

# CIT@MSU

CENTER FOR INTEGRATIVE TOXICOLOGY



**2012-2013 Annual Report**



# Annual Report 2012-2013

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# CIT@MSU

## A TRADITION OF EXCELLENCE

The Michigan State University Center for Integrative Toxicology (CIT) is a multidisciplinary academic unit that supports and coordinates research and graduate education activities for faculty interested in various aspects of **toxicology**. The Center 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.

Two 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 multi-departmental 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 20 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



The period of 2012-2013 was a watershed academic year for the Center for Integrative Toxicology (CIT) in a number of ways. For the first time in the history of our Center, which spans 35 years, the total number of faculty affiliated with the CIT has risen

to 62 members, an all time high. Our Center derives many benefits from having such a critical mass of faculty that includes increased student recruitment and participation in our Environmental and Integrative Toxicological Sciences dual major graduate program, a breadth of diverse faculty expertise from which to draw when developing new courses and collaborative research initiatives as well as a greater overall sense of community. Another critically important benefit is the increased visibility the CIT receives outside of the MSU campus. With this visibility comes new opportunities for research funding, private sector partnerships, participation on advisory and decision making bodies as well as increased career opportunities for our trainees as they matriculate. All of these feed into the age-old adage, “excellence breeds excellence”.

Commensurate with our increase in faculty, 18 new graduate trainees were recruited into the EITS dual major graduate program in the 2012-13 academic year, which also represents an all time high for any given year. The EITS graduate program can presently boast a total of 48 trainees within our two training tracks. Importantly, the EITS graduate program continues to be supported, in part, by a National Institutes of Health Training Grant, which has been enforce for 24 continuous years and again bringing visibility and prestige to the EITS Program and MSU. However, even more important than the total number is the quality of the trainees that matriculate. In the pages that follow, we have

attempted to highlight the fact that our trainees continue to be strongly recruited into positions for which they have been trained within government, industry and academia, in spite of the current economic challenges. Likewise, many of our past trainees have assumed important leadership positions in toxicology, which further promotes visibility for the CIT and our EITS graduate program.

A longstanding tenant of the MSU toxicology community has been excellence in research, in the pages that follow, the many significant research accomplishments by our faculty and trainees are featured. Quantity and quality of publications in the peer-reviewed literature continues to be outstanding and extramural funding likewise. Indeed a major funding stream for research and training of graduate students and postdoctoral fellows has been the MSU Superfund Center Grant. Since its inception in 1988, MSU has successfully maintained continuous funding of this Center Grant securing over \$75.6 million in research funding. I am pleased to convey that the MSU Superfund Center Grant has been renewed and will provide support for an additional five years for human health-related research and for remediation technology focused on environmental contaminants. We are very proud of the legacy as well as continued success of this vibrant multidisciplinary research program that includes 25 faculty and numerous students, postdoctoral fellows and staff.

In summary, I am delighted to express with great pride that the CIT and its EITS graduate program continues to bring national and international prominence to MSU through the many successes of it faculty and trainees.

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





## Student and Faculty HIGHLIGHTS

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

# CIT AWARDED NIEHS SUPERFUND RESEARCH CENTER GRANT

The CIT is proud to announce their National Institute of Environmental Health Sciences Superfund Center Grant has been renewed for another five years with the award of \$14.1 million. The CIT was one of only two programs awarded a Center grant this year. MSU's Superfund Program began in December of 1988 and since that time has received \$75.6 million in funding. The overall goal of the program is to continue to conduct human health-oriented research on risks from exposure to chemicals commonly found in Superfund sites and on remediation technologies to eliminate the potential for exposure to chemicals from those sites.

The pollutants under investigation are a subclass of chemicals belonging to the halogenated aromatic hydrocarbon family that bind and activate the aryl hydrocarbon receptor. These chemicals, which include chlorinated dibenzo-p-dioxins, dibenzofurans, biphenyls and polyaromatic hydrocarbons, are environmentally persistent, lipid soluble that accumulate in the food chain leading to human and wildlife exposure.

Biomedical projects in the program are aimed at illuminating the interactions of biochemical pathways with the ligand-activated aryl hydrocarbon receptor, which cause altered responses in the liver and immune system as well as changes in the gut microbiome. Non-biomedical research topic areas include studies of the diversity and physiogenomic responses of dioxin-degrading microbial populations and geochemical parameters governing bioavailability of dioxin-like compounds in soils.

A highly integrated, multidisciplinary research program is already underway consisting of six research projects and six supporting core units. The research team of 25 investigators includes faculty at Michigan State University, the Hamner Institutes for Health Sciences, Rutgers University, Purdue University, and the U.S. Environmental Protection Agency.

"This is one of the few National Institutes of Health programs where there is sufficient funding to bring together a large, multidisciplinary group of investigators," said Norbert Kaminski, principal

investigator and director of the MSU CIT. "We have 25 scientists who are involved, as well as many students, postdoctoral trainees and technicians. It's a rare opportunity when you can bring all these different areas of expertise together to focus on a single problem or theme, and

that's why we're very excited about having this type of funding."

## SUPERFUND PROJECTS & CORES

**PROJECT 1:** TCDD Impedes the Minimal Activation Threshold Required for Initiation of B Cell Differentiation: An Integrated Experimental and Computational Modeling Approach

*Principal Investigator & Project Leader:*  
Norbert E. Kaminski

**PROJECT 2:** An Integrated Experimental and Computational Approach to Understand the Effects of Population Variability on the Shape of the Dose-Response Curve

*Project Leader:* John J. LaPres

**PROJECT 3:** TCDD-Elicited Steatosis: The Role of Aryl Hydrocarbon Receptor Regulation in Lipid Uptake, Metabolism, and Transport

*Project Leader:* Timothy R. Zacharewski

**PROJECT 4:** Gut Microbiome - Host Interactions in Response to TCDD Exposure

*Project Leader:* Syed A. Hashsham

**PROJECT 5:** Molecular Insight into Dioxin Degradation by Microbes and Microbial Communities

*Project Leader:* Gerben J. Zylstra

**PROJECT 6:** Geochemical Controls on the Sorption, Bioavailability, Formation, and Long-term Environmental Fate of Polychlorinated Dibenzo-p-Dioxins (PCDDs)

*Project Leader:* Stephen A. Boyd

### ADMINISTRATIVE CORE

*Core Leader:* Norbert E. Kaminski

### RESEARCH TRANSLATION CORE

*Core Leader:* Brad L. Upham

### COMMUNITY ENGAGEMENT CORE

*Co-Core Leaders:* Wynne Wright and Claire N. Layman

### TRAINING CORE

*Core Leader:* Jay I. Goodman

### RESEARCH SUPPORT CORE A: Computational Modeling of Mammalian Biomolecular Responses

*Core Leaders:* Rory B. Conolly and Qiang Zhang

### RESEARCH SUPPORT CORE B: Environmental Molecular Analysis Core

*Core Leader:* James M. Tiedje



# CIT WELCOMES NINE NEW AFFILIATED FACULTY MEMBERS

Over the past year, the MSU-CIT added the following group of affiliated faculty members. These faculty join the CIT as research collaborators as well as contributors to the Environmental and Integrative Toxicological Sciences Graduate Training Program.



**Eran Andrechek**  
*Assistant Professor, Department of Physiology*

Dr. Andrechek received his B.Sc. in Molecular Biology and Biotechnology from McMaster University in 1997 and Ph.D. in Biology from McMaster University in 2003.

Research in the Andrechek lab focuses on breast cancer using a combination of mouse models (transgenic, knockout and carcinogen induced) and bioinformatics methods.

Bioinformatics is used to generate predictions and hypotheses that are then tested with traditional genetics, with recent work identifying a role for key signaling pathways in both tumor development and metastasis.



**Brian Gulbransen**  
*Assistant Professor, Neuroscience Program, Department of Physiology*

Dr. Gulbransen received his B.S. in Zoology and Physiology from the University of Wyoming in 2003 and his Ph.D. in Neuroscience from the University of Colorado Health Sciences Center in 2007.

Dr. Gulbransen is interested in how the two constituent cell types of the enteric nervous system (neurons and glia) interact and how these interactions influence

gut function. Specifically, he is interested in how enteric glial cells influence enteric neurotransmission and neuron survival.



**Gina Leininger**  
*Assistant Professor, Department of Physiology, Neuroscience Program*

Dr. Leininger received her B.S. in Chemistry from the University of Michigan in 1999 and her Ph.D. in Neuroscience from the University of Michigan in 2005.

The Leininger Lab studies neuronal circuits that regulate energy balance. Dr. Leininger uses molecular and pharmacological tools to identify, activate

or ablate specific neuronal populations and study their physiological importance, particularly regarding feeding, movement and weight.



**Ning Li**  
*Assistant Professor, Pathobiology and Diagnostic Investigation*

Dr. Li received her M.D. from Capital Medical University in 1982. In 1990, she received her M.S. in Endocrinology and Reproductive Physiology from the University of Wisconsin-Madison and 1997 received her Ph.D. in Pathology from the same university.

Dr. Li's research focuses on using in vitro and in vivo models to study the impact of air pollutants

(e.g., particulate matter, vapors and ozone) from different sources on allergic airway inflammation such as asthma and allergic rhinitis. The emphasis is on understanding the mechanisms by which various air pollutants and their combined actions promote allergic airway inflammation and the role of oxidative stress in this process.



**Keith Lookingland**  
*Associate Professor, Pharmacology and Toxicology*

Dr. Lookingland received his B.S. and M.S. in Biology from Towson State College in 1975 and 1977. He earned his Ph.D. in Physiology from the University of Maryland in 1982.

His research interests are focused on genetic and environmental factors involved in the pathogenesis of progressive neurodegenerative disorders

associated with loss of central dopamine neurons such as Parkinson Disease and Restless Legs Syndrome. The goal of his laboratory's research is to develop novel neuroprotective or neurorestorative therapeutics to slow, halt or reverse the progressive neurodegeneration in these diseases.

The work in his laboratory uses rodent and cell culture models to identify and characterize genetic and environmental factors that cause selective DA neuronal toxicity - especially as applied to the underlying mechanisms that determine differential susceptibility of DA neurons to neurotoxic insult. Animals are evaluated on the basis of their neurochemical and immunohistochemical changes in selected regions of the brain, as well as genome-wide mRNA expression profiling to identify changes in gene expression in regions of brain with differential sensitivity to environmental neurotoxins.





### Linda Mansfield

*Professor, Large Animal Clinical Sciences, Microbiology and Molecular Genetics*

Dr. Mansfield received her B.S. in Biology in 1975 and M.S. in Virology in 1980 at the University of Delaware. She earned her V.M.D. in Veterinary Medicine in 1986 and her Ph.D. in Parasite Immunology in 1990 from the University of Pennsylvania.

Dr. Mansfield's Comparative Enteric Diseases Laboratory studies the enteric bacterial pathogen *Campylobacter jejuni*. The incidence of foodborne disease due to *C. jejuni* remains very high worldwide. Serious disease sequelae can follow gastrointestinal (GI) infections with *C. jejuni*. The acute neuropathies Guillain Barré Syndrome (GBS) and Miller Fisher Syndrome (MFS), and Reactive Arthritis (RA) are autoimmune conditions associated with recent *Campylobacter* infection. Her overall hypothesis is that murine model(s) with a "humanized" microbiome will develop spontaneous autoimmune sequelae secondary to *C. jejuni* infection with strains with class A LOS. These models can be used to dissect mechanisms of autoimmunity and to serve as treatment and prevention surrogates for GBS/MFS patients. The expected outcomes will be new murine models of GBS and MFS and an increased understanding of mechanisms of initiation of autoimmunity following enteric infections with *C. jejuni* from GBS and MFS patients; this information will lead to future detailed mechanistic studies of how these identified autoimmune pathways are facilitated by particular outer membrane and secreted proteins of this bacterium such as toxins.



### Michelle Mazei-Robison

*Assistant Professor, Department of Physiology, Neuroscience Program*

Dr. Mazei-Robison received her B.S. in Biology and Chemistry, Summa Cum Laude from Central Michigan University in 1999 and her Ph.D. in Pharmacology from Vanderbilt University in 2005.

The Mazei-Robison lab is interested in understanding the molecular mechanisms that underlie changes in ventral tegmental area (VTA) dopamine (DA) neuron signaling, morphology, and activity induced in neuropsychiatric disorders such as depression and addiction. Despite evidence that dysregulation of the mesocorticolimbic DA system contributes to a number of psychiatric disorders, a detailed understanding of the main projection neurons in this pathway, the DA neurons of the VTA, is lacking. This includes the structural and functional neuroadaptations, the molecular mechanisms responsible for these adaptations, and the specific neurons and outputs affected.



### A.J. Robison

*Assistant Professor, Department of Physiology, Neuroscience Program*

Dr. Robison received his B.S. in Biology from Rhodes College in 1999 and his Ph.D. in Molecular Physiology and Biophysics from Vanderbilt University in 2005.

Research in the Robison Lab focuses on how models of drug addiction and depression alter gene expression in discrete brain regions, particularly the hippocampus. They use transgenic mice and viral gene-transfer tools to manipulate hippocampal expression of specific genes, as well as the machinery that regulates chromatin structure and gene transcription. They then examine the effects of these manipulations on biochemistry, neuronal structure and physiology, and behavioral responses to drugs and stress with the goal of uncovering novel targets for therapeutic intervention in addiction and depression.



### Felicia Wu

*John A. Hannah Distinguished Professor, Department of Food Science and Human Nutrition, Department of Agricultural, Food, and Resource Economics*

Dr. Wu received her A.B. and S.M. in Applied Mathematics and Medical Sciences from Harvard University in 1998 and her Ph.D. in Engineering and Public Policy from Carnegie Mellon University in 2002.

Dr. Wu's research interests lie at the intersection of global public health, agriculture, and trade. How do agricultural systems affect health in different parts of the world? How do food safety regulations affect global trade of food, and ultimately food quality, particularly in low-income nations? What is the global burden of disease caused by food contaminants, and how cost-effective and feasible are interventions to reduce these risks?

Her research focuses on applying health economic and mathematical modeling techniques to understanding the public health impacts of agricultural practices, both in the United States and worldwide. ♣

# EITS PROGRAM 2012-2013

It was an excellent year for the Environmental and Integrative Toxicological Sciences (EITS) graduate program. This MSU program administered by the CIT continues to be among the very top programs in the U.S. for graduate training in toxicology, and the dual major format remains well respected and appreciated by our students and alumni. Importantly, several recent faculty hires have added strength to the CIT-affiliated faculty and hence to our capacity to train students. Currently, 48 doctoral students are enrolled in the EITS program, distributed among several of our partnering PhD programs. Forty-two of these students are in the Biomedical Track and 6 in the Environmental Track. Many of our current students have received awards from the Society of Toxicology (SOT) or other organizations and serve on SOT committees. Students who graduated in the past year are all in postdoctoral positions at various academic institutions in the U.S. and Canada.

The Fall of 2012 marked the first time that several of our partnering doctoral programs recruited and accepted students through the new BioMolecular Sciences (BMS) joint recruiting program. This proved to be highly beneficial to the EITS program, as a record 15 new students chose the EITS option during the past year. The 2012-2013 academic year also marked the 24<sup>th</sup> consecutive year that the program has enjoyed training grant support from the National Institute for Environmental Health Sciences. This grant provides stipend support for 6 predoctoral and 3 postdoctoral fellows. Supplemental funding from Dean Klomparens of the Graduate School provides additional support for stipends and for fellowships that enable students to travel to scientific meetings to present the results of their research. With the help of an outstanding cadre of CIT faculty trainers, Dr. Roth, the EITS Director, applied for competing renewal of the Training Grant in May 2013.

## RECENT EITS GRADUATES



**Brenna Flannery**  
*Department of Food Science and Human Nutrition*  
 Mentor, James Pestka

Brenna successfully defended her dissertation, "Mechanisms of deoxynivalenol-induced anorexia and its impact on weight in the female mouse," in December of 2012 and earned her Ph.D. degree in Food Science and Environmental Toxicology.

She is currently working as a post-doctoral fellow at the University of California Davis in the School of Veterinary Medicine Department of Molecular Biosciences. Her research there involves evaluating the neurotoxicities and the

long-term behavioral deficits of organophosphate poisoning. Once her models are established, she will be testing novel therapeutic agents against organophosphate poisoning in hopes to reduce death, seizures, neurodegeneration, neuroinflammation and long-term behavioral deficits associated with exposure.

Five years from now she hopes to be an assistant professor publishing her research findings in peer-reviewed literature and successfully competing for research funding. She would like to focus on how foodborne toxins/toxicants adversely affect the central nervous system.



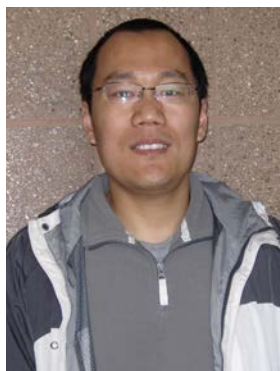
**Steven Proper**  
*Department of Biochemistry and Molecular Biology*  
 Mentor, John LaPres

Steven successfully defended his dissertation, "The role of hypoxia-inducible factors 1 and 2 in cobalt-induced lung inflammation and development of lung immunity," in May of 2013 and earned his Ph.D. degree in Biochemistry and Molecular Biology and Environmental Toxicology.

As part of the D.O.-Ph.D. Program, Steve is working on finishing his D.O. degree by completing his clinical clerkships (essentially his 3rd and 4th year of medical school where he completes the many rotations and board exams that are required). He is based out of Sparrow Hospital and will be here in Lansing until he graduates with the Class of 2015 from the MSU College of Osteopathic Medicine. From there, he will have to complete a residency (usually a 3 year pro-

cess). As of now, he is interested in pediatrics or internal medicine.

In five years he hopes to be finishing his residency, and ready to start a fellowship in a pediatric specialty (either pulmonary/critical care medicine, allergy/immunology or neonatology). His research at MSU has greatly influenced his interest in how our lungs develop their immunity to environmental threats, and especially how environmental exposures affect this process and impact acute clinical care situations as well as future disease risk. Proper said, "Extra training in toxicology was absolutely essential not just for my Ph.D. research but also for taking me in the direction of inhalation toxicology. It's fascinating to me how much overlap our environment has with our development and risk for disease, so no matter what I end up doing in my career, it will probably revolve around toxicology and immunology."



**Kaiyu He**  
*Department of Microbiology and Molecular Genetics*  
 Mentor, James Pestka

Kaiyu successfully defended his dissertation, "Mechanisms of ribotoxic stress response and downstream sequelae," in September of 2012 and earned his Ph.D. degree in Microbiology and Molecular Genetics and Environmental Toxicology.

Kaiyu is currently a post-doctoral fellow at the University of Michigan Medical School in the Department of Cell and Developmental Biology. His primary project focuses on elucidating the

endoplasmic reticulum (ER)-associated degradation pathway using Cholera toxin as a model. Elucidating basic ERAD mechanisms should provide critical strategies to alleviate ER stress, a pathologic cellular condition that underlies many human diseases including cardiovascular diseases.

His future plans include publishing several papers in top tier journals and he hopes to pass the exam from the American Board of Toxicology to achieve his certificate. He hopes to be well-prepared in five years for toxicological positions in either academia or industry.



**Agnes Forgacs**  
*Department of Biochemistry and Molecular Biology*  
 Mentor, Timothy Zacharewski

Agnes successfully defended her dissertation, "Triazine-mediated disruption of BLTK1 Leydig cell steroidogenesis," in July of 2013 and earned her Ph.D. degree in Biochemistry and Molecular Biology and Environmental Toxicology.

Agnes has accepted a postdoctoral research fellowship through Oak Ridge Institute for Science and Education (ORISE) to work with the US EPA at the National Center for Computational Toxicology in the Office of Research and Development located in Research Triangle Park, NC. The research she is conducting aims to increase the confidence in the use of chemical categories and read-across methods to integrate in vitro screening data into informing decision making.

More specifically, she is developing methodologies that combine EPA's in vitro high-throughput screening ToxCast data, predictive signatures of toxicity, and computational models with traditional systems and structure-based approaches to enhance chemical category clustering for existing as well as new chemicals. This work involves data mining and analysis, development of software packages and computational methods, as well as collaboration with other government agencies including the European Chemicals Agency in the European Union.

After completing her postdoctoral research, Agnes hopes to obtain a job in either government or industry, and continue to work in the field of toxicology, specifically in in vitro alternative methods and computational toxicology.

I really sincerely feel that CIT opened doors for me, the support for attending meetings and the peers I have met through participation in the program made a huge difference in my career.

- Agnes Forgacs



**Timothy Johnson**  
*Department of Plant, Soil and Microbial Sciences*  
 Mentor, James Tiedje

Tim successfully defended his dissertation, "Microbial community response to anthropogenic pollution: Antibiotic resistance genes and dioxin biodegradation," in May of 2013 and earned his Ph.D. degree in Crop and Soil Science and Environmental Toxicology.

Tim is now a post-doctoral fellow in the lab of Gerry Wright at the Institute for Infectious Disease at McMaster University in Hamilton, ON

in Canada. He is studying novel drug discovery, secondary metabolite biochemistry and genome sequencing all from soil actinomycetes and also antibiotic resistance mechanisms. He is focusing his research toward antibiotics which target and bind elongation factor Tu to prevent bacterial growth.

In five years, Tim hopes to be in a tenure track position continuing research in antibiotic production and resistance.

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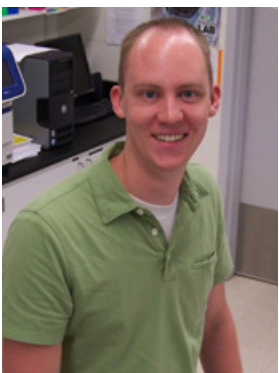
**Thitirat Ngaoteprutaram**  
*Department of Pharmacology and Toxicology*  
*Mentor, Norbert Kaminski*

Thitirat successfully defended her dissertation, "Suppression of the T-cell dependent Humoral Immune Response by Δ9-Tetrahydrocannabinol Involves Impairment of CD40-CD40 Ligand Interaction," in February of 2013 and earned her Ph.D. degree in Pharmacology and Toxicology and Environmental Toxicology.

She is currently working as a research scientist at the Chulabhorn Research Institute in Thailand. Thitirat works in the laboratory of

environmental toxicology. Her current research focuses on the immunotoxicity of e-waste and arsenic exposure. For the e-waste project, she is now evaluating the association between the levels and types of toxic chemicals found in e-waste (risk factors) and the amount of salivary IgA and IL-6 among young Thai children residing in the vicinity of e-waste dismantling areas. For the arsenic project, she is planning to assess the in-utero arsenic exposure on human cord blood hematopoietic progenitors.

Thitirat hopes to continue her work at the Chulabhorn Research Institute for many years to come.



**Aaron Fullerton**  
*Department of Pharmacology and Toxicology*  
*Mentor, Patricia Ganey*

Aaron successfully defended his dissertation, "2,3,7,8-TCDD Alters the Development and Severity of Hepatotoxicity in a Mouse Model of Immune-mediated Liver Injury Induced by Concanavalin A," in February of 2013 and earned his Ph.D. degree in Pharmacology and Toxicology and Environmental Toxicology.

Aaron is currently working as a postdoctoral IRTA fellow at the National Institute of Health in the National Heart, Lung and Blood institute.

He is working in the laboratory of Dr. Lance Pohl who is a senior investigator in the Cellular and Molecular Toxicology Section. The laboratory's research goal is to identify the mechanisms of drug-induced liver injury with a particular focus of etiology related to the activity of innate and adaptive immune cells.



**Xiao Pan**  
*Department of Biochemistry and Molecular Biology*  
*Mentor, James Pestka*

Xiao successfully defended her dissertation, "Induction of Ribotoxic Stress Response by Mycotoxin Deoxynivalenol: A Proteomic View," in June of 2013 and earned her Ph.D. degree in Biochemistry and Molecular Biology and Environmental Toxicology.

Xiao is currently an Assistant Professor of Practice with the Department of Food Science and Human Nutrition here at MSU.

In five years, Xiao hopes to become an expert in food toxicology and risk assessment to improve food safety and contribute to new paradigms for assessing toxicity to reduce animal testing. 🌱



# GLACIER: AN UPDATE

The Great Lakes Air Center for Integrated Environmental Research (GLACIER) at Michigan State University (MSU) is one of four U.S. Environmental Protection Agency (EPA)-funded Clean Air Research Centers (CLARCs) in the nation. Dr. Jack Harkema, CIT faculty member and MSU University Distinguished Professor, is the Director of this multi-institutional and multi-disciplinary research center that is comprised of environmental and biomedical scientists from MSU, the University of Michigan, and The Ohio State University. The EPA has committed close to \$32 million to the CLARCs. The overall mission of these EPA Centers is to research health effects of exposure to particulate matter (PM), ozone, and other air pollutants, both singly and in multi-pollutant atmospheres. In the last two years, GLACIER scientists have made tremendous progress in our understanding of the health



effects of air pollutants found in urban and rural communities of Michigan and Ohio. For example, Dr. Robert Brook, professor of cardiology at the University of Michigan, and his colleagues have found that exposures to ambient levels of PM in airsheds of southeastern Michigan can cause early signs of insulin resistance and increased blood pressure. Both of these health effects are facets of the metabolic syndrome (e.g., diabetes, hypertension, obesity) that affects over a third of the U.S. population. In the next three years, GLACIER scientists will focus their efforts on understanding what specific air pollutants or air pollutant mixtures in the Great Lakes region are responsible for these and other

health effects associated with urban and rural air pollution. For more information go to the GLACIER website, <http://greatlakesairresearchcenter.org>.

## OTHER NOTABLES

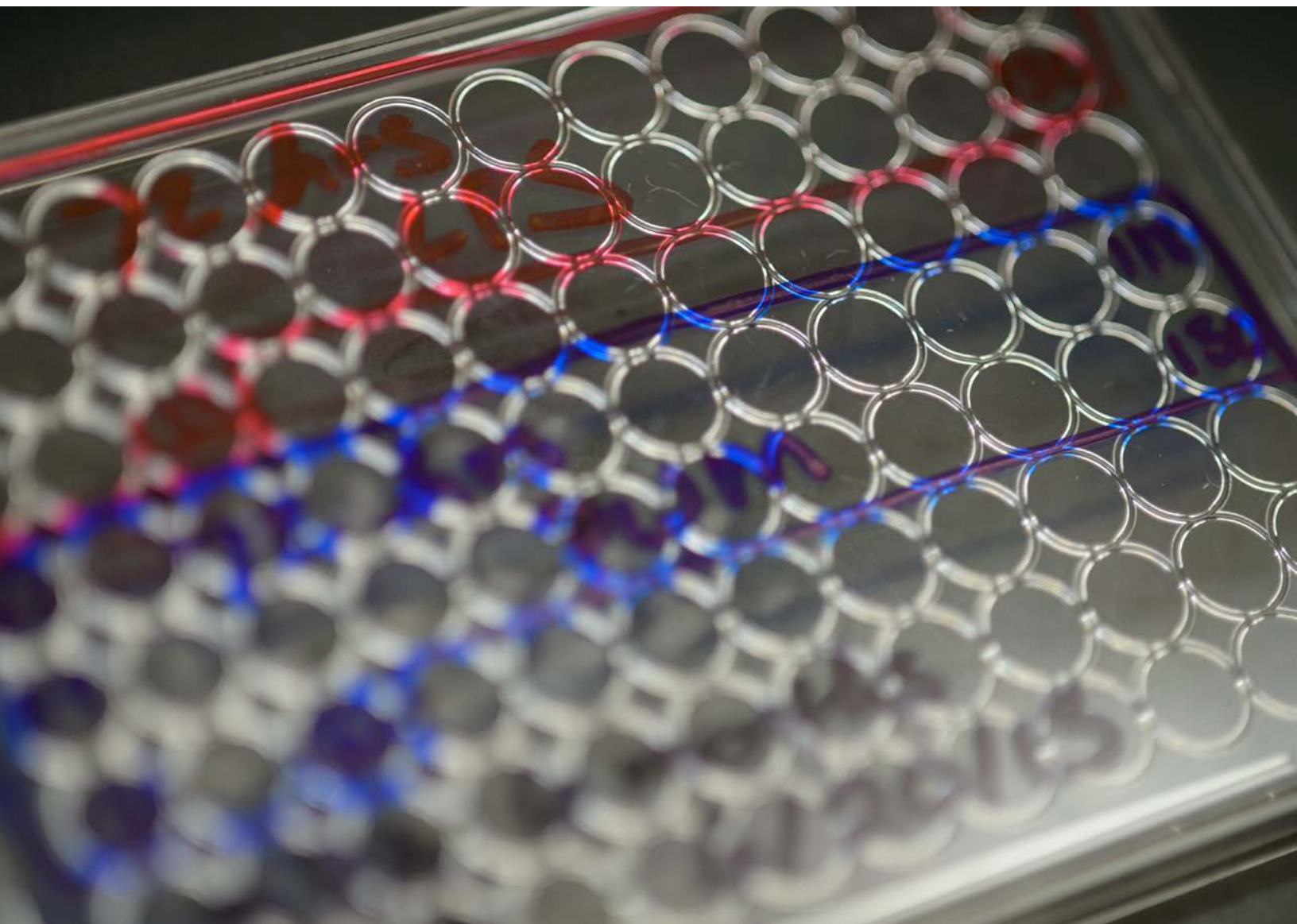
**Brandon Armstrong**, training with Dr. Cheryl Murphy, received the Dr. Howard A. Tanner Fisheries Excellence Fellowship through the MSU Fisheries and Wildlife Department. The award recognizes a student who is committed to fisheries research related to the Great Lakes, connecting waterway or tributary stream research. Armstrong was also selected to serve as a student representative on both the Ohio Valley Society of Environmental Toxicology and Chemistry Chapter and the Society of Environmental Toxicology and Chemistry North American Student Advisory Council.



**Kate O'Brien**, training with Dr. Bryan Copple, recently spoke at the 2013 Michigan Pharmacology Colloquium held at Wayne State University. She spoke on, "Bile Acids Elicit Production of Interleukin-23 by Hepatocytes."

**Agnes Forgacs**, training with Dr. Timothy Zacharewski, was awarded the MSU College of Natural Sciences Barnett Rosenberg Fellowship. The prestigious fellowship provides a stipend, health insurance and tuition waiver for an entire year. The recipients of this award are advanced students who have shown a distinguished record of accomplishment at MSU.

Forgacs was also the ILSI North America Technical Committee on Food and Chemical Safety Summer Fellowship recipient conducting a project evaluating food-relevant chemicals in the Tox21 high-throughput screening program for 10 weeks in Washington, D.C. As a result of this work, Forgacs was an invited speaker at their Weight of Evidence workshop in Miami, FL.



## Faculty PUBLICATIONS

*During the 2012-2013 academic year, CIT affiliated faculty published more than 200 peer-reviewed articles. As a result, the CIT, and MSU research, has been highly visible in prominent peer-reviewed literature.*



## Amalfitano, Andrea

- Aldhamen YA, Seregin SS, Rastall DP, Aylsworth CF, Pepelyayeva Y, Busuito CJ, Godbehere-Roosa S, Kim S, Amalfitano A (2013). Endoplasmic reticulum aminopeptidase-1 functions regulate key aspects of the innate immune response. *PLoS One*. 8(7):e69539. PubMed PMID: 23894499.
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- Envoudou I, Birtley J, Seregin S, Papakyriakou A, Zervoudi E, Samiotaki M, Panayotou G, Giastas P, Petrakis O, Georgiadis D, Amalfitano A, Saridakis E, Mavridis IM, Stratikos E (2012). A common single nucleotide polymorphism in endoplasmic reticulum aminopeptidase 2 induces a specificity switch that leads to altered antigen processing. *J Immunol*. 189(5):2383-92. PubMed PMID: 22837489.
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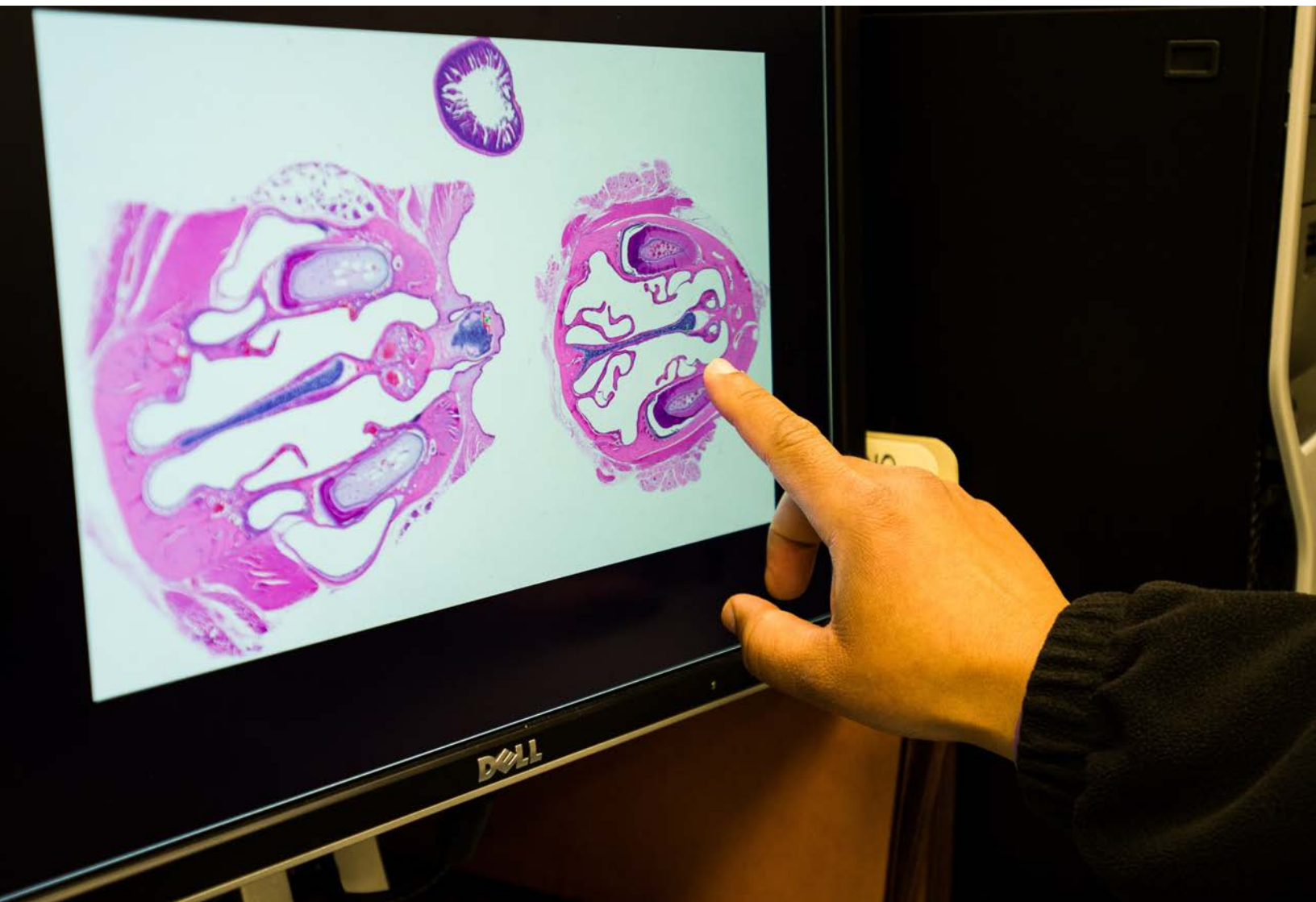
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## Faculty FUNDING

*The CIT and its affiliated faculty maintained a longstanding tradition of external research funding with over \$13 million accepted by the MSU Board of Trustees during the past fiscal year. The majority of the amounts listed here represent just one year in a multi-year award cycle, ensuring that a high level of funding for toxicology will continue in the near future.*



**Andrea Amalfitano**

- \$472,780; ER-localized aminopeptidases in ankylosing spondylitis; NIH/PHS
- \$2,500; Evaluation of innate immune signaling in HIV immunological non-responder monocytes; American Medical Association Foundation

**Eran Andrechek**

- \$308,831; Dissecting Tumor Heterogeneity by Analyzing Signaling Pathway Requirements; NIH/PHS

**William Atchison**

- \$263,475; Increasing Hispanic Representation in Neuroscience; NIH/PHS
- \$740,969; Neurotoxic Mechanism of Methylmercury Poisoning; NIH/PHS
- \$27,885; Purinergic neurotransmission in the gut; NIH/PHS
- \$27,340; Increasing Training of Hispanic Neuroscientists at Michigan State University (Supplement K-12 Neuroscience Workshop Training); NIH/PHS

**Leslie Bourquin**

- \$19,500; Impact of Apple Variety, Storage and Processing Parameters on Patulin Concentrations in Apple Juice; Michigan Apple Research Committee I
- \$20,000; Influence of Apple Pomace and Ethanol-Extractable Polyphenols on Colon Cancer Risk; Michigan Apple Research Committee I
- \$102,560; Food Safety Training Program On Prerequisite Programs And HACCP Systems – China; World Bank
- \$14,370; Food Safety Training Program – Coca-Cola Sugar Suppliers; The Coca-Cola Company
- \$8,528; Food Safety KCommunity Webinar; The Coca-Cola Company

- \$16,482; Maximizing Agricultural Revenue through Knowledge, Enterprise Development, and Trade (MARKET) - MSU Planning; Nathan Associates Inc.
- \$14,478; Food Safety Training Program – India; SSAFE
- \$35,178; APEC PTIN Food Safety Capacity Building Support; USDA – Foreign Agriculture Service
- \$143,249; Collaboration Agreement Between Saudi Food and Drug Authority And Michigan State University; Saudi Arabian Educational Mission
- \$6,201; Capture and production of educational content for the Asia Pacific Economic Cooperation (APEC) Forum’s Partnership Training Institute Network (PTIN); Food Standards Australia New Zealand

**Steven Bursian**

- \$20,000; Research on Nutrition, Toxicology, Behavior and Management of Mink; Mink Farmer’s Research Foundation I
- \$49,985; Prediction and Mitigation of Foodborne Disease Potential of Emerging Trichothecene Mycotoxins; USDA – National Institute of Food and Agriculture

**Susan Ewart**

- \$63,354; Building Researchers on the Diverse Foundation of a Veterinary Medical Education; NIH/PHS
- \$30,113; Veterinary Research Student Training Program: Building Capacity; NIH/PHS
- \$4,000; 2013 Merial Veterinary Scholars Summer Research Program; Merial Limited
- \$19,831; Short-term biomedical research training program for veterinary students; NIH/PHS

**Jay Goodman**

- \$3,051; The Epigenetic Mecha-

nism of Arsenic Lung Carcinogenesis - Role of MicroRNAs; NIH/PHS

**John Goudreau**

- \$780; CD-PROBE: Cervical Dystonia Patient Registry for Observation of Botox Efficacy; Allergan
- \$98,346; Michigan State University Parkinson Disease Clinical Center; Natl Inst Neuro Dis & Strokes
- \$21,643; An open-label, multi-center, follow-up study to evaluate the long-term effects of rasagiline in Parkinson disease subjects who participated in the ADAGIO study; Teva Neuroscience Inc
- \$10,651; Safety of URate Elevation in Parkinson Disease (SURE-PD); Massachusetts General Hospital
- \$220,330; The role of Parkin in selective dopamine neuronal degeneration; Natl Inst Neuro Dis & Strokes

**Jack Harkema**

- \$786,996; Great Lakes Air Center for Integrative Environmental Research (GLACIER); Environmental Protection Agency
- \$90,218; Ethylene Mode of Action in Brown Norway and Fisher 346 Rats; American Chemistry Council
- \$121,570; Vinyl Acetate: Evaluation of N2-Ethyl dG DNA adducts and epithelial cell proliferation in nasal airways of Crl: CD(SD) rats repeatedly exposed to vinyl acetate vapors; Vinyl Acetate Council

**Syed Hashsham**

- \$105,231; ERIN CRC: Host-microbiota-pathogen interactions govern enteric health and disease; Natl Inst of Allergy & Infec Dis -NIH
- \$26,000; Testing of Concrete Specimens for Microbial Corrosion; American Concrete Pipe Association
- \$240,000; Environmental DNA Monitoring for High Risk In-

vative Species; Environmental Protection Agency

### Colleen Hegg

- \$230,250; Neural stem cell susceptibility to ambient particulate matter over the lifespan; Natl Inst of Health - NIH/PHS
- \$76,750; Neurogenesis and chronic cannabinoid exposure; Natl Inst of Health - NIH/PHS

### Robert Hollingworth

- \$643,080; Interregional Research Project No. 4 Minor Crop Pest Management for the North Central Region; US Dept Agriculture
- \$2,777; Quality Assurance Services and Support for IR-4 Minor Use Pesticides at State Facilities in New Jersey and Similar Locations; Rutgers, The State University
- \$721; Weed Control for Minor and Specialty Crops; USDA - Agriculture Research Service

### A. Daniel Jones

- \$24,560; The effect of OMT on patients with Chronic Obstructive Pulmonary Disease: correlating pulmonary function tests with biochemical alterations; American Osteopathic Association
- \$284,049; GEPR: Building and operating chemical factories: Comparative studies of biochemical pathways for defense compounds in the Solanum; National Science Foundation

### Norbert Kaminski

- \$330,211; THC impairment of CD4/CD8 T cell-mediated host resistance to HIV and influenza; Natl Inst of Health - NIH/PHS
- \$197,998; Immunotoxicology of Chronic Exposure to Estrogenic Bisphenol-A, NIH/NIEHS
- \$167,504; Impaired B cell Activation/Differentiation via Sustained BCL6 Expression by TCDD; Natl Inst of Health - NIH/PHS

- \$150,000; Environmental, Microbial and Mammalian Biomolecular Responses to AhR Ligands; Natl Inst of Environ Health Sci-NIH/PHS

- \$265,810; A characterization of species-dependent sensitivity of B cell function to modulation by 2,3,7,8-tetrachlorodibenzo-p-dio; Dow Chemical Co.

### John Kaneene

- \$92,000; Capacity Development for Modernizing African Food Systems (MAFS); International Fund for Agricultural Development of the United Nations
- \$67,619; USDA Tri-lateral Partnership; US Dept Agriculture
- \$26,702; 2012 Borlaug Fellowship Program- Animal Science; USDA - Foreign Ag Ser
- \$56,995; Assessment of Human and Animal Disease Surveillance Systems in Uganda; North Dakota State University
- \$81,385; Strengthening Critical Value Chains with AgShare Open Knowledge; South African Institute for Distance Education

### Gina Leininger

- \$1,531; Lateral Hypothalamic Leptin Receptor-Neurotensin Neurons in Energy Balance; Natl Inst of Health - NIH/PHS

### Ning Li

- \$47,149; An instrument for direct exposure of cell cultures to airborne particulate matter; Aerosol Dynamics, Inc.
- \$156,295; In vivo Assessment of the Adjuvant Effect of Vapor-phase Pollutants on Allergic Sensitization; University of California - Los Angeles

### David Long

- \$183,526; A strategic environmental quality monitoring program for Michigan's surface waters: the inland lakes sediment; MI Environmental Quality

### Keith Lookingland

- \$38,881; The role of Parkin in selective dopamine neuronal degeneration; Natl Inst Neuro Dis & Strokes

### James Luyendyk

- \$539,781; Mechanisms of xenobiotic-induced biliary inflammation and fibrosis; Natl Inst of Health - NIH/PHS
- \$113,034; Dichotomous Roles of Thrombin in Acetaminophen Hepatotoxicity; Natl Inst of Health - NIH/PHS

### Laura McCabe

- \$131,625; Assessing the ability of L. Reuteri ATCC PTA 4659 to Ameliorate Symptoms of Osteoporosis; BIOGATA

### Linda Mansfield

- \$511,125; ERINCR: Host-microbiota-pathogen interactions govern enteric health and disease; Natl Inst of Allergy & Infec Dis - NIH
- \$19,830; Short-term biomedical research training program for veterinary students; NIH/PHS
- \$4,000; 2013 Merial Veterinary Scholars Summer Research Program; Merial Limited

### Cheryl Murphy

- \$67,550; Cell-Free Neurochemical Screening Assays to Predict Adverse Effects in Mammals, Fish, and Birds; Regents of the University of Michigan
- \$42,203; Iraq University Linkage Program: Collaborations in Higher Education between Michigan State University and University of Duhok, Iraq; Intl Research & Exchanges Board

### L. Karl Olson

- \$103,926; Life Course Energy Balance and Breast Cancer Risk in Black/White Women under 50;

Natl Cancer Institute -NIH/PHS

### Nigel Paneth

- \$62,500; Neonatal Biomarkers in Extremity Preterm Babies Predict Childhood Brain Disorders; Boston Medical Center
- \$36,000; Data Coordinating Center for Autism & Other Developmental Disabilities: SEED I&II; Centers for Disease Control and Prevention
- \$821,898; MANCS – 6 Month Follow on Contract; National Institute of Child Health and Human Development - NIH/PHS
- \$20,000; OWL Cerebral Palsy Study; MSU-DFI Discretionary Funding Initiative

### James Pestka

- \$331,558; Dietary Lipids and Silica-Accelerated Autoimmunity; National Institute of Environmental Health Sciences - NIH/PHS
- \$449,873; Prediction and Mitigation of Foodborne Disease Potential of Emerging Trichothecene Mycotoxins; USDA-National Institute of Food and Agriculture
- \$10,009; Hosting the manager of the USWBSI's networking and facilitation office; US Department of Agriculture

### Thomas Pinnavaia

- \$11,128; Green synthesis of BTX as intermediates for PET production; The Coca-Cola Company

### N. Edward Robinson

- \$12,320; Pulmonary Microvascular Function and EIPH; Grayson-Jockey Club Research Fdn Inc

### Cheryl Rockwell

- \$316,240; Role of Nrf2 in immunotoxicity by food additives and environmental contaminants; NIH/PHS

### Kenneth Rosenman

- \$12,000; Fatality Assessment

and Control Evaluation (FACE); Michigan Farm Bureau

- \$22,000; AOEC Exposure Code System Updates; Assoc Occupational and Environment Clinics
- \$21,500; ABLES; Centers for Disease Control and Prevention
- \$893,629; Expanded Program in Occupational Injury and Illness Surveillance; Centers for Disease Control and Prevention
- \$30,000; Environmental Surveillance system; Michigan Dept of Community Health

### Robert Roth

- \$273,608; Multidisciplinary Training in Environmental Toxicology; Natl Inst of Environ Health Sci - NIH/PHS
- \$113,034; Dichotomous Roles of Thrombin in Acetaminophen Hepatotoxicity; NIH/PHS

### Greg Swain

- \$27,885; Purinergic neurotransmission in the gut; NIH/PHS
- \$41,767; SERT KO rats are a model of gender specific visceral pain; NIH/PHS
- \$100,000; Prediction of Galvanic Corrosion of Defense Materials; Naval Research US Office of USDN

### James Tiedje

- \$58,649; The Ribosomal Database Project: Sequences and Tools for Microbial Analysis; US Dept of Energy
- \$282,703; The role of the gut microbiota in ulcerative colitis; University of Michigan
- \$30,064; ERIN CRC: Host-microbiota-pathogen interactions govern enteric health and disease; Natl Inst of Allergy and Infec Dis - NIH
- \$148,129; Metageonomics-Enabled Predictive Understanding of Temperature Sensitivity of Soil Carbon Decomposition to Climate Warming; University of Oklahoma

### Bruce Uhal

- \$250,806; Control of Type II Pneumocyte Proliferation; NIH/PHS

### Thomas Voice

- \$17,634; PIRE: Water and Commerce: Technologies to Enable environmental sustainability in global markets; Duke University

### James Wagner

- \$629,597; Great Lakes Air Center for Integrative Environmental Research (GLACIER); Environmental Protection Agency

### Chengfeng Yang

- \$271,558; The Epigenetic Mechanism of Arsenic Lung Carcinogenesis - Role of MicroRNAs; NIH/PHS





## Professional Service of **FACULTY**

### William Atchison

- Associate Editor, Neurotoxicology
- Chair, Environmental Health Sciences Review Committee, NIEHS

### Leslie Bourquin

- Director, MSU Saudi Arabia Food Safety Education – Training Initiative (SAFE-TI)
- Technical Committee Member, World Bank Global Food Safety Partnership
- Consumer Goods Forum, Global Food Safety Initiative, GFSI Technical Committee Member
- Advisory Council Member, International Food Protection Training Institute (IFPTI)
- Editorial Board, Foods Journal

### Dan Bronstein

- Member, Council, Section K (Social, political and economic science) American Association for the Advancement of Science
- Member, Environmental Quality Committee, American Bar Association

### Steven Bursian

- Editorial Board, Journal of Toxicology
- Editorial Board, Chemosphere
- Editorial Board, Bulletin of Environmental Contamination and Toxicology
- Member, Health Advisory Board of NSF International

### Stephan Carey

- Member, Board of Directors, Veterinary Comparative Respiratory Society
- Member, Early Faculty and Fellows Subcommittee, Environmental and Occupational Health Assembly, The American Thoracic Society
- Ad Hoc Reviewer, The Veterinary Journal
- Ad Hoc Reviewer, Journal of Veterinary Internal Medicine

### Susan Ewart

- National Institutes of Health; Allergy, Immunology, and Transplantation Research Committee (AITC) reviewer, February 2013

### Patricia Ganey

- Editorial Board, Journal of Pharmacology and Experimental Therapeutics
- Editorial Board, Journal of Toxicology and Environmental Health
- Editorial Board, Toxicology
- Chair, Division of Toxicology, American Society of Pharmacology and Experimental Therapeutics
- Secretary/Treasurer, Mechanisms Specialty Section of the Society of Toxicology
- Member, Society of Toxicology Board of Publications

### Jay Goodman

- Editorial Board, Toxicology
- Member, Board of Scientific Councilors, National Institute of Environmental Health Sciences
- Board of Trustees Member, International Life Sciences Institute (ILSI)
- Board of Trustees Member, ILSI Health and Environmental Sciences Institute (HESI)

### John Goudreau

- Chair, COMLEX Level 2 Committee National Board of Osteopathic Medical Examiners
- Chair, Clinical Decision Making Task Force, National Board of Osteopathic Medical Examiners
- Chair, Cognitive Testing Advisory Committee, National Board of Osteopathic Medical Examiners
- Composite Committee, National Board of Osteopathic Medical Examiners
- Blue Ribbon Advisory Panel: Advancing National Board Certification Examinations, National Board of Osteopathic Medical Examiners
- COMVEX Committee, National Board of Osteopathic Medical Examiners
- NSD-B Study Section, National Institutes for Neurological Disorders and Stroke
- NIH Udall Center for Parkinson Disease Research Excellence Special Review Group
- NINDS Panel on Optimizing the Predictive Value of Pre-clinical Research

- Professional Advisory Board, Michigan Parkinson Foundation
- Credentialing Committee, Parkinson Study Group
- Recruitment Committee, NINDS, NET-PD FZ-ZONE Study

### Jack R. Harkema

- Editorial Board, Journal of Experimental and Toxicologic Pathology
- Director, EPA Great Lakes Air Center for Integrated Environmental Research
- Member, Directors of EPA Clean Air Research Centers
- Member, Science Advisory Committee, Harvard University Clean Air Research Center, Boston, MA
- Chairperson, Science Advisory Committee, California National Primate Research Center, Davis, CA
- Member, EPA Clean Air Science Advisory Committee
- Member, Board of Scientific Advisors, National Toxicology Program, NIEHS/NIH

### Syed Hashsham

- Reviewer, National Institute of Environmental Health Sciences Special Emphasis Panel, NIEHS

### Colleen Cosgrove Hegg

- Reviewer, NIH NIDCD Fellowship Application review
- Reviewer, Caroline tum Suden/Francis Hellebrandt Professional Opportunity Awards
- Reviewer, Susan G. Komen Mid-Michigan Community Grants program
- Co-Chair, Judging, College of Veterinary Medicine Phi Zeta Research Day
- Advocate in Science, Susan G. Komen for the Cure National Panel for Grant Review
- Speaker, Susan G. Komen Mid-Michigan Race for the Cure

### Robert Hollingworth

- Editorial Board, Insecticide Resistance Newsletter
- Officer, Agrochemicals Division, American Chemical Society

### A. Daniel Jones

- NIH Study Section (Mentored Research Scientist Development Award in Metabolomics Study Section, ZRG1 IMST-K(52)), July 2012
- NIH Study Section (Regional Comprehensive Metabolomics Resource Cores, ZRBI BST-F(50)), May 2013
- Review Editor, Frontiers in Plant Metabolism and Chemodiversity

### Norbert Kaminski

- Editorial Board, Toxicology
- Editorial Board, Journal of Immunotoxicology
- Board of Trustees Member, Treasurer Elect, ILSI Health and Environmental Sciences Institute (HESI)
- Ad hoc member, NIH Special Emphasis Panel (ZRG1-F07-C)





- External Advisory Committee, Oregon State University Superfund Center Grant
- Endowment Board, Society of Toxicology
- Vice President-Elect, Society of Toxicology

### John Kaneene

- Member, Tanzania Partnership Program Committee
- Member, Institute of International Health Committee
- Reviewer, Engineer Research and Development Center

### Barbara Kaplan

- Member, Career Resource and Development Committee, SOT
- Chairperson, Society of Toxicology Mentoring Breakfast Planning Committee

### John LaPres

- Director, BioMolecular Sciences Recruiting Program

### Gina Leininger

- Reviewer, Obesity
- Reviewer, Diabetes

### Hui Li

- Associate Editor, Journal of Environmental Quality

### Ning Li

- Editorial Board, Journal of Environmental Immunology and Toxicology

### James Luyendyk

- Editorial Board, Arteriosclerosis, Thrombosis and Vascular Biology
- Editorial Board, Toxicological Sciences
- Editorial Board, Journal of Biochemical and Molecular Toxicology
- Task Force on Scientific Events and Special Programs, American Society for Investigative Pathology
- Education Committee, Society of Toxicology
- Councilor, Michigan Regional Chapter of the Society of Toxicology

### Laura McCabe

- Scientific and Medical Advisory Panel Member, Melorheostosis Association
- Research Advisory Committee, Orthopedic Clinical Research Center, Ingham Regional Medical Center
- Michigan Chapter Medical Advisory Committee, Crohn's and Colitis Foundation of America
- Michigan Diabetes Research and Training Center/Translational Research Pilot and Feasibility Grants Program Advisory Council
- Research and Funding Advocacy Committee, American Society of Bone and Mineral Research (ASBMR)

- Associate Editor: Journal of Cellular Biochemistry, Molecular Biology Reports, World Journal of Diabetes
- Review Board: Journal of Pediatric Biochemistry

### Cheryl Murphy

- Editorial Board, Ecotoxicology

### L. Karl Olson

- Merit Review Panel for Endocrinology-A, Department of Veterans Affairs
- Ad Hoc Reviewer, Special Emphasis Panel, NIH/NIDDK

### Nigel Paneth

- National Scientific Advisory Committee, March of Dimes Foundation
- 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)
- Member, NIH panel to review the study section structure of the "Health of the Population" Integrated Review Group of NIH CSR

### Ed Robinson

- Member, Editorial advisory board, Equine Veterinary Journal
- Member, Scientific advisory Board, Animal Health Trust, Newmarket, UK

### Cheryl Rockwell

- Member, Awards Committee, Immunotoxicology Specialty Section, SOT
- Member, Communications Committee, Immunotoxicology Specialty Section, SOT
- Councilor, Michigan Regional Chapter, SOT

### Kenneth Rosenman

- Ad Hoc Member, Safety and Occupational Health Study Section of the Centers for Disease Control and Prevention
- Member, Board of Directors of the Association of Occupational and Environmental Clinics
- Co-Leader, Occupational Health Work Group, Conference of State and Territorial Epidemiologists
- Member, Board of Directors of the Michigan Occupational and Environmental Medical Association
- Member, Michigan State Medical Society Liaison Committee with Public Health

### Robert Roth

- Editorial Board, Toxicology and Applied Pharmacology
- Editorial Board, Journal of Toxicology and Environmental Health



- Associate Editor, Journal of Pharmacology and Experimental Therapeutics
- Member, Research Funding Committee, Society of Toxicology
- Member/Consultant, Technical Committee on the Application of Genomics to Mechanism-based Risk Assessment, ILSI, Health and Environmental Sciences Institute (HESI)

### J. Craig Rowlands

- Chair, American Chemistry Council, Public Health and Science Policy Sub-team, Science Integrity and Risk Assessment Working Group
- Member, of American Chemistry Council, Public Health and Science Policy Sub-team, Computational Toxicology Working Group
- Member, American Chemistry Council, Center for the Advancement of Risk Assessment Science and Policy
- Member, Board of Trustees, International Life Sciences Institute, Health and Environmental Sciences Institute
- Steering Committee Member, International Life Sciences Institute, Health and Environmental Sciences Institute, Risk21 Project
- Co-chair, International Life Sciences Institute, Health and Environmental Sciences Institute, Risk21 Project, DoseResponse sub-team
- Chair, Society of Toxicology, Continuing Education Committee
- Vice President Elect, Society of Toxicology, Molecular Biology Specialty Section
- Editorial Board, Journal of Biochemical and Molecular Toxicology
- Editorial Board, ISRN Toxicology

### James Sikarskie

- Member of the AVMA's Committee on Environmental Issues representing at AAWV and AAZW
- Member, Michigan Veterinary Medical Association's Public Health Committee and the State of Michigan's Rabies Working Group
- Manuscript Reviewer, Journal of Wildlife Diseases and Journal of Zoo and Wildlife Medicine
- Planning Committee Member, Annual Michigan Veterinary Conference
- Member, Animal Welfare Committee, Binder Park Zoo, Battle Creek, MI

### Bruce Uhal

- Executive Guest Editor, Current Pharmaceutical Design

### Brad Upham

- Councilor, Michigan Chapter of the Society of Toxicology
- Chair, In Vitro Animal Cell Science Section, Society of In Vitro Biology (SIVB)
- Councilor, Michigan Chapter of the Society of Toxicology

(MISOT)

- Associate Editor, BioMed Research International and Journal of Toxicology

### James Wagner

- Editorial Board, Inhalation Toxicology
- Past -President, Inhalation and Respiratory Specialty Section, National Society of Toxicology
- NIH Reviewer, NIH: National Institute for Environmental Health Sciences Children's Health Centers, Special Emphasis Panel 2012 ZESI LKB-K (PO)
- Ad Hoc Reviewer: Inhalation Toxicology, Environmental Health Perspectives, Atmospheric Environment
- Member Candidate, Committee for Threshold Limit Values for Chemical Substances (TLV-CS); American Conference of Governmental Industrial Hygienists (ACGIH)
- External Reviewer, California National Primate Research Center (NORA) FY13-14, Pilot Project Proposals

### Felicia Wu

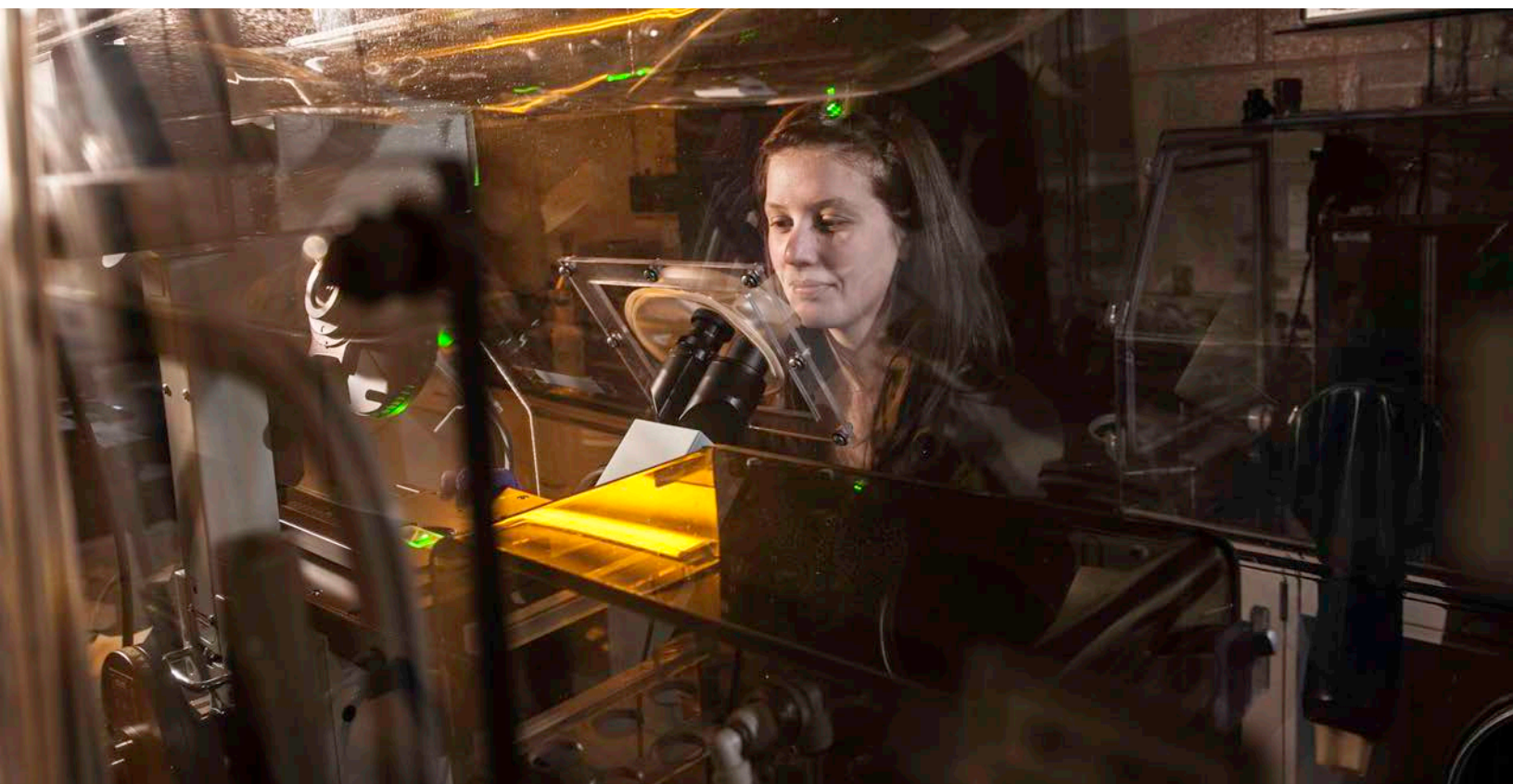
- Area Editor for Health Risk Assessment, Risk Analysis
- Section Editor for Economics and Policy, World Mycotoxin Journal
- Consulting Editor for Risk Communication, Archives of Environmental and Occupational Health
- Member, Computational Task Force, World Health Organization (WHO) Foodborne Disease Burden Epidemiology Reference Group
- Expert Panelist, Joint FAO/WHO Expert Committee on Food Additives (JECFA)
- Chair, Communications Committee, Society for Risk Analysis

### Chengfeng Yang

- Grant reviewer: Ad hoc reviewer for The French National Research Agency (ANR) funds research projects
- Journal manuscript reviewer: British Journal of Cancer, Cell Cycle, PLOS One, Archives of Toxicology, Toxicological Sciences, IUBMB Life, Environmental Toxicology and Pharmacology

### Timothy Zacharewski

- Editorial Board, Toxicological Sciences
- Editorial Board, Toxicology and Applied Pharmacology



# CIT AFFILIATES

## Academic Dept. / Disciplinary Ph.D. Programs

(Participate in the CIT's EITS graduate program.)

Animal Science  
 Biochemistry and Molecular Biology  
 Cell and Molecular Biology  
 Chemistry  
 Comparative Medicine & Integrative Biology  
 Fisheries and Wildlife  
 Food Science and Human Nutrition  
 Forestry  
 Genetics  
 Geological Sciences  
 Microbiology and Molecular Genetics  
 Neuroscience  
 Pathobiology and Diagnostic Investigation  
 Pharmacology and Toxicology  
 Plant, Soil, and Microbial Sciences  
 Zoology

## Deans

**Christopher M. Brown**, College of Veterinary Medicine  
**Fred L. Poston**, College of Agriculture and Natural Resources  
**Leo Kempel**, College of Engineering  
**Marsha D. Rappley**, College of Human Medicine  
**William D. Strampel**, College of Osteopathic Medicine  
**R. James Kirkpatrick**, College of Natural Science  
**Doug Buhler**, Director, AgBioResearch

## Affiliated Faculty

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**William D. Atchison**, Professor, Pharmacology & Toxicology

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

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