linked directly in humans and may serve as an effective drug target," commented Dornbos. "So - in layman's terms - we use human genetics to search for genes that impact diseases in large datasets as a means of drug discovery."

Dornbos has valued his time as a postdoctoral fellow. He has been able to work in a highly-collaborative atmosphere, do cutting-edge research, lead various projects, and then present the research. He found his time as an EITS student invaluable in the many ways it prepared him for the academic role he now holds. The collaborative efforts of the EITS program, as well as the Superfund program, provided Dornbos with the opportunity to learn to work with others effectively as well as hear other scientists' methods of solving problems, shaping Dornbos' own scientific process today. Dornbos is also grateful for the exceptional levels of funding provided by EITS to present his graduate work at numerous conferences. These opportunities helped Dornbos learn to create effective presentations in limited time-slots. 📌

FACULTY FEATURES



Timothy Zacharewski

Professor, Biochemistry and Molecular Biology

Dr. Timothy Zacharewski grew up in Canada, near Love Canal, NY, a place that shaped his first exposures to environmental science. Love Canal became the landfill for the company Occidental, the producer of Agent Orange. The news coverage around the repercussions of this landfill in relation to the Niagara River, sparked his interest in science and Zacharewski decided to earn his undergraduate degree in chemistry with a microbiology emphasis at the University of Guelph. During his time there, he came across a professor, Dr. Stephen Safe, studying dioxins. Intrigued, Zacharewski, approached Dr. Safe to learn more and ended up accepting a position in his laboratory. When Dr. Safe began work at Texas A&M University, Zacharewski inquired about joining his lab there for graduate studies and this is where Zacharewski was able to bridge his love of biology and chemistry with toxicology. He earned his Ph.D. in Toxicology in 1990 from Texas A&M. A postdoctoral position in France followed and then Zacharewski returned to Canada for an assistant professor position in the Department of Pharmacology & Toxicology at the University of Western Ontario in London, Ontario.

In 1997, Zacharewski heard about a

position at MSU in the Department of Biochemistry & Molecular Biology. After interviewing, he knew it would be the perfect fit and found himself moving to Michigan. The reason he continued to stay at MSU is simple, “The Department of Biochemistry and Molecular Biology is a really strong department – good faculty, excellent infrastructure, and collaborations are great. To be able to take advantage of that as well as to be able to interact with the faculty of the IIT has really been a benefit to my career and I don’t think there are too many other programs in the country that could offer that kind of environment,” commented Zacharewski. He has also found that BMB has continued to provide access to emerging technologies and tools, allowing his research to grow in new and exciting ways. The collaborations he has been able to form with other faculty at MSU have also expanded his research by allowing him to call upon expertise in areas outside of his own.

Today, Zacharewski leads a laboratory that includes one assistant professor, 2 postdoctoral students, one graduate student, and two undergraduates. Zacharewski works in the area of receptor-mediated toxicology. The overall focus of Zacharewski’s research is on the aryl hydrocarbon

receptor (AhR) and the environmental toxins that activate the receptor – dioxins, PCBs, etc. The consequences of AhR activation by TCDD and related chemicals are numerous and tend to be species-, sex-, age- and tissue-specific. Zacharewski’s lab is focused on elucidating the role of AhR activation on the progression of fatty liver to more complex metabolic human diseases. Current areas of research interest include the progression of fatty liver to steatohepatitis with fibrosis and implications associated with diabetes, cardiovascular disease, and liver cancer; the role of intestine-liver and host-microbiota interactions in AhR-mediated hepatotoxicity; and comparative studies examining similarities and differences in disease progression in human, rat, and mouse in vitro and in vivo models.

Zacharewski’s approach involves the study of conventional toxicology endpoints with traditional and emerging molecular biology approaches. Computational techniques are used to analyze and integrate ‘layers’ of complementary datasets (e.g., computational response element identification, chromatin immunoprecipitation, targeted and untargeted metabolomics, transcriptomics, next generation sequencing) within the context of histological and phenotypic assessments to identify critical steps from receptor activation to toxicity. His goal is to decrease uncertainties in cross-species and cross-model extrapolations in order to predict the potential of human toxicity and disease resulting from environmental exposures.

Zacharewski has been part of the MSU Superfund Research Program for close to twenty years and leads a project, “TCDD-Elicited Steatosis: The Role of Aryl Hydrocarbon Receptor Regulation in Lipid Uptake, Metabolism, and Transport.” Zacharewski also leads numerous grant projects through NIH and has several collaborations with various industry partners.

Zacharewski looks forward to moving towards more computational approaches in his laboratory in the coming years. Learning to become better data managers of the large data sets they generate will allow his laboratory to mine and share the information more effectively for new discoveries and therapeutic targets. 🍷



James Luyendyk

Professor, Pathobiology and Diagnostic Investigation

Dr. James Luyendyk followed a passion for skiing when he chose to attend college at Colorado State University after growing up in Holland, MI. His initial interest was in accounting, but ultimately selected a major in biochemistry after being inspired by Nicolas Cage's biochemist character, Dr. Stanley Godspeed, in the movie, "The Rock." Luyendyk also had developed a love and interest for science in the engaging classroom of his high school science teacher, Mr. Carl VanFaasen. During his biochemistry classes at Colorado State, Luyendyk developed an interest in cell signaling and molecular biology, but knew he needed lab experience. He ended up in the laboratory of Dr. Anne Avery as an undergraduate research assistant for just under two years studying malaria pathogenesis in mice, which peaked his interest in the immune system.

After earning his Bachelor of Science in Biochemistry from Colorado State, Luyendyk came to MSU to earn his Ph.D. in Pharmacology and Toxicology. He joined the Environmental and Integrative Toxicological Sciences (EITS) graduate program and began his first rotation with Dr. Norbert Kaminski, where he recalls technician Bob Crawford setting the tone on how to be a successful graduate student. After his second rotation with Dr. Bob Roth, Luyendyk knew he had found the place

where he fit best. "Dr. Roth's passion for the central hypothesis that inflammation could determine the sensitivity to hepatotoxic chemicals was truly infectious," commented Luyendyk. "It was so easy to share in Roth's excitement when I was in the lab, and he remains a key source of enthusiasm for our science." Mechanisms of hepatotoxicity have been fascinating to Luyendyk ever since and this has framed his current research. After earning his Ph.D., Luyendyk pursued post-doctoral studies at The Scripps Research Institute in the laboratory of Dr. Nigel Mackman, an experience that created a durable interest in the hemostatic system, and thereafter in 2007 joined the Department of Pharmacology, Toxicology and Therapeutics at the University of Kansas Medical Center as assistant professor prior to returning to MSU in 2012.

The strong research environment, genuine people and overall atmosphere of MSU made it easy for Luyendyk to return to his alma mater. The limitless collaboration opportunities across campus have kept Luyendyk here since. "The spontaneity of these interactions is invaluable," he commented. The IIT has provided a lot of these collaborative opportunities and Luyendyk has been astounded by its diverse array of faculty. Today, Luyendyk leads a laboratory which includes two postdoctoral

students, an undergraduate, a rotating graduate student and his mouse colony tech extraordinaire, Holly Cline-Fedewa. The team is currently looking for graduate students to join the laboratory. The overarching research theme of the laboratory sits at the intersection between liver injury and the hemostatic system. Students and post-docs with research interests in hematology, pathology, hepatology, and toxicology are able to deep dive into mechanistic questions within that sphere. Luyendyk strives to make the lab a fun place to learn and grow, "I feel lucky to be able to mentor and simultaneously learn from a diverse group of personalities in our lab with diverse skill sets and interests."

The primary thrust of Luyendyk's research is on liver injury/toxicity and subsequent liver repair and regeneration. His research focuses primarily on identifying novel mechanisms linking the hemostatic system (e.g. blood coagulation factors, platelets) to these processes. Ongoing projects fall under the umbrella of three main themes including 1) identifying mechanisms whereby the coagulation cascade contributes to acetaminophen-induced liver injury and repair, 2) discovery of mechanisms linking the clotting protein fibrinogen to liver regeneration to inform strategies to detect and prevent hepatic dysfunction after liver surgery, and 3) determining the role of coagulation factors in the pathogenesis of obesity and non-alcoholic fatty liver disease. "The creativity and commitment of my research team has our research theme constantly evolving, bridging across fields, and engaging new collaborators to maximize the impact of our research," says Luyendyk.

Luyendyk has been most grateful for his mentee experiences at MSU, "We are a composite of the mentoring we receive, and at MSU, multiple IIT Faculty, among them my earliest of graduate mentors Dr. Bob Roth and Dr. Patti Ganey, made a true mark. I am proud to have been mentored by them and thrilled to call them colleagues and friends." Luyendyk strives to provide the same kind of mentee experience he received at MSU for his own laboratory students. 🐾



Jamie Bernard

Assistant Professor, Pharmacology and Toxicology

Dr. Jamie Bernard began her college experience at the University of Rochester with a strong interest in social psychology – she had always been fascinated by the interactions between people. Along with her social psychology classes, she also took a few neuroscience classes, helping her make the turn into hard science, and she began to think about how these interests could lead to a career. With the way in which she wanted to help humanity in mind, she considered becoming a medical doctor or a scientist. Ultimately, her desire to be able to interact with a wide variety of students and colleagues of all ages, with no time limits or restraints, led her down the scientific route. She continued at the University of Rochester after earning her Bachelor of Science in Neuroscience and in 2009 she earned her Ph.D. in Toxicology. She then went on to complete two postdoctoral fellowships – one at the University of California San Diego where she studied skin immunology and one at Rutgers University where she studied chemoprevention and received a K99/R00 to study the role of fat in tumor formation. These postdoctoral opportunities were both critical in shaping her current research interests at MSU today. Bernard came to MSU in 2015 as an Assistant Professor in the Department of Pharmacology and Toxicology. After interviewing at MSU and presenting a

chalk talk, Bernard loved the interdisciplinary nature of the department and knew that the interactions she could have with other faculty and students could open a lot of doors to further her research in interesting and new ways. Today, Bernard leads a laboratory which includes a postdoctoral student, a medical student, two technicians, and two undergraduates. She is currently looking to hire two graduate students.

The focus of Bernard's lab is to find ways to prevent cancer; specifically, her research looks at mechanisms of early-stage carcinogenesis caused by extrinsic risk factors such as diet, obesity and environmental exposures. Bernard investigates these pathways that are important in early stage cancer, so that they can find ways to target them with pharmacological agents to prevent cancer outcomes.

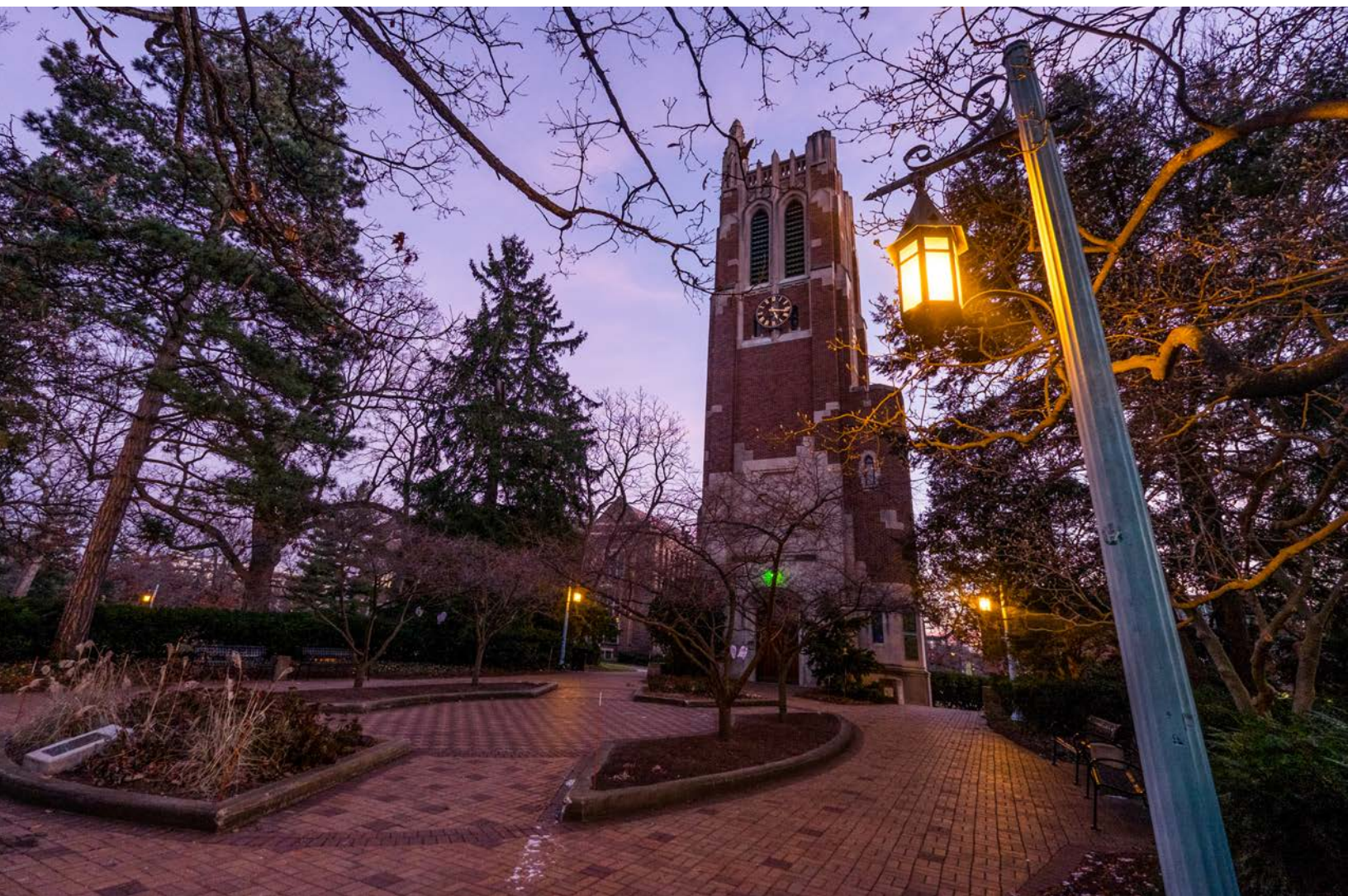
Bernard's laboratory discovered that dysfunctional visceral adipose tissue releases a growth factor, fibroblast growth factor-2 (FGF2), which stimulates the malignant transformation of non-tumorigenic, albeit, vulnerable cells. She also studies how obesity impacts the carcinogenicity of environmental chemicals. Lastly, Bernard has a strong interest in drug discovery and her laboratory developed the first transformation high throughput screen (HTS) to identify chemopreventive agents.

Most recently, Bernard was awarded a R01 grant from the National Institute for Environmental Health Sciences for her project, "Mechanistic Role of Obesity in Benzo(a)pyrene-initiated Cancer." Bernard, in collaboration with Dr. Sophia Lunt, MSU, and Dr. Weston Porter, Texas A&M University, will receive \$1,537,350 to perform this research over the next four years.

"We currently have an unprecedented obesity epidemic with no signs of reversing course," explained Bernard on the basis of the project. "While the cancer biology field has a mechanistic understanding of how obesity can make existing cancers more aggressive, we still have a very limited understanding about how obesity increases the risk of developing cancer in the first place."

Bernard and her team have demonstrated that factors from adipose tissue, specifically those released from belly fat, influence the metabolism of chemicals by providing an environment that favors the bioactivation of carcinogens. They hypothesize that this influences cancer risk in obesity which helps shed light on a major unknown – how does obesity cause cancer? By studying this question, Bernard and her team, hope to be one of the first to show that toxicological risk changes due to obesity. Understanding these mechanisms will provide insights into new targets for cancer prevention and determine how excess adipose tissue may increase one's vulnerability to specific carcinogenic exposures.

Bernard's overall goal is to determine how obesity promotes cancer to identify at risk individuals that would benefit from pharmacological intervention or weight loss/maintenance programs. Her laboratory is also interested in natural product drug discovery to identify new compounds that inhibit pathways that drive obesity-associated tumorigenesis. Additionally, inhibitory compounds have the potential to prevent cancer and reveal novel mechanisms and pathways of carcinogenesis. These findings could ultimately help to reduce the cancer burden. 🌱



FACULTY PUBLICATIONS

During the 2019-2020 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, 2019 to June 30, 2020.

Andrea Amalfitano

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Rizzo MD, Crawford RB, Bach A, Sermet S, Amalfitano A, Kaminski NE (2019). Imiquimod and interferon-alpha augment monocyte-mediated astrocyte secretion of MCP-1, IL-6 and IP-10 in a human co-culture system. *J Neuroimmunol*. 333:576969. PMID: 31136945.

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- Bui T, Rennhack J, Mok S, Ling C, Perez M, Roccamo J, Andrechek ER, Moraes C, Muller WJ (2019). Functional Redundancy between $\beta 1$ and $\beta 3$ Integrin in Activating the IR/Akt/mTORC1 Signaling Axis to Promote ErbB2-Driven Breast Cancer. *Cell Rep.* 29(3):589-602.e6. PMID: 31618629.
- William D. Atchison**
Colón-Rodríguez A, Tiernan CT, Rodríguez-Tapia ES, Atchison WD (2019). Bridge to neuroscience workshop: An effective educational tool to introduce principles of neuroscience to Hispanics students. *PLoS One.* 14(12):e0225116. PMID: 31830069.
- Sceniak MP, Spitsbergen JB, Sabo SL, Yuan Y, Atchison WD (2020). Acute neurotoxicant exposure induces hyperexcitability in mouse lumbar spinal motor neurons. *J Neurophysiol.* 123(4):1448-1459. PMID: 32159428.
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James E. Trosko

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Bruce D. Uhal

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Brad L. Upham

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Almudena Veiga-Lopez

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James G. Wagner

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Felicia Wu

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Timothy R. Zacharewski

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Wei Zhang

Dainese M, et al (2019). A global synthesis reveals biodiversity-mediated benefits for crop production. *Sci Adv*. 5(10):eaax0121. PMID: 31663019.



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, 2019 to June 30, 2020.

Andrechek, Eran

- » Editorial Board, Present Journal of Mammary Gland Biology and Neoplasia
- » Metastasis Research Society Outreach Group I
- » Study Section Member: Swiss National Science Foundation, NY State Rowley Grant Reviewer, DoD Study Section, Swiss National Science Foundation Review, NCI PAR Special Emphasis Study Section, NIH TCB Study Section (Ad Hoc),

NIH ZRGI BMCT-CI Study Section (Ad Hoc)

Andrechek, Eran

- » Secretary/ Treasurer, Carcinogenesis Specialty Section, Society of Toxicology
- » Current Concepts in Toxicology Committee Member for SOT

Bernstein, Alison I.

- » Reviewer: Physiology and Behavior, BMC Genomics, Journal of Neuro-

pathology & Experimental Neurology, Frontiers in Neurology, Frontiers in Neuroscience

- » Secretary/Treasurer, Neurotoxicology Specialty Section, Society of Toxicology, 2020-2022 term
- » Guest Editor, Frontiers in Genetics

Bhattacharya, Sudin

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

Bourquin, Leslie D.

- » Chair, NSF International Global Food Safety Advisory Council
- » Consumer Goods Forum, Global Food Safety Initiative - GFSI Technical Committee Member, Co-Chair of Global Markets Primary Production Technical Working Group
- » 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.

- » Member, Health Advisory Board of NSF International

Burgoon, Lyle D.

- » Member of US Delegation to the OECD Working Party on Hazard Assessment and the OECD Extended Advisory Group on Molecular Screening and Toxicogenomics
- » DoD Representative, Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM)

Carignan, Courtney C.

- » Chair, Mentoring Committee for the International Society of Exposure Science
- » Organizing Committee, Third National Conference on Per- and Polyfluoroalkyl Substances
- » Scientific Advisor, ATSDR Community Assistance Panel for Pease Tradeport
- » Environmental Health Research and Surveillance Guidance Panel for the Michigan Department of Health and Human Services
- » CVM Committee on Graduate Study and Research

- » MSU Center for PFAS Research, Research and Funding Task Force
- » Environmental Science and Policy Program Advisory Council
- » Emerging Issues Committee, Center for Research on Ingredient Safety
- » Reproductive and Developmental Science Program, Trainer
- » Food Science Curriculum Committee for the Department of Food Science and Human Nutrition
- » Inclusion and Multicultural Committee for the Department of Pharmacology and Toxicology
- » Ad-hoc reviewer for Environmental Health Perspectives, Journal of Exposure Science and Environmental Epidemiology, Environment International, and Environmental Science and Technology.

Chou, Karen

- » Science Advisory Board, Chemical Assessment Advisory Committee, U.S. Environmental Protection Agency
- » Invited consultation on EPA's proposed New Approach Methods and Reducing the Use of Laboratory Animals for Chronic and Carcinogenicity Testing
- » Invited consultation on EPA's proposed approach for developing a Consolidated Human Toxicity Risk Assessment Guideline
- » Reviewer of U.S. EPA's draft document, Human Health Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375 73 5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420 49 3)
- » Toxicity and exposure assessment and management strategies for Michigan grape growers and wine makers.

Copple, Bryan L.

- » Study section member, Hepatobiliary Pathophysiology (HBPP)

Doseff, Andrea

- » Director, Physiology Graduate Program

- » Director, Post-baccalaureate Graduate Program SiGuE (Success in Graduate Education)
- » Associate Editor, Journal of Pharmacology and Therapeutics
- » Co-Chair, American Heart Association Study Section
- » National Institute of Health. Study Section Immunology and Immunotherapy
- » Service at MSU: Council on Diversity and Community (CDC), College of Natural Sciences, CNS Graduate Education Strategic Plan Committee, Graduate School Strategic Plan, Graduate School Mentoring Task Force

Ganey, Patricia E.

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

Goodman, Jay I.

- » Fellow, Academy of Toxicological Sciences

Gulbransen, Brian D.

- » Chair of 2019 American Neurogastroenterology and Motility Society (ANMS) Young Investigator Forum, Chicago, IL, USA
- » Member, Digestive Disease Week (DDW) 2020 Abstract Review; American Gastroenterological Association (AGA); Enteric Neurobiology Section: Cell and Molecular Biology (Including Neurons, Glia, ICC, Smooth Muscle and Stem Cells)
- » Member, Little Brain Big Brain Application Review Committee
- » Member, Michigan Physiological Society Awards Committee
- » Member, American Physiological Society GI & Liver Physiology Section Trainee Development Committee
- » Member, Michigan State University Institutional Animal Care and Use Committee (IACUC)
- » Member, Michigan State University

Department of Physiology Research Committee (Chair 2018-2019)

- » Member, Crohn's and Colitis Foundation National Scientific Advisory Committee (NSAC), Research Awards Committee
- » Regular Member, NIH, NIDDK DDK-C 2018/05 DDK-C subcommittee
- » Ad-hoc Member, NIH, Panel 2019/08 ZRG1 ETTN-B (71) R
- » Member, American Neurogastroenterology and Motility Society Small Grants Program Review Committee
- » Guest Associate Editor, Cellular and Molecular Gastroenterology and Hepatology (CMGH)
- » Editor, Neurogastroenterology and Motility
- » Associate Reviews Editor, Experimental Physiology

Harkema, Jack R.

- » Member, American Thoracic Society's Environmental Health Policy Committee

Hashsham, Syed

- » Member, ASTM International Committee on Determining the Effects of Biogenic Sulfuric Acid on Concrete Pipe and Structures (C13.03)
- » Reviewer for multiple study sections of NIEHS K99/R00 and NIEHS ONES application

Hayes, A. Wallace

- » Member, SOT/FDA Colloquium Organizing Committee. Society of Toxicology/Food and Drug Administration
- » Keynote Lecture, Risk Assessment and Cosmetic World. 2019 International Symposium for Risk Assessment in Cosmetic Products, Ministry of Food and Drug Safety. Seoul, Korea
- » Plenary Presentation, Approaches for Mixtures. XI Mexican Congress of Toxicology. San Luis Potosi, Mexico
- » Member, SOT/FDA Colloquium Organizing Committee. Society of Toxicology/Food & Drug Administration

- » Plenary Lecture, Occupational Toxicology: Then and Now. International Industrial and Environmental Toxicology. Antalya, Turkey
- » Invited Lecture, Approaches for Mixtures. Brazilian Society of Toxicology and 15 Latin American Regional Meeting. Aguas de Lindoia, Brazil
- » Plenary Lecture, What About Alternatives? Brazilian Society of Toxicology and 15 Latin American Regional Meeting. Aguas de Lindoia, Brazil
- » Member, Next Gen Food Toxicology project. U.S. Food and Drug Administration
- » Session co-chairs: Susan Chemerynski and A. Wallace Hayes. 2020. Electronic Nicotine Delivery System (ENDS) Toxicity: Knowns and Unknowns. The Toxicology Forum, 44th Winter Annual Meeting. Tysons, VA
- » Plenary Lecture, Fundamentals of Toxicology. Part I. Toxgurakul Foundation Webinar Series

Hegg, Colleen C.

- » Reviewer, NIH NIDCD Fellowship Application review
- » Co-Chair, Judging, College of Veterinary Medicine Phi Zeta Research Day
- » Director, Comparative Medicine and Integrative Biology Graduate Program

Jackson, James E.

- » Member, American Chemical Society
- » Member, National Academy of Inventors
- » Member (and past chair), Meridian Township Environmental Commission
- » Vice Chair, Brownfield Redevelopment Authority, Meridian Township, MI

Jones, A. Daniel

- » Review Editor, Frontiers in Plant Metabolism and Chemodiversity
- » Secretary and Executive Board

member, Metabolomics Association of North America

- » Scientific Advisory Panel, Michigan PFAS Action Response Team, State of Michigan

Kaminski, Norbert E.

- » Member, Toxicology Forum, Board of Directors
- » Academic Advisor, Chemical Food Safety Committee ILSI North America
- » External Advisory Committee, University of New Mexico P42 Superfund Center
- » 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, National Academy of Sciences, Institute of Medicine Committee on the Health Effects of Marijuana
- » Editorial Board, Toxicology

Kaneene, John

- » Chairperson of the Zoonotic Tuberculosis sub-section of International Union Against TB and Lung Diseases.
- » Member, State of Michigan Tuberculosis Committee
- » Member, All University Committee on Promotion and Tenure, MSU
- » Member, College Advisory Committee of the College of Veterinary Medicine
- » Member, Management Committee of the Tanzania Partnership Program, MSU
- » Member, Board of the Public Health Program, College of Human Medicine, MSU
- » Member, Department of Large Animal Clinical Services' Promotion

and Tenure Committee

- » Member, Department of Large Animal Clinical Services' Advisory Committee

Karmaus, Peer

- » Immunotoxicology Specialty Section, Program Committee, Society of Toxicology
- » Ad hoc Reviewer, iScience
- » Ad hoc Reviewer, PLOS Pathogens
- » Review Editor, Frontiers in Immunology

LaPres, John J.

- » Associate Editor, Toxicology Reports
- » Grant Reviewer, Congressionally Directed Medical Research Programs
- » Lee, Kin Sing
- » Reviewer: Journal of Medicinal Chemistry, Journal of Fluorine Chemistry, ChemMedChem, ACS Neuroscience

Leininger, Gina M.

- » Ad hoc Reviewer: Diabetes, Journal of Neuroscience, Nature Communications, Nature Medicine, Neuropeptides, Neuropharmacology, Scientific Reports
- » Society Service: The Obesity Society Annual Program Committee, The Society for the Study of Ingestive Behaviors Program Committee
- » Abstract Reviewer: The Endocrine Society, The Obesity Society, The American Diabetes Association
- » Grant Reviewer: NIDDK Fellowships Panel, IPOD (ad hoc reviewer)
- » Editorial Board, Neuropeptides

Li, Hui

- » Guest Editor, Special Issue of Organic Contaminants in Agro-Environment for Chemosphere

Li, Ning

- » Section Editor, Drug and Chemical Toxicology
- » Manuscript Reviewer: Toxicology Letters, Atmospheric Environment,

Journal of Allergy and Clinical Immunology, Science of the Total Environment, Allergy

Liby, Karen T.

- » Editorial Board, AACR Cancer Prevention Research
- » Editorial Board, Scientific Reports
- » Director, MSU ASPET Summer Undergraduate Research Fellowship (SURF)
- » Member, PREVENT Program Scientific Review Panel
- » Member, AACR Cancer Epidemiology and Prevention Award Committee
- » Member, DOD Lung Cancer Research Program Review Panel
- » Member, Pancreatic Cancer Action Network, Translational Research Grant Scientific Review Panel
- » Reviewer, NIH F30/F31/F31 Fellowship Review Panel: Cancer Immunology and Immunotherapy

Luyendyk, James

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

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 Associations 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

- » American College of Neuropsychopharmacology (ACNP) Women's Task Force
- » ACNP Liaison Committee
- » ASPET Division for Neuropharmacology Program Committee
- » ASPET Division for Neuropharmacology Executive Committee
- » Catecholamine Society, Councilor
- » Molecular Neuropharmacology and Signaling (MNPS) Study section: Ad hoc members June 2020 and October 2020

McCabe, Laura

- » Women in Bone and Mineral Research Committee, American Society of Bone and Mineral Research
- » FASEB Science Policy Committee, FASEB
- » Grant Program Council and Operating Committee For Cores, Michigan Diabetes Research and Training Center/Translational Research
- » Faculty Steering Committee and FDP Executive Committee, Federal Demonstration Partnership
- » Chair, Science Policy Committee, American Physiological Society
- » Animal Care and Experimentation Committee, American Physiological Society
- » SPC Chair Member, Council, American Physiological Society
- » Associate Editor, Journal of Cellular Biochemistry, Molecular Biology Reports, World Journal of Diabetes
- » Editorial Board, Physiological Reviews

Medina Meza, Ilce

- » Editorial Board, Food Research International

Morishita, Masako

- » Abstract Reviewer: American Public Health Association: 2020 Annual Meeting and Expo (2020)
- » Study Section Peer Reviewer: NIH R01 RFA-CA19-009: U.S.-China Program for Biomedical Collaborative Research, 2910/10 ZRG1 OBT-M (50) R, Special Emphasis Panel/Scientific Review Group

Murphy, Cheryl A.

- » Steering Committee, High-Throughput Screening and Environmental Risk Assessment, SETAC North America
- » Associate Editor, Ecotoxicology
- » Reviewer for the NRC Research Associateship Programs (RAP) review panel
- » Wisconsin Sea Grant Preproposal and Full Proposal Panel Review Member
- » Reviewed Proposal for Center of Excellence sponsored by the European Science Foundation
- » Society for Environmental Toxicology, North America, Professional Awards Committee

Paneth, Nigel S.

- » Leadership team, National Convalescent Plasma Project (CCPPI9.org)
- » Board of Directors, Michigan Neonatal Biobank, (representing Michigan State University)
- » Co-Chair (with David Savitz, Brown University) State of Michigan Environmental Health Research and Surveillance Guidance Panel
- » Scientific Advisory Group, Norwegian Mother and Child Cohort (MoBa) and Danish National Birth Cohort (DNCCB) combined cerebral palsy study (MOBAND)
- » External Advisor, Screening to Improve Health in Very Premature Infants in Europe (SHIPS) Study, INSERM, Paris, funded by European Commission

Robison, A.J.

- » NIH Study Section Member, Brain Disorders and Clinical Neuroscience
- » NIH Study Section Member, Brain Disorders and Clinical Neuroscience
- » Grant Reviewer: Israel Science Foundation, Joint NSFC-ISF Research Proposals
- » Committee Member, American College of Neuropsychopharmacology Public Information Committee

Rockwell, Cheryl E.

- » Editorial Board, Molecular Pharmacology
- » Editorial Board, Pharmacological Research
- » Associate Editor, BMC Pharmacology & Toxicology
- » Ad hoc member, Systemic Injury by Environmental Exposure Study Section
- » Ad hoc member, Hypersensitivity, Allergy and Mucosal Immunology Study Section
- » Ad hoc member, Lung Cellular, Molecular, and Immunobiology Study Section
- » President-elect, Michigan Society of Toxicology
- » Vice President-elect, Mechanisms Specialty Section, SOT
- » Secretary/Treasurer-Elect, Toxicology Division, ASPET

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

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- » Editorial Board, Journal of Toxicology and Environmental Health
- » External Advisory Committee, Curriculum in Toxicology, University of North Carolina at Chapel Hill

- » External Advisory Committee, Graduate Program in Pharmacology, University of Kansas Medical Center

Rowlands, Craig

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

Strakovsky, Rita

- » Ad-hoc grant reviewer, Selected Early Stage Reviewer, NIH Systemic Injury by Environmental Exposure Study Section
- » Ad-hoc grant reviewer, NIH ECHO (Environmental Influences on Child Health Outcomes) Opportunities and Infrastructure Fund
- » Editorial board member, Endocrine and Metabolic Science

Tewari-Singh, Neera

- » Editorial Boards: Cutaneous and Ocular Toxicology, Francis and Taylor Journal, Toxicology Mechanisms and Methods, Taylor and Francis Journal
- » Guest editor: Special Volume of "Chemical Threat Agents and Countermeasures" for the 'Toxicology Mechanisms and Methods'
- » Committee on Research and Graduate Studies for the College of Osteopathic Medicine, Michigan State University
- » Course & Curriculum Committee, Department of Pharmacology and Toxicology, Michigan State University
- » Communications Committee, Department of Pharmacology and Toxicology, Michigan State University
- » Faculty Advisory Committee, Department of Pharmacology and Toxicology, Michigan State University
- » 2020- President, Dermal Toxicology Specialty Section, Society of Toxicology
- » 2019-Vice President, Dermal Toxicology Specialty Section, Society of Toxicology

- » 2019-2021-Treasurer, Ocular Toxicology Specialty Section, Society of Toxicology
- » 2020-present: NIH-CounterACT grant review panels 05 ZRGI-MDCN-B-50 and 05 ZRGI-MDCN-B-54
- » Academia Expert Panelist and speaker Ocular Toxicology for the Medical Device and Combination Product Specialty Section in the career mentoring event at the Society of Toxicology meeting webinar 2020
- » Chair at the XLIV Annual Conference of Environmental Mutagen Society of India and International symposium on present and future challenges of xenobiotic mediate mutagenesis: Impact on human health & environmental safety” (EMSI-2020), Lucknow, India
- » Chair and Organizer, Continuing Education Course Session: Beauty of the Skin is in the Eye of the Beholder: A Basic Course on Dermal and Ocular Toxicology, Society of Toxicology 2019 Annual Meeting

Tiedje, James M.

- » Bioscience External Science Advisory Committee, Berkeley National Laboratory
- » Science Advisory Committee, Denmark’s CENPERM (Cntr for Permafrost change in Greenland) Projects
- » Member of Science Advisory Comm for Consortium for Monitoring, Technology, and Verification (Nuclear Non-proliferation)
- » Member of Simons Foundation Bioscience Advisory Committee
- » Steering Comm member of NMDC (Natl Microbiome Data Collaborative)
- » Member of NRC Workshop on Exploring a Dynamic Soil Information System
- » Advisory committee for DOE’s PNNL Soil Microbiome Project, and LBNL’s EcoFAB Steering Comm
- » Speaker in the International iFAST Seminar Program
- » American Society of Microbiology’s representative too US Nagoya Protocol Action Group (USANPAG)

Trosko, James

- » Editorial Board, Diseases
- » Member, Advisory Board to the MSU-COM Institute for Global Health
- » Scientific Advisory Board Member, Adult Stem Cell Research Company
- » Reviewer for multiple scientific journals and grant reviews for international granting agencies (Italy, Brazil, Korea, Czech Republic, France)
- » Consultant to Dr. Mari Dezawa, Director of Human Stem Cell Research, Tohoku University, Sendai, Japan

Uhal, Bruce

- » Member, College of External Reviewers, European Science Foundation
- » Editorial Board Member, Frontiers in Pediatrics

Upham, Brad L.

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

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- » Chair, Graduate Student Affairs & Curriculum Committee, Department of Animal Sciences, Michigan State University
- » Reviewer, Scientific Reports, Toxicological Sciences, Environmental Pollution, Reproductive Toxicology, Endocrinology, Human Reproduction, Biology of Reproduction, Molecular Reproduction and Development, Journal of Ovarian Research, Fertility & Sterility
- » Ad hoc Abstract Reviewer, Endocrine Society Annual Meeting
- » Ad hoc Grant Reviewer, Michigan Alliance for Animal Agriculture Pilot Grants
- » Ad hoc Grant Reviewer, NIH Pathway to Independence Award Study Section (PA-18-397/8), National Institutes of Environmental Health

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Wagner, James G.

- » Associate Editor, Inhalation Toxicology
- » Editorial Board, Particle and Fibre Toxicology
- » Member, Finance Committee, Society of Toxicology
- » Member, Program Committee, Environmental, Occupational and Population Health; American Thoracic Society
- » Member, Committee for Threshold Limit Values for Chemical Substances (TLV-CS); American Conference of Governmental Industrial Hygienists (ACGIH)
- » CDC/NIOSH Reviewer, ZOH1 NXT (52), Disease, Disability and Injury Prevention and Control Special Emphasis Panel -World Trade Center Health Program (U01)

Wu, Felicia

- » Member, MSU Presidential Transition Committee
- » Member, MSU Presidential Search Committee
- » MSU AFRE Food Policy Search Committee
- » Area Editor, Risk Analysis
- » Section Editor, World Mycotoxin Journal
- » Editorial Board, Archives of Environmental and Occupational Health
- » Expert Reviewer, Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6)
- » Member, MSU Provost Search Committee
- » Member, NIH Study Section, Global Noncommunicable Diseases and Injury Across the Lifespan

Zacharewski, Timothy R.

- » Editorial Board, Toxicological Sciences
- » Editorial Board, Toxicology & Applied Pharmacology
- » Ad-Hoc Committee Member, Na-

tional Institutes of Health – Special Emphasis Panel

- » Ad-Hoc Committee Member, Health Canada
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- » Ad-Hoc Committee Member, The French National Research Agency (ANR)

Zhang, Wei

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

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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
 Pharmacology & Toxicology
 Physiology
 Plant, Soil, & Microbial Sciences

Birgit Puschner, College of Veterinary Medicine
Ronald L. Hendrick, College of Agriculture and Natural Resources
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Aron Sousa, College of Human Medicine
Andrea Amalfitano, College of Osteopathic Medicine
Phillip Duxbury, College of Natural Science
Douglas Buhler, Director, AgBio-Research



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