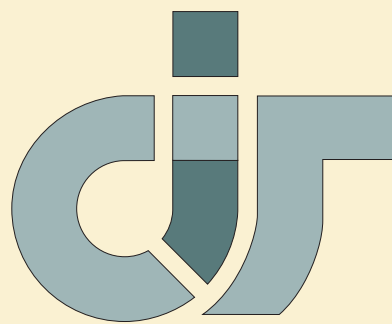


Annual Report



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Center for  
Integrative Toxicology

MICHIGAN STATE  
UNIVERSITY

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**ON THE COVER**

**Pictured from left to right are Anna Kopec, Joshua Kwekel and Suntae Kim, all graduate students in the Environmental and Integrative Toxicological Sciences program, working in the lab of Timothy Zacharewski. Photo credit: Lyle Burgoon, Visting Research Associate.**

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# THE MICHIGAN STATE UNIVERSITY CENTER FOR INTEGRATIVE TOXICOLOGY

2006-2007 ANNUAL REPORT

## CONTENTS:

Director's Message 1

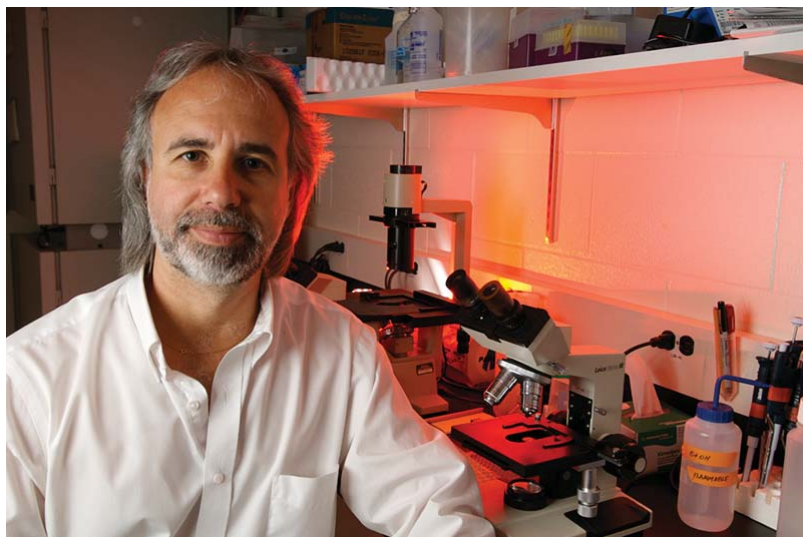
Year's Highlights 2-6

Publications 7-14

Funding 15-18

Affiliates 19-20





## DIRECTOR'S MESSAGE

The Center for Integrative Toxicology is focused in two general areas, graduate training and research. Due to the enthusiasm and commitment of our faculty and trainees and with the strong support of university administration, the 2006-07 academic year was an exceptionally successful year as highlighted in this annual report.

In spite of increasing challenges facing faculty to conduct research and to train students, the CIT faculty continue to be highly successful as measured by peer reviewed publications, securing extramural research funding, holding leadership positions in a wide variety of national and international scientific organizations and advisory boards, and through recognition by their peers for their accomplishments in and contributions to the field of toxicology.

Likewise, CIT has continued to recruit some of the best and brightest trainees to the graduate program in Environmental and Integrative Toxicological Sciences (EITS). The EITS graduate programs provide trainees with the opportunity to receive a dual degree in one of the basic sciences and in environmental toxicology, a combination that has

provided past graduates with many career-options and exceptional preparation for professional advancement in the sciences.

As in past years, a number of our trainees received awards for their innovative research and contributions to the discipline of toxicology as well as funding to present their research findings at scientific meetings.

In order to maintain the national and international reputation for excellence in research and training in toxicological sciences that the CIT has enjoyed over the years, a strong effort was launched in 2006-07 academic year to recruit new faculty to our center. The hiring for the first of two newly created positions was completed, with the recruitment of Dr. Alison Bauer. In addition, two faculty from the MSU ranks with strong extramurally funded research programs were recruited to the CIT, Drs. Colleen Hegg and John Goudreau.

We look forward to another exceptionally successful year for our faculty and trainees.

*Norb Kaminski*  
CIT Director



*Three trainees in the Environmental and Integrative Toxicological Sciences Program presented platform research sessions at the CIT's Annual Research Evening: Cora Fong, Biochemistry and Molecular Biology; Stephan Carey, Comparative Medicine and Integrative Biology; and Jennifer Phillips, Biochemistry and Molecular Biology.*



## CIT Welcomes New Faculty

The CIT successfully recruited **Dr. Alison Bauer** to the MSU faculty in the Fall of 2006. She holds a joint appointment in the CIT and the Department of Pathobiology and Diagnostic Investigation.

Dr. Bauer's research is focused on the role of the innate immune system in mouse and human pulmonary inflammation and tumorigenesis. Her work has been specifically concerned with the ozone-induced mechanisms downstream of toll-like receptor 4 (TLR4) and the protective nature of TLR4 and the innate immune system in lung carcinogenesis.

CIT Director Dr. Norbert Kaminski, notes that "her position is part of a comprehensive strategic effort to capitalize on existing strengths within the MSU toxicology community while also better positioning current MSU research activities in the area of environmental health sciences for the future."

Dr. Bauer received a grant award from the National Institute of Environmental Health Sciences for a project investigating the role of TLR4 in lung inflammation and injury.

**Dr. Colleen Hegg**, assistant professor of pharmacology and toxicology, joined the CIT as affiliate faculty. She is studying the role of purinergics in neuroregeneration of olfactory receptor neurons. Dr. Hegg has initiated studies on the effects of environmental toxicants, including components of cigarette smoke and other airborne toxicants, on olfaction, glial-like sustentacular cell function, toxicity, and neuroregeneration. She also has a long-standing interest in the cellular mechanisms of toxicity. Dr. Hegg has extramural research support from the National Institutes of Health.

Also this year, **Dr. John Goudreau** became a new faculty affiliate of the CIT. Dr. Goudreau is a graduate of the College of Osteopathic Medicine's medical scientist training program and joined the MSU faculty in 2001 as an associate professor in neurology with a joint appointment in pharmacology and toxicology. He will participate with the CIT's training faculty as part of the National Institute of Environmental Health Sciences training grant.

His research in translational neurobiology and neurotoxicology is concerned with neuroprotective treatments of Parkinson's disease. His lab investigates the mechanisms responsible for the degeneration of nigrostriatal dopamine neurons and also considers environmental factors that may contribute to the etiology of Parkinson's disease. Dr. Goudreau has extramural support from the National Institutes of Health.

## Dr. John Giesy Retires from MSU

World renowned ecotoxicologist, Dr. John Giesy, retired from his 25 year career as MSU professor. However, as professor emeritus he plans to not only remain actively engaged at MSU with graduate students and ongoing projects with the U.S. Environmental Protection Agency, State of Michigan, and Dow Chemical; but also has accepted the Canada Research Chair of Environmental Toxicology and Chemistry, placed at the University of Saskatchewan (U of S).

The U of S successfully competed to obtain the chair and recruited Dr. Giesy to fill the position. He will be a professor of Biomedical Sciences in the Western Veterinary College and a member of the Toxicology Centre, a multidisciplinary program much like the CIT.

Dr. Giesy's work in many other countries, including China, Japan, Korea, and Vietnam, will continue with a lab base in Hong Kong for these efforts.

Dr. Giesy will also maintain an MSU office in years to come, allowing his MSU legacy to continue to grow.



*Dr. Alison Bauer began a joint appointment with the CIT and the Department of Pathobiology and Diagnostic Investigations.*

## HIGHLIGHTS

### Dow Chemical Company Partners with the CIT



*In partnership with Dow Chemical Company, the CIT hosted Dr. Laurie Haws who lectured on toxic equivalency factors for dioxin-like compounds. On her left is CIT Director Dr. Norb Kaminski and at right is Dow's Dr. Bob Budinski.*

A partnership with Dow Chemical Company and the CIT fostered the sponsorship of several toxicology expert lectures on campus. These experts spent part of their time lecturing and meeting with MSU faculty and students on campus, and part of their time meeting with scientists at Dow's headquarters in Midland, Michigan. The Research Translation Core for the MSU Superfund Program, administered by the CIT, also provided financial support for the scientist's visits.

- From the United Kingdom, Drs. David Bell, University of Nottingham, and Martin Rose, Central Science Laboratory, presented their work on determining the fetal body burden of TCDD required to cause developmental effects on the male reproductive system. A special round table discussion took place to further discuss TCDD as a potent developmental toxicant and the basis of regulatory advice related to known endpoints of TCDD.

- Dr. Laurie Haws, Ph.D., DABT, of ChemRisk, Inc. lectured on the use of toxic equivalency factors to assess potential human health risks posed by dioxin-like compounds.
- Dr. Stephan Safe, an internationally recognized expert in risk assessment for the aryl hydrocarbon receptor (AHR), also visited. He spoke about opportunities for cancer chemotherapy presented by AHR modulators and the problems for risk assessment. Dr. Safe is a distinguished professor of Veterinary Physiology and Pharmacology at Texas A & M.

### Faculty and Trainee Notables

- Dr. Colleen Cosgrove Hegg was selected as the 2007 recipient of the American Physiological Society Central Nervous System New Investigator Award. The award recognizes outstanding investigators in the early stages of their careers. The award carries a cash prize of \$1,000 and travel costs to attend the APS annual meeting.
- Rashad N. Simmons, Environmental and Integrative Toxicological Sciences (EITS) and Chemistry trainee, was the 2007 recipient of the College of Natural Science Alumni Tracy Hammer Graduate Student Award. Simmons is an analytical chemistry doctoral student working on the CIT EITS training program with Professor Victoria McGuffin. Simmons' primary research activities consist of using high-performance liquid chromatography as a model for a ground water system to determine the effects of perfluorinated surfactants on the groundwater transport of co-contaminants. His work serves as a means of identifying if the presence of the surfactant will lead to increased groundwater contamination.
- Dr. N. Edward Robinson was made an honorary diplomat of the American College of Veterinary Internal Medicine in June 2007 at the organization's annual meeting. He is one of just two individuals to ever receive this prestigious award. Dr. Robinson has devoted his career to the investigation of respiratory problems in horses.

## HIGHLIGHTS

- Dr. Norbert Kaminski was honored by the MSU College of Veterinary Medicine at a banquet on May 3, 2007 with the Pfizer Animal Health Award for Research Excellence. The award recognized the international prominence of his research in immunotoxicology.
- Dr. Barbara L. Kaplan, assistant professor, working in the lab of Dr. Norbert Kaminski, received a Junior Faculty Travel Award to attend "Immunology 2007", the annual meeting of the American Association of Immunologists.

## CIT Launches Distinguished Scholars in Toxicology Lecture Series

With financial support from the MSU Graduate School, the CIT launched a Distinguished Scholars in Toxicology Lecture Series in 2007. Each year the series will bring investigators to the MSU campus who have made substantial scientific contributions to the discipline of toxicology. The CIT will partner each year with an affiliated academic unit to select and host the speakers.

The 2007 series was hosted in cooperation with the Department of Pharmacology and Toxicology and two distinguished scholars were recruited.

- Dr. Jose Manautou, an associate professor of toxicology in the Department of Pharmaceutical Sciences at the University of Connecticut and the 2006 recipient of the Society of Toxicology's Achievement Award, lectured on changes in the expression of hepatobiliary transport proteins as a compensatory response to drug-induced hepatotoxicity.
- Dr. David Sherr, professor of environmental health and of pathology and laboratory medicine at Boston University, presented his work on the role of the aryl hydrocarbon receptor in breast cancer mammary tumor growth and invasiveness.



*Jose Manautou, the first speaker in the CIT's Distinguished Scholars in Toxicology Lecture Series, received the 2006 Society of Toxicology Achievement Award. He is pictured here with Professor Patricia Ganey.*

## Lunch and Learn Tradition

Continuing a tradition from the CIT's former location in Holden Hall, a scientific lecture was hosted by the Center with lunch for students and faculty at the Holden Hunt Club in January.

- Dr. David Warheit, from DuPont Haskell Laboratory for Health and Environmental Sciences in Delaware, spoke on the impact of nanoparticles on respiratory health effects. Dr. Warheit noted that toxicity is not always dependent solely upon particle size and surface area.

## EITS Program Expansions

The graduate program in Environmental and Integrative Toxicological Sciences (EITS) is undergoing changes and growth.

The CIT recently completed a comprehensive internal review of the graduate curriculum for both the Toxicology Track and the Environmental Track of the program. A number of important recommendations have been implemented relating primarily to changes in the content of existing courses as well as to adding new courses in leading edge areas such as "omics" technologies.

Two additional graduate programs have affiliated with EITS. The CIT welcomed the Cell and Molecular Biology Program and the Comparative Medicine and Integrative Biology Program. The additions bring the total to fifteen graduate programs that offer the opportunity for doctoral students to obtain a dual major in Environmental Toxicology.



## HIGHLIGHTS

### Toxicology Scholar Visit Program

The CIT continued efforts to recruit outstanding graduate students, notably receiving funding from the Society of Toxicology's Committee on Diversity Initiatives Toxicology Scholar Visit Program.

The funding helped defray the cost for the CIT to send Dr. Stephan Carey, an Environmental and Integrative Toxicological Sciences (EITS) doctoral student, to the Elizabeth State University's Research Career Fair in Elizabeth City, North Carolina last winter.

Dr. Carey earned his DVM degree from the University of Wisconsin-Madison and is a dual major in EITS and Comparative Medicine and Integrative Biology. He conducts his research in the lab of Dr. Jack Harkema.

During his visit to the ESU campus he presented an informal seminar titled "Air Pollution and Water Damage, Right Up Your Nose (And Into Your Brain?)" to a group of junior and seniors in an upper level microbial biochemistry class.

### Graduate School Enhancement Awards

For the second year, the CIT in partnership with the MSU Graduate Office provided educational funding from the "CIT Graduate School Dean Educational Enhancement Award Program" for students participating in the dual-degree Environmental and Integrative Toxicological Sciences (EITS) program. Five students received stipends to continue their research during the summer months, one student received a fall research stipend, and eight students received support to attend the Society of Toxicology annual meeting in March. Three additional students attended other society meetings.

Dr. Norbert Kaminski, CIT Director, noted that the Graduate School funding has been and continues to be an important resource in providing

the best training experience possible for students preparing for multi-disciplinary careers in toxicology.

"It is critical that our trainees have the opportunity to attend and present their research at regional, national, and international meetings," Kaminski said. "By providing them with the opportunity to present their research in a formal setting and to meet other scientists in their area of study, this funding not only allows many of our graduate students to enhance their training experiences, but also demonstrates MSU's commitment to maintaining excellence in our program."

### NIEHS Training Grant

The MSU-CIT began its 19th year of continuous training grant funding from the National Institute of Environmental Health Sciences. The grant provides stipends and other support for up to six toxicology doctoral students and up to three postdoctoral trainees each year.

Many of the beneficiaries of this program have gone on to successful careers in academia, government and industry, becoming leaders in the toxicology discipline. For example, past training grant recipient Dr. James Luyendyk graduated from the EITS program in 2005, completed a postdoctoral fellowship at the Scripps Biological Institute, and recently accepted a position as Assistant Professor of Pharmacology, Toxicology and Experimental Therapeutics at the University of Kansas.

During the past fiscal year, two Pharmacology and Toxicology grant supported trainees graduated: Steve Bezdecny, from the lab of Dr. Patricia Ganey; and John P. Buchweitz, from the lab of Dr. Norbert Kaminski.

As these students graduated, three new trainees were appointed to the training grant: Colin North, working the Kaminski lab; and Patrick Shaw and Erica Sparkenbaugh, both working in Dr. Robert Roth's lab. Two grant-funded trainees also continued their programs: Sarah Coefield, working in Dr. John Giesy's lab and Jennifer Phillips, working in Dr. Jay Goodman's lab.



*Dr. Stephan Carey represented the MSU-CIT Environmental and Integrative Toxicological Sciences Program at Elizabeth State University, utilizing funding from the Society of Toxicology's Committee on Diversity Initiatives Toxicology Scholar Visit Program.*



## HIGHLIGHTS

In addition, the grant provided stipend support for three postdoctoral trainees: Dr. Neil Birmingham, Food Science and Human Nutrition, continued an appointment in Dr. Jack Harkema's lab; Dr. Scott Lynn, Biochemistry and Molecular Biology, began an appointment in Dr. John LaPres's lab; and Dr. Frank Johnson, Pharmacology and Toxicology, began an appointment in Dr. William Atchison's lab.

CIT Graduate Director, Dr. Robert Roth, emphasized that the training grant is important not only for the opportunities and support that it provides trainees in the EITS program but also for the visibility it provides MSU.

"Colleagues and students nationwide recognize NIH training grants as evidence of excellence at the grantee institution," Roth said. "Additionally, it helps our efforts to partner with cooperating doctoral programs at MSU to provide the very best training for our students and enhance enthusiasm and support for our program from the MSU administration."



*Dr. Frank Johnson joined William Atchison's lab as a postdoctoral trainee.*

## Admissions and Graduations

The MSU-CIT graduated seven students from the Environmental and Integrative Toxicological Science Doctoral Program and admitted eight new students.

- Three zoology graduates completed dual degree, all under the tutelage of Dr. John Giesy: Karl Strause, Tannia Gracia-Bustos, and Hoon Yu.
- Two graduates completed in pharmacology and toxicology: Steve Bezdecny, who worked in Dr. Patricia Ganey's lab, and John P. Buchweitz, who worked in Dr. Norbert Kaminski's lab.
- Jennifer Gray, who worked in the lab of Dr. James Pestka, completed the microbiology dual degree.
- Yang Song completed the chemistry dual degree, while working in the lab of Dr. Greg Swain.

## MSU at the 46th Annual SOT Meeting

At the Society of Toxicology's 46th Annual Meeting in March of 2007, MSU scientists presented over 50 abstracts and received many honors.

- Research Associate Professor Zahidul Islam received the Best Publication of the Year Award from the SOT Occupational and Public Health Specialty Section for "Satrotoxin G from the Black Mold *Stchybotrys Chartum* Evokes Olfactory Sensory Neuron Loss and Inflammation in the Murine Nose and Brain." (*Environ. Health Perspect.*; 114: 1099-1107, 2006.) Dr. Islam works in the labs of Drs. James Pestka and Jack Harkema.
- Patrick Shaw, a trainee in Dr. Robert Roth's lab, received a best poster award from the Drug Discovery Toxicology Specialty Section.
- Joshua Kwekel, a trainee in Dr. Timothy Zacharewski's lab, received a travel award from the Reproductive and Developmental Specialty Section and an award for second place in the Comparative and Veterinary Toxicology Specialty Section for his abstract "Cross-Species Comparison of Tamoxifen & Estrogen Induced Uterotrophy in Rodents."
- Anna Kopec, a first year student working in Dr. Timothy Zacharewski's lab, received an Honorable Mention Award in the Molecular Biology Specialty Section.
- Travel Awards also went to: Jennifer Phillips, working in Dr. Jay Goodman's lab; Chidozie Amuzie and Beckey Bae, both working in Dr. James Peska's lab; and Dina Shneider and John Buchweitz, both working in Dr. Norbert Kaminski's lab.



*Dr. Zahidul Islam accepted an award for "Best Publication of the Year" from the Society of Toxicology's Occupational and Public Health Specialty Section.*

## PUBLICATIONS

The CIT faculty published over 130 articles in peer-reviewed journals. These publications not only report on research that was conducted at MSU, but also on collaborative research being conducted by MSU faculty and trainees worldwide.

The following list details those publications included in PubMed, the on-line service of the U.S. National Library of Medicine. To access abstracts, and in many cases the full text of these articles, go to <http://www.ncbi.nlm.nih.gov/>.



### William Atchison Lab

Acetylcholine release at neuromuscular junctions of adult tottering mice is controlled by N- (Cav2.2) and R- (Cav2.3), but not L-Type (Cav1.2) Ca<sup>2+</sup> channels. Pardo NE, Hajela RK, Atchison WD. *J Pharmacol Exp Ther*. 2006 Dec;319(3):1009-20.

Methylmercury-induced increase of intracellular Ca<sup>2+</sup> increases spontaneous synaptic current frequency in rat cerebellar slices. Yuan Y, Atchison WD. *Mol Pharmacol*. 2007 Apr; 71(4): 1109-21

### Alison Bauer Lab

Protection against inhaled oxidants through scavenging of oxidized lipids by macrophage receptors MARCO and SR-AI/II. Dahl M, Bauer AK, Arredouani M, Soyninen R, Tryggvason K, Kleeberger SR, Kobzik L. *J Clin Invest*. 2007 Mar 1;117(3):757-764.

Signal transduction pathways of tumor necrosis factor-mediated lung injury induced by ozone in mice. Cho HY, Morgan DL, Bauer AK, Kleeberger SR. *Am J Respir Crit Care Med*. 2007 Apr 15;175(8):829-39.

### Leslie Bourquin Lab

Dietary anthocyanin-rich tart cherry extract inhibits intestinal tumorigenesis in APC(Min) mice fed suboptimal levels of sulindac. Bobe G, Wang B, Seeram NP, Nair MG, Bourquin LD. *J Agric Food Chem*. 2006 Dec 13;54(25):9322-8.

### Stephen Boyd Lab

Geochemical modulation of bioavailability and toxicity of nitroaromatic compounds to aquatic plants. Roberts MG, Rugh CL, Li H, Teppen BJ, Boyd SA. *Environ Sci Technol*. 2007 Mar 1;41(5):1641-5.

Ionic strength-induced formation of smectite quasicrystals enhances nitroaromatic compound sorption. Li H, Pereira TR, Teppen BJ, Laird DA, Johnston CT, Boyd SA. *Environ Sci Technol*. 2007 Feb 15;41(4):1251-6.

Reducing bioavailability and phytotoxicity of 2,4-dinitrotoluene by sorption on K-smectite clay. Roberts MG, Rugh CL, Li H, Teppen BJ, Boyd SA. *Environ Toxicol Chem*. 2007 Feb;26(2):358-60.

Quantifying the availability of clay surfaces in soils for adsorption of nitrocyano benzene and diuron. Charles SM, Li H, Teppen BJ, Boyd SA. *Environ Science and Technology*. 2006 Dec 15;40(24):7751-6.

### Steven Bursian Lab

Mink as a sentinel species in environmental health. Basu N, Scheuhammer AM, Bursian SJ, Elliott J, Rouvinen-Watt K, Chan HM. *Environ Res*. 2007 Jan;103(1):130-44.

### Karen Chou Lab

Phthalates in food and medical devices. Chou K, Wright RO. *J Med Toxicol*. 2006 Sep;2(3):126-35

### Susan Ewart Lab

Fine mapping of murine asthma quantitative trait loci and analyses of *Ptgs1* and *Mrc1* as positional candidate genes. Li X, Fleis RI, Shubitowski DM, Ramadas RA, Ewart SL. *DNA Seq*. 2007 Jun;18(3):190-5.

Genes and respiratory disease: a first step on a long journey. Ewart SL, Robinson NE. *Equine Vet J*. 2007 May;39(3):270-4.

Elevated amount of toll-like receptor 4 mRNA in bronchial epithelial cells is associated with airway inflammation in horses with recurrent airway obstruction. Berndt A, Derksen FJ, Venta PJ, Ewart S, Yuzbasiyan-Gurkan V, Robinson NE. *Am J Physiol Lung Cell Mol Physiol*. 2007 Apr;292(4):L936-43.

Interleukin-1R antagonist gene and pre-natal smoke exposure are associated with childhood asthma. Ramadas RA, Sadeghnejad A, Karmaus W, Arshad SH, Matthews S, Huebner M, Kim DY, Ewart SL. *Eur Respir J*. 2007 Mar;29(3):502-8.

IL-1 receptor antagonist as a positional candidate gene in a murine model of allergic asthma. Ramadas RA, Li X, Shubitowski DM, Samineni S, Wills-Karp M, Ewart SL. *Immunogenetics*. 2006 Oct;58(10):851-5.

Investigating *Gata3* as a positional candidate gene for allergic asthma in a murine model. Li X, Wills-Karp M, Ewart S. *Int J Immunogenet*. 2006 Oct;33(5):333-7.



## PUBLICATIONS

### Patricia Ganey Lab

2,2',4,4'-Tetrachlorobiphenyl upregulates cyclooxygenase-2 in HL-60 cells via p38 mitogen-activated protein kinase and NF-kappaB. Bezdecny SA, Karmaus P, Roth RA, Ganey PE. *Toxicol Appl Pharmacol*. 2007 Jun 15;221(3):285-94.

Role of the kupffer cell in mediating hepatic toxicity and carcinogenesis. Roberts RA, Ganey PE, Ju C, Kamendulis LM, Rusyn I, Klaunig JE. *Toxicol Sci*. 2007 Mar;96(1):2-15.

Modest inflammation enhances diclofenac hepatotoxicity in rats: role of neutrophils and bacterial translocation. Deng X, Stachlewitz RF, Liguori MJ, Blomme EA, Waring JF, Luyendyk JP, Maddox JF, Ganey PE, Roth RA. *J Pharmacol Exp Ther*. 2006 Dec;319(3):1191-9.

Modeling inflammation-drug interactions in vitro: a rat Kupffer cell-hepatocyte coculture system. Tukov FF, Maddox JF, Amacher DE, Bobrowski WF, Roth RA, Ganey PE. *Toxicol In Vitro*. 2006 Dec;20(8):1488-99.

Anticoagulation and inhibition of nitric oxide synthase influence hepatic hypoxia after monocrotaline exposure. Coople BL, Roth RA, Ganey PE. *Toxicology*. 2006 Aug 15;225(2-3):128-37.



### Jay Goodman Lab

Orphan nuclear receptor constitutive active/androstane receptor-mediated alterations in DNA methylation during phenobarbital promotion of liver tumorigenesis. Phillips JM, Yamamoto Y, Negishi M, Maronpot RR, Goodman JI. *Toxicol Sci*. 2007 Mar;96(1):72-82.

Genetic toxicity assessment: employing the best science for human safety evaluation. Goodman JI, Gollapudi B, Lehman-McKeeman LD. *Toxicol Sci*. 2007 Mar;96(1):1.

The FEMA GRAS assessment of aromatic substituted secondary alcohols, ketones, and related esters used as flavor ingredients. Adams TB, McGowen MM, Williams MC, Cohen SM, Feron VJ, Goodman JI, Marnett LJ, Munro IC, Portoghese PS, Smith RL, Waddell WJ. *Food Chem Toxicol*. 2007 Feb;45(2):171-201.

### John Goudreau Lab

Medical management of advanced Parkinson's disease. Goudreau JL. *Clin Geriatr Med*. 2006 Nov;22(4):753-72, v. Review.

Alpha-synuclein induces hyperphosphorylation of Tau in the MPTP model of parkinsonism. Duka T, Rusnak M, Drolet RE, Duka V, Wersinger C, Goudreau JL, Sidhu A. *FASEB J*. 2006 Nov;20(13):2302-12.



### Jack Harkema Lab

Evaluation of effects from repeated inhalation exposure of F344 rats to high concentrations of propylene. Pottenger L, Malley L, Bogdanffy M, Donner E, Upton P, Li Y, Walker V, Harkema J, Banton M, Swenberg J. *Toxicol Sci*. 2007 Jun;97(2):336-47.

Rodent models of allergic rhinitis: Relevance to human pathophysiology. Wagner JG, Harkema JR. *Curr Allergy Asthma Rep*. 2007 May;7(2):134-40.

Deoxynivalenol exacerbates viral bronchopneumonia induced by respiratory reovirus infection. Li M, Harkema JR, Cuff CF, Pestka JJ. *Toxicol Sci*. 2007 Feb;95(2):412-26.

Time-dependent airway epithelial and inflammatory cell responses induced by influenza virus A/PR/8/34 in C57BL/6 mice. Buchweitz JP, Harkema JR, Kaminski NE. *Toxicol Pathol*. 2007;35(3):424-35.

Three-dimensional mapping of ozone-induced injury in the nasal airways of monkeys using magnetic resonance imaging and morphometric techniques. Carey SA, Minard KR, Trease LL, Wagner JG, Garcia GJM, Ballinger CA, Kimbell JS, Plopper CG, Corley RA, Postlethwait EM, Harkema JR. *Toxicologic Pathology*. 2007;35:27-40.

Characterization of urban atmospheres during inhalation exposure studies in Detroit and Grand Rapids, Michigan. Keeler GJ, Morishita M, Wagner JG, Harkema JR. *Toxicol Pathol*. 2007;35(1):15-22.

Comparative toxicogenomic analysis of the hepatotoxic effects of TCDD in sprague dawley rats and C57BL/6 mice. Boverhof DR, Burgoon LD, Tashiro C, Sharratt B, Chittim B, Harkema JR, Mendrick DL, Zacharewski TR. *Toxicol Sci*. 2006 Dec;94(2):398-416.

T-2 toxin impairs murine immune response to respiratory reovirus and exacerbates viral bronchiolitis. Li M, Harkema JR, Islam Z, Cuff, CF, Pestka JJ. *Toxicol Appl Pharmacol*. 2006 Nov 15;217(1):76-85.

## PUBLICATIONS

Airway inflammation is associated with mucous cell metaplasia and increased intraepithelial stored mucosubstances in horses. Lugo J, Harkema JR, deFeijter-Rupp H, Bartner L, Boruta D, Robinson NE. *Vet J*. 2006 Sep;172(2):293-301.

Satratoxin G from the black mold *stachybotrys chartarum* evokes olfactory sensory neuron loss and inflammation in the murine nose and brain. Islam Z, Harkema JR, Pestka JJ. *Environ Health Perspect*. 2006 Jul;114(7):1099-107.

Topical application versus intranasal instillation: a qualitative comparison of the effect of the route of sensitization on trimellitic anhydride-induced allergic rhinitis in A/J mice. Farraj AK, Harkema JR, Kaminski NE. *Toxicol Sci*. 2006 Jul;92(1):321-8.

### Syed Hashsham Lab

Stable colloidal dispersions of C60 fullerenes in water: evidence for genotoxicity. Dhawan A, Taurozzi JS, Pandey AK, Shan W, Miller SM, Hashsham SA, Tarabara VV. *Environ Sci Technol*. 2006 Dec 1;40(23):7394-401.

Revision of the nonequilibrium thermal dissociation and stringent washing approaches for identification of mixed nucleic acid targets by microarrays. Pozhitkov AE, Stedtfeld RD, Hashsham SA, Noble PA. *Nucleic Acids Res*. 2007;35(9):e70.

Virulence factor activity relationships: challenges and development approaches. Tourlousse DM, Stedtfeld RD, Baushke SW, Wick LM, Hashsham SA. *Water Environ Res*. 2007 Mar;79(3):246-59. Review.

Multiplex approach for screening genetic markers of microbial indicators. Stedtfeld RD, Baushke S, Tourlousse D, Chai B, Cole JR, Hashsham SA. *Water Environ Res*. 2007 Mar;79(3):260-9.

Coping with polychlorinated biphenyl (PCB) toxicity: Physiological and genome-wide responses of *Burkholderia xenovorans* LB400 to PCB-mediated stress. Parnell JJ, Park J, Deneff V, Tsoi T, Hashsham S, Quensen J 3rd, Tiedje JM. *Appl Environ Microbiol*. 2006 Oct;72(10):6607-14.

Influence of dangling ends and surface-proximal tails of targets on probe-target duplex formation in 16S rRNA gene-based diagnostic arrays. Stedtfeld RD, Wick LM, Baushke SW, Tourlousse DM, Herzog AB, Xia Y, Rouillard JM, Klappenbach JA, Cole JR, Gulari E, Tiedje JM, Hashsham SA. *Appl Environ Microbiol*. 2007 Jan;73(2):380-9.

### Norbert Kaminski Lab

Endocannabinoid regulates blood pressure via activation of the transient receptor potential vanilloid type 1 in wistar rats fed

a high-salt diet. Wang Y, Kaminski NE, Wang DH. *J Pharmacol Exp Ther*. 2007 May;321(2):763-9. Epub 2007 Feb 16.

Time-dependent airway epithelial and inflammatory cell responses induced by influenza virus A/PR/8/34 in C57BL/6 mice. Buchweitz JP, Harkema JR, Kaminski NE. *Toxicol Pathol*. 2007;35(3):424-35.

Interleukin-2 suppression by 2-arachidonyl glycerol is mediated through peroxisome proliferator-activated receptor gamma independently of cannabinoid receptors 1 and 2. Rockwell CE, Snider NT, Thompson JT, Vanden Heuvel JP, Kaminski NE. *Mol Pharmacol*. 2006 Jul;70(1):101-11.

Topical application versus intranasal instillation: a qualitative comparison of the effect of the route of sensitization on trimellitic anhydride-induced allergic rhinitis in A/J mice. Farraj AK, Harkema JR, Kaminski NE. *Toxicol Sci*. 2006 Jul;92(1):321-8.

### John Kaneene Lab

Antimicrobial resistance in *Campylobacter* isolated from food animals and humans in northern Thailand. Padungtod P, Kaneene JB, Hanson R, Morita Y, Boonmar S. *FEMS Immunol Med Microbiol*. 2006 Jul;47(2):217-25.

Effect of tracheal mucus and tracheal cytology on racing performance in thoroughbred racehorses. Holcombe SJ, Robinson NE, Derksen FJ, Bertold B, Genovese R, Miller R, de Feiter Rupp H, Carr EA, Eberhart SW, Boruta D, Kaneene JB. *Equine Vet J*. 2006 Jul;38(4):300-4.

Prevalence of shiga toxin-encoding bacteria and shiga toxin-producing *Escherichia coli* isolates from dairy farms and county fairs. Cho S, Diez-Gonzalez F, Fossler CP, Wells SJ, Hedberg CW, Kaneene JB, Ruegg PL, Warnick LD, Bender JB. *Vet Microbiol*. 2006 Dec 20;118(3-4):289-98.

Prevalence of antimicrobial resistance among *Salmonella* on midwest and northeast USA dairy farms. Ray KA, Warnick LD, Mitchell RM, Kaneene JB, Ruegg PL, Wells SJ, Fossler CP, Halbert LW, May K. *Prev Vet Med*. 2007 May 16;79(2-4):204-23.

Cellular proliferation in canine cutaneous mast cell tumors: associations with c-KIT and its role in prognostication. Webster JD, Yuzbasiyan-Gurkan V, Miller RA, Kaneene JB, Kiupel M. *Vet Pathol*. 2007 May;44(3):298-308.

Considerations when using discriminant function analysis of antimicrobial resistance profiles to identify sources of fecal contamination of surface water in Michigan, USA. Kaneene JB, Miller R, Sayah R, Johnson YJ, Gilliland D, Gardiner JC. *Appl Environ Microbiol*. 2007 May;73(9):2878-90.

### John LaPres Lab

Prolyl-hydroxylase inhibition and HIF activation in osteoblasts promotes an adipocytic phenotype. Irwin R, Lapres JJ, Kinser S, McCabe LR. *J Cell Biochem*. 2007 Feb 15;100(3):762-72.

Hypoxia, drug therapy and toxicity. Lee K, Roth RA, Lapres JJ. *Pharmacol Ther*. 2007 Feb;113(2):229-46.

Identification and characterization of genes susceptible to transcriptional cross-talk between the hypoxia and dioxin signaling cascades. Lee K, Burgoon LD, Lamb L, Dere E, Zacharewski TR, Hogenesch JB, LaPres JJ. *Chem Res Toxicol*. 2006 Oct;19(10):1284-93. Erratum in: *Chem Res Toxicol*. 2006 Dec;19(12):1702.





## PUBLICATIONS

### John Linz Lab

Evidence that a wortmannin-sensitive signal transduction pathway regulates aflatoxin biosynthesis. Lee JW, Roze LV, Linz JE. *Mycologia*. 2007 Jul-Aug;99(4):562-8.

C57BL/6 and congenic interleukin-10-deficient mice can serve as models of *Campylobacter jejuni* colonization and enteritis. Mansfield LS, Bell JA, Wilson DL, Murphy AJ, Elsheikha HM, Rathinam VA, Fierro BR, Linz JE, Young VB. *Infect Immun*. 2007 Mar;75(3):1099-115.

Detection of *Escherichia coli* in packaged alfalfa sprouts with an electronic nose and an artificial neural network. Siripatrawan U, Linz JE, Harte BR. *J Food Prot*. 2006 Aug;69(8):1844-50.

### David Long Lab

Evaluation of the hypothesis that Balkan endemic nephropathy is caused by drinking water exposure to contaminants leaching from Pliocene coal deposits. Voice TC, McElmurry SP, Long DT, Dimitrov P, Ganey VS, Peptropoulos EA. *J Expo Sci Environ Epidemiol*. 2006 Nov;16(6):515-24.

Role of exposure analysis in solving the mystery of Balkan endemic nephropathy. Long DT, Voice TC. *Croat Med J*. 2007 Jun;48(3):300-11.

Critical evaluation of environmental exposure agents suspected in the etiology of Balkan endemic nephropathy. Voice TC, Long DT, Radovanovic Z, Atkins JL, McElmurry SP, Niagolova ND, Dimitrov P, Peptropoulos EA, Ganey VS. *Int J Occup Environ Health*. 2006 Oct-Dec;12(4):369-76. Review.

### Jane Maddox Lab

Modeling inflammation-drug interactions in vitro: a rat Kupffer cell-hepatocyte coculture system. Tukov FF, Maddox JF, Amacher DE, Bobrowski WF, Roth RA, Ganey PE. *Toxicol In Vitro*. 2006 Dec;20(8):1488-99.

Modest inflammation enhances diclofenac hepatotoxicity in rats: role of neutrophils and bacterial translocation. Deng X, Stachlewitz RF, Liguori MJ, Blomme EA, Waring JF, Luyendyk JP, Maddox JF, Ganey PE, Roth RA. *J Pharmacol Exp Ther*. 2006 Dec;319(3):1191-9.

### Veronica Maher/Justin McCormick Labs

Evidence that in Xeroderma Pigmentosum Variant Cells, which Lack DNA polymerase {eta}, DNA polymerase {iota} causes the very high frequency and unique spectrum of uv-induced mutations. Wang Y, Woodgate R, McManus TP, Mead S, McCormick JJ, Maher VM. *Cancer Res*. 2007 Apr 1;67(7):3018-26.

### Victoria McGuffin Lab

The thermodynamic and kinetic basis of liquid chromatography. Li X, Hupp AM, McGuffin VL. *Adv Chromatogr*. 2007;45:1-88.

### L. Karl Olson Lab

Cigarette smoke components inhibited intercellular communication and differentiation in human pancreatic ductal epithelial cells. Tai MH, Upham BL, Olson LK, Tsao MS, Reed DN Jr, Trosko JE. *Int J Cancer*. 2007 May 1;120(9):1855-62.

Regulation of hepatic fatty acid elongase and desaturase expression in diabetes and obesity. Wang Y, Botolin D, Xu J,

Christian B, Mitchell E, Jayaprakasam B, Nair M, Peters J, Busik J, Olson LK, Jump DB. *J Lipid Res*. 2006 Sep;47(9):2028-41.

### Nigel Paneth Lab

Ambient manganese exposure is negatively associated with human sperm motility and concentration. Wirth JJ, Rossano MG, Daly DC, Paneth N, Puscheck E, Potter RC, Diamond MP. *Epidemiology*. 2007 Mar;18(2):270-273.

Comparison of current health, functional limitations, and health care use of young adults who were born with extremely low birth weight and normal birth weight. Saigal S, Stoskopf B, Boyle M, Paneth N, Pinelli J, Streiner D, Goddeeris J. *Pediatrics*. 2007 Mar;119(3):e562-73.

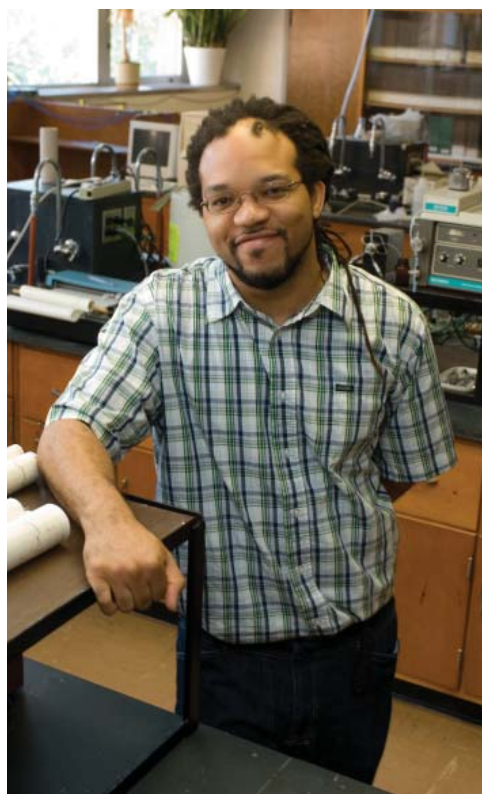
A report: the definition and classification of cerebral palsy. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, Damiano D, Dan B, Jacobsson B. *Dev Med Child Neurol Suppl*. 2007 Feb;109:8-14. Erratum in: *Dev Med Child Neurol Suppl*. 2007 Jun;49(6):480.

Physical activity and fetal growth during pregnancy. Perkins CC, Pivarnik JM, Paneth N, Stein AD. *Obstet Gynecol*. 2007 Jan;109(1):81-87.

Growth trajectories of extremely low birth weight infants from birth to young adulthood: a longitudinal, population-based study. Saigal S, Stoskopf B, Streiner D, Paneth N, Pinelli J, Boyle M. *Pediatr Res*. 2006 Dec;60(6):751-8.

Reports of birthweight by adolescents and their mothers: comparing accuracy and identifying correlates. Lucia VC, Luo Z, Gardiner JC, Paneth N, Breslau N. *Paediatr Perinat Epidemiol*. 2006 Nov;20(6):520-7.

Motor and cognitive outcomes in nondisabled low-birth-weight adolescents: early determinants. Whitaker AH, Feldman JF, Lorenz JM, Shen S, McNicholas F, Nieto M, McCulloch D, Pinto-Martin JA, Paneth N. *Arch Pediatr Adolesc Med*. 2006

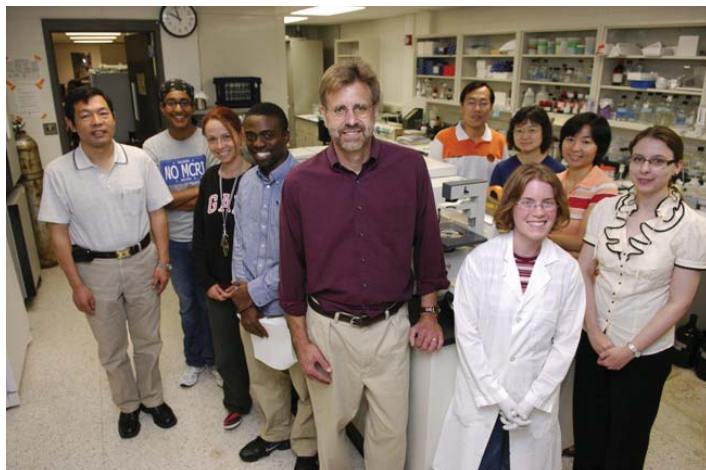


*Rashad Simmons, doctoral trainee in the McGuffin lab, conducts research on the transport of environmental contaminants through water.*

## PUBLICATIONS

Oct;160(10):1040-6.

Self-perceived health-related quality of life of former extremely low birth weight infants at young adulthood. Saigal S, Stoskopf B, Pinelli J, Steiner D, Hoult L, Paneth N, Goddeeris J. *Pediatrics*. 2006 Sep;118(3):1140-1148.



### James Pestka Lab

Attenuation of mycotoxin-induced IGA nephropathy by eicosapentaenoic acid in the mouse: dose response and relation to IL-6 expression. Shi Y, Pestka JJ. *J Nutr Biochem*. 2006 Oct;17(10):697-706.

T-2 toxin impairs murine immune response to respiratory reovirus and exacerbates viral bronchiolitis. Li M, Harkema JR, Islam Z, Cuff, CF, Pestka JJ. *Toxicol Appl Pharmacol*. 2006 Nov 15;217(1):76-85.

Deoxynivalenol exacerbates viral bronchopneumonia induced by respiratory reovirus infection. Li M, Harkema JR, Cuff CF, Pestka JJ. *Toxicol Sci*. 2007 Feb;95(2):412-26.

T-2 toxin impairment of enteric reovirus clearance in the mouse associated with suppressed immunoglobulin and IFN-gamma responses. Li M, Cuff CF, Pestka JJ. *Toxicol Appl Pharmacol*. 2006 Aug 1;214(3):318-25.

Satratoxin G from the black mold *stachybotrys chartarum* evokes olfactory sensory neuron loss and inflammation in the murine nose and brain. Islam Z, Harkema JR, Pestka JJ. *Environ Health Perspect*. 2006 Jul;114(7):1099-107.

### Thomas Pinnavaia Lab

MFI zeolite with small and uniform intracrystal mesopores. Wang H, Pinnavaia TJ. *Angew Chem Int Ed Engl*. 2006 Nov 20;45(45):7603-7606.

### N. Edward Robinson Lab

Histological evaluation of the equine larynx after unilateral laser-assisted ventriculocordectomy. Robinson P, Williams KJ, Sullins KE, Arnoczky SP, Stick JA, Robinson NE, de Feijter-Rupp H, Derksen FJ. *Equine Vet J*. 2007 May;39(3):222-5.

Trimetoquinol: bronchodilator effects in horses with heaves following aerosolised and oral administration. Camargo FC, Robinson NE, Berney C, Eberhart S, Baker S, DeTolve P, Derksen FJ, Lehner AF, Hughes C, Tobin T. *Equine Vet J*. 2007 May;39(3):215-20.

Genes and respiratory disease: a first step on a long journey.

Ewart SL, Robinson NE. *Equine Vet J*. 2007 May;39(3):270-4.

Elevated amount of toll-like receptor 4 mRNA in bronchial epithelial cells is associated with airway inflammation in horses with recurrent airway obstruction. Berndt A, Derksen FJ, Venta PJ, Ewart S, Yuzbasiyan-Gurkan V, Robinson NE. *Am J Physiol Lung Cell Mol Physiol*. 2007 Apr;292(4):L936-43.

Endoscopic scoring of the tracheal septum in horses and its clinical relevance for the evaluation of lower airway health in horses. Koch C, Straub R, Ramseyer A, Widmer A, Robinson NE, Gerber V. *Equine Vet J*. 2007 Mar;39(2):107-12.

Heaves, genes, nerves, and Victorians. Robinson NE, Wilson MR. *J Vet Intern Med*. 2007 Jan-Feb;21(1):1-2

Intravenous and intratracheal administration of trimetoquinol, a fast-acting short-lived bronchodilator in horses with heaves. Camargo FC, Robinson NE, Berney C, Eberhart S, Baker S, DeTolve P, Derksen FJ, Harkins JD, Lehner AF, Tobin T. *Equine Vet J*. 2006 Nov;38(6):563-9.

Effects of unilateral laser-assisted ventriculocordectomy in horses with laryngeal hemiplegia. Robinson P, Derksen FJ, Stick JA, Sullins KE, DeTolve PG, Robinson NE. *Equine Vet J*. 2006 Nov;38(6):491-6.

Airway inflammation is associated with mucous cell metaplasia and increased intraepithelial stored mucosubstances in horses. Lugo J, Harkema JR, deFeijter-Rupp H, Bartner L, Boruta D, Robinson NE. *Vet J*. 2006 Sep;172(2):293-301.

Effect of tracheal mucus and tracheal cytology on racing performance in thoroughbred racehorses. Holcombe SJ, Robinson NE, Derksen FJ, Bertold B, Genovese R, Miller R, de Feiter Rupp H, Carr EA, Eberhart SW. *Equine Vet J*. 2006 Jul;38(4):300-4.

Airway inflammation in Michigan pleasure horses: prevalence and risk factors. Robinson NE, Karmaus W, Holcombe SJ, Carr EA, Derksen FJ. *Equine Vet J*. 2006 Jul;38(4):293-9.

Correlates between human lung injury after particle exposure and recurrent airway obstruction in the horse. Ghio AJ, Mazan HR, Hoffman AM, Robinson NE. *Equine Vet J*. 2006 Jul;38(4):362-7.

### Kenneth Rosenman Lab

The Upper Midwest Health Study: a case-control study of primary intracranial gliomas in farm and rural residents. Ruder AM, Waters MA, Carreon T, Butler MA, Davis-King KE, Calvert GM, Schulte PA, Ward EM, Connally LB, Lu J, Wall D, Zivkovich Z, Heineman EF, Mandel JS, Morton RF, Reding DJ, Rosenman KD; The Brain Cancer Collaborative Study Group. *J Agric Saf Health*. 2006 Nov;12(4):255-74.

Variations in worker compensation claims by company—the potential for achieving a significant reduction in claims. Rosenman KD, Kalush A, Reilly MJ. *Am J Ind Med*. 2007 Jun;50(6):415-20.

Ulcerative colitis reactivation after mercury vapor inhalation. Cummings CE, Rosenman KD. *Am J Ind Med*. 2006 Jun;49(6):499-502.

Investigating asthma deaths among children and young adults: Michigan Asthma Mortality Review. Rosenman KD, Hanna EA, Lyon-Callo SK, Wasilevich EA. *Public Health Rep*. 2007 May-Jun;122(3):373-81.

## PUBLICATIONS

### Robert Roth Lab

2,2',4,4'-Tetrachlorobiphenyl upregulates cyclooxygenase-2 in HL-60 cells via p38 mitogen-activated protein kinase and NF- $\kappa$ B. Bezdecny SA, Karmaus P, Roth RA, Ganey PE. *Toxicol Appl Pharmacol*. 2007 Jun 15;221(3):285-94.

Hypoxia, drug therapy and toxicity. Lee K, Roth RA, Lapres JJ. *Pharmacol Ther*. 2007 Feb;113(2):229-46.

Modest inflammation enhances diclofenac hepatotoxicity in rats: role of neutrophils and bacterial translocation. Deng X, Stachlewitz RF, Liguori MJ, Blomme EA, Waring JF, Luyendyk JP, Maddox JF, Ganey PE, Roth RA. *J Pharmacol Exp Ther*. 2006 Dec;319(3):1191-9.

Modeling inflammation-drug interactions in vitro: a rat Kupffer cell-hepatocyte coculture system. Tukov FF, Maddox JF, Amacher DE, Bobrowski WF, Roth RA, Ganey PE. *Toxicol In Vitro*. 2006 Dec;20(8):1488-99.

Anticoagulation and inhibition of nitric oxide synthase influence hepatic hypoxia after monocrotaline exposure. Coople BL, Roth RA, Ganey PE. *Toxicology*. 2006 Aug 15;225(2-3):128-37.

### Wilson Rumbelha Lab

Determination of amprolium, carbadox, monensin, and tylosin in surface water by liquid chromatography/tandem mass spectrometry. Song W, Huang M, Rumbelha W, Li H. *Rapid Commun Mass Spectrom*. 2007 May 17;21(12):1944-1950 [Epub ahead of print].

Arsenic and metaldehyde toxicosis in a beef herd. Valentine BA, Rumbelha WK, Hensley TS, Halse RR. *J Vet Diagn Invest*. 2007 Mar;19(2):212-5.

Acute anhydrous ammonia intoxication in cattle. Fitzgerald SD, Grooms DL, Scott MA, Clarke KR, Rumbelha WK. *J Vet Diagn Invest*. 2006 Sep;18(5):485-9.

### James Sikarskie Lab

Suggested guidelines for use of avian species as biomonitors. Hollamby S, Afema-Azikuru J, Waigo S, Cameron K, Rae Gandolf A, Norris A, Sikarskie JG. *Environ Monit Assess*. 2006 Jul;118(1-3):13-20.

### Greg Swain Lab

Total inorganic arsenic detection in real water samples using anodic stripping voltammetry and a gold-coated diamond thin-film electrode. Song Y, Swain GM. *Anal Chim Acta*. 2007 Jun 12;593(1):7-12.

Determination of endogenous norepinephrine levels in different chambers of the rat heart by capillary electrophoresis coupled with amperometric detection methods. Novotny M, Quaiserova-Mocko V, Wehrwein EA, Kreulen DL, Swain GM. *J Neurosci*. 2007 Jun 15;163(1):52-9.

Development of a method for total inorganic arsenic analysis using anodic stripping voltammetry and a Au-coated, diamond thin-film electrode. Song Y, Swain GM. *Anal Chem*. 2007 Mar 15;79(6):2412-20.

In vitro continuous amperometry with a diamond microelectrode coupled with video microscopy for simultaneously monitoring endogenous norepinephrine and its effect on the contractile response of a rat mesenteric artery. Park

J, Galligan JJ, Fink GD, Swain GM. *Anal Chem*. 2006 Oct 1;78(19):6756-64.

A comparison of boron-doped diamond thin-film and Hg-coated glassy carbon electrodes for anodic stripping voltammetric determination of heavy metal ions in aqueous media. McGaw EA, Swain GM. *Anal Chim Acta*. 2006 Aug 11;575(2):180-9.

### Brian Teppen Lab

Geochemical modulation of bioavailability and toxicity of nitroaromatic compounds to aquatic plants. Roberts MG, Rugh CL, Li H, Teppen BJ, Boyd SA. *Environ Sci Technol*. 2007 Mar 1;41(5):1641-5.

Ionic strength-induced formation of smectite quasicrystals enhances nitroaromatic compound sorption. Li H, Pereira TR, Teppen BJ, Laird DA, Johnston CT, Boyd SA. *Environ Sci Technol*. 2007 Feb 15;41(4):1251-6.

Reducing bioavailability and phytotoxicity of 2,4-dinitrotoluene by sorption on K-smectite clay. Roberts MG, Rugh CL, Li H, Teppen BJ, Boyd SA. *Environ Toxicol Chem*. 2007 Feb;26(2):358-60.

Quantifying the availability of clay surfaces in soils for adsorption of nitrobenzene and diuron. Charles SM, Li H, Teppen BJ, Boyd SA. *Environmental Science and Technology*. 2006 Dec 15;40(24):7751-6.

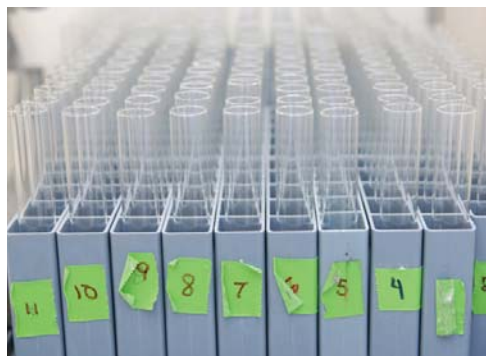
### James Tiedje Lab

Biphenyl-utilizing bacteria and their functional genes in a pine root zone contaminated with polychlorinated biphenyls (PCBs). Leigh MB, Pellizari VH, Uhlík O, Sutka R, Rodrigues J, Ostrom NE, Zhou J, Tiedje JM. *ISME J*. 2007 Jun;1(2):134-48.

Microbial populations in antarctic permafrost: biodiversity, state, age, and implication for astrobiology. Gilichinsky DA, Wilson GS, Friedmann EI, McKay CP, Sletten RS, Rivkina EM, Vishnivetskaya TA, Erokhina LG, Ivanushkina NE, Kochkina GA, Shcherbakova VA, Soina VS, Spirina EV, Vorobyova EA, Fyodorov-Davydov DG, Hallet B, Ozerskaya SM, Sorokovikov VA, Laurinavichyus KS, Shatilovich AV, Chanton JP, Ostroumov VE, Tiedje JM. *Astrobiology*. 2007 May;7(2):275-311.

Effect of low temperature and culture media on the growth and freeze-thawing tolerance of *Exiguobacterium* strains. Vishnivetskaya TA, Siletzky R, Jefferies N, Tiedje JM, Kathariou S. *Cryobiology*. 2007 Apr;54(2):234-40.

Identifying the genetic basis of ecologically and biotechnologically useful functions of the bacterium *Burkholderia vietnamiensis*. O'Sullivan LA, Weightman AJ, Jones TH, Marchbank





## PUBLICATIONS

- AM, Tiedje JM, Mahenthiralingam E. *Environ Microbiol.* 2007 Apr;9(4):1017-34.
- Proteomic analysis of psychrobacter cryohalolentis K5 during growth at subzero temperatures. Bakermans C, Tollaksen SL, Giometti CS, Wilkerson C, Tiedje JM, Thomashow MF. *Extremophiles.* 2007 Mar;11(2):343-54. Epub 2006 Nov 23.
- Multiscale responses of microbial life to spatial distance and environmental heterogeneity in a patchy ecosystem. Ramette A, Tiedje JM. *Proc Natl Acad Sci U S A.* 2007 Feb 12;
- Multi-locus real-time PCR for quantitation of bacteria in the environment reveals *Exiguobacterium* to be prevalent in permafrost. Rodrigues DF, Tiedje JM. *FEMS Microbiol Ecol.* 2007 Feb;59(2):489-99
- Biogeography: an emerging cornerstone for understanding prokaryotic diversity, ecology, and evolution. Ramette A, Tiedje JM. *Microb Ecol.* 2007 Feb;53(2):197-207. Review.
- Influence of dangling ends and surface-proximal tails of targets on probe-target duplex formation in 16S rRNA gene-based diagnostic arrays. Stedtfeld RD, Wick LM, Baushke SW, Tourlousse DM, Herzog AB, Xia Y, Rouillard JM, Klappenbach JA, Cole JR, Gulari E, Tiedje JM, Hashsham SA. *Appl Environ Microbiol.* 2007 Jan;73(2):380-9.
- DNA-DNA hybridization values and their relationship to whole-genome sequence similarities. Goris J, Konstantinidis KT, Klappenbach JA, Coenye T, Vandamme P, Tiedje JM. *Int J Syst Evol Microbiol.* 2007 Jan;57(Pt 1):81-91.
- Respiratory nitrate ammonification by *Shewanella oneidensis* MR-1. Respiratory nitrate ammonification by *Shewanella oneidensis* MR-1. Cruz-Garcia C, Murray AE, Klappenbach JA, Stewart V, Tiedje JM. *J Bacteriol.* 2007 Jan;189(2):656-62.
- The bacterial species definition in the genomic era. Konstantinidis KT, Ramette A, Tiedje JM. *Philos Trans R Soc Lond B Biol Sci.* 2006 Nov 29;361(1475):1929-40.
- The bacterial species definition in the genomic era. Konstantinidis KT, Ramette A, Tiedje JM. *Philos Trans R Soc Lond B Biol Sci.* 2006 Nov 29;361(1475):1929-40.
- Toward a more robust assessment of intraspecies diversity, using fewer genetic markers. Konstantinidis KT, Ramette A, Tiedje JM. *Appl Environ Microbiol.* 2006 Nov;72(11):7286-93.
- Burkholderia xenovorans* LB400 harbors a multi-replicon, 9.73-Mbp genome shaped for versatility. Chain PS, Deneff VJ, Konstantinidis KT, Vergez LM, Agullo L, Reyes VL, Hauser L, Cordova M, Gomez L, Gonzalez M, Land M, Lao V, Larimer F, Lipuma JJ, Mahenthiralingam E, Malfatti SA, Marx CJ, Parnell JJ, Ramette A, Richardson P, Seeger M, Smith D, Spilker T, Sul WJ, Tsoi TV, Ulrich LE, Zhulin IB, Tiedje JM. *Proc Natl Acad Sci USA.* 2006 Oct 17;103(42):15280-7.
- Molecular evidence for the broad distribution of anaerobic ammonium-oxidizing bacteria in freshwater and marine sediments. Penton CR, Devol AH, Tiedje JM. *Appl Environ Microbiol.* 2006 Oct;72(10):6829-32.
- Coping with polychlorinated biphenyl (PCB) toxicity: Physiological and genome-wide responses of *Burkholderia xenovorans* LB400 to PCB-mediated stress. Parnell JJ, Park J, Deneff V, Tsoi T, Hashsham S, Quensen J 3rd, Tiedje JM. *Appl Environ Microbiol.* 2006 Oct;72(10):6607-14.
- Characterization of *exiguobacterium* isolates from the Siberian permafrost: Description of *Exiguobacterium sibiricum* sp. nov. Rodrigues DF, Goris J, Vishnivetskaya T, Gilichinsky, D, Thomashow MF, Tiedje JM. *Extremophiles.* 2006 Aug;10(4):285-94.
- Shewanella ioihica* sp. nov., isolated from iron-rich microbial mats in the Pacific Ocean. Gao H, Obraztova A, Stewart N, Popa R, Fredrickson JK, Tiedje JM, Nealson KH, Zhou J. *Int J Syst Evol Microbiol.* 2006 Aug;56(Pt 8):1911-6.

### James Trosko Lab

- Protective role of connexin 32 in steady-state hematopoiesis, regeneration state, and leukemogenesis. Hirabayashi Y, Yoon BI, Tsuboi I, Huo Y, Kodama Y, Kanno J, Ott T, Trosko JE. *Inoue T. Exp Biol Med (Maywood).* 2007 May;232(5):700-12.
- Methylene blue dye test for rapid qualitative detection of hydroxyl radicals formed in a Fenton's reaction aqueous solution. Satoh AY, Trosko JE, Masten SJ. *Environ Sci Technol.* 2007 Apr 15;41(8):2881-7.
- Inhibition of gap junctional intercellular communication and activation of mitogen-activated protein kinase by tumor-promoting organic peroxides and protection by resveratrol. Upham BL, Guzvić M, Scott J, Carbone JM, Blaha L, Coe C, Li LL, Rummel AM, Trosko JE. *Nutr Cancer.* 2007;57(1):38-47.
- Induction by 7,12-dimethylbenz(a)anthracene of molecular and biochemical alterations in transformed human mammary epithelial stem cells, and protection by N-acetylcysteine. De Flora S, Scarfi S, Izzotti A, D'Agostini F, Chang CC, Bagnasco M, De Flora A, Trosko JE. *Int J Oncol.* 2006 Sep;29(3):521-9.
- Resveratrol reversed the effects of tumor-promoting organic peroxides on gap junctional intercellular communication and MAP-kinase. Upham, B.L., M. Guvi, J. Scott, J.M. Carbone, L. Blaha, L.L. Li, A.M. Rummel, and J.E Trosko (2007). *Nutr. Cancer* 57:38-47.
- Cigarette smoke components inhibited intercellular communication and differentiation in human pancreatic ductal epithelial cells. Tai, M-H, B.L. Upham, M.-S. Tsao, D.N. Reed, J.E. Trosko (2007). *Int. J. Cancer* 120:1855-1862.



*Dr. Chidozie Amuzie, doctoral trainee in Comparative Medicine and Integrative Biology, studies inflammation in the Pestka Lab.*



## PUBLICATIONS

### Bruce Uhal Lab

Amiodarone induces angiotensinogen gene expression in lung alveolar epithelial cells through activation protein-1. Uhal BD, Zhang H, Abdul-Hafez A, Shu R, Li X. *Basic Clin Pharmacol Toxicol*. 2007 Jan;100(1):59-66.

Attenuation of bleomycin-induced pulmonary fibrosis by intratracheal administration of antisense oligonucleotides against angiotensinogen mRNA. Li X, Zhuang J, Rayford H, Zhang H, Shu R, Uhal BD. *Curr Pharm Des*. 2007;13(12):1257-68.

Angiotensin-TGF-beta 1 cross talk in human idiopathic pulmonary fibrosis: autocrine mechanisms in myofibroblasts and macrophages. Uhal BD, Kim JK, Li X, Molina-Molina M. *Curr Pharm Des*. 2007;13(12):1247-56. Review.

Extravascular sources of lung angiotensin peptide synthesis in idiopathic pulmonary fibrosis. Li X, Molina-Molina M, Abdul-Hafez A, Ramirez J, Serrano-Mollar A, Xaubet A, Uhal BD. *Am J Physiol Lung Cell Mol Physiol*. 2006 Nov;291(5):L887-95.

### Brad Upham Lab

Resveratrol reversed the effects of tumor-promoting organic peroxides on gap junctional intercellular communication and MAP-kinase. Upham, B.L., M. Guvi, J. Scott, J.M. Carbone, L. Blaha, L.L. Li, A.M. Rummel, and J.E Trosko (2007). *Nutr. Cancer* 57:38-47.

Inhibition of gap junctional intercellular communication and activation of mitogen-activated protein kinase by tumor-promoting organic peroxides and protection by resveratrol. Upham BL, Guzvić M, Scott J, Carbone JM, Blaha L, Coe C, Li LL, Rummel AM, Trosko JE. *Nutr Cancer*. 2007;57(1):38-47.

Cigarette smoke components inhibited intercellular communication and differentiation in human pancreatic ductal epithelial cells. Tai, M-H, B.L. Upham, M.-S. Tsao, D.N. Reed, J.E. Trosko (2007). *Int. J. Cancer* 120:1855-1862.

### Thomas Voice Lab

Role of exposure analysis in solving the mystery of Balkan endemic nephropathy. Long DT, Voice, TC. *Croat Med J*. 2007 Jun;48(3):300-11.

Kinetics of contaminant desorption from soil: comparison of model formulations using the Akaike information criterion. Saffron CM, Park JH, Dale BE, Voice TC. *Environ Sci Technol*. 2006 Dec 15;40(24):7662-7

Evaluation of the hypothesis that Balkan endemic nephropathy is caused by drinking water exposure to contaminants leaching from Pliocene coal deposits. Voice TC, McElmurry SP, Long DT, Dimitrov P, Ganey VS, Peptropoulos EA. *J Expo Sci Environ Epidemiol*. 2006 Nov;16(6):515-24.

Critical evaluation of environmental exposure agents suspected in the etiology of Balkan endemic nephropathy. Voice TC, Long DT, Radovanovic Z, Atkins JL, McElmurry SP, Niagolova ND, Dimitrov P, Petropoulos EA, Ganey VS. *Int J Occup Environ Health*. 2006 Oct-Dec;12(4):369-76. Review.

### James Wagner Lab

Three-dimensional mapping of ozone-induced injury in the nasal airways of monkeys using magnetic resonance imaging and morphometric techniques. Carey SA, Minard KR, Trease



*Dr. Timothy Zacharewski delivered a keynote address at the 11th International Congress of Toxicology held in Montreal titled "Toxicogenomics: What Have we Learned About the Mechanisms of Toxicity?"*

LL, Wagner JG, Garcia GJM, Ballinger CA, Kimbell JS, Plopper CG, Corley RA, Postlethwait EM, and Harkema JR. *Toxicologic Pathology*, 35:27-40, 2007.

Characterization of urban atmospheres during inhalation exposure studies in Detroit and Grand Rapids, Michigan. Keeler GJ, Morishita M, Wagner JG, Harkema JR. *Toxicol Pathol*. 2007;35(1):15-22.

Rodent models of allergic rhinitis: Relevance to human pathophysiology. Wagner JG, Harkema JR. *Curr Allergy Asthma Rep*. 2007 May;7(2):134-40.

### Timothy Zacharewski Lab

dbZach toxicogenomic information management system. Burgoon LD, Zacharewski TR. *Pharmacogenomics*. 2007 Mar;8(3):287-91.

Analysis of the interaction of phytoestrogens and synthetic chemicals: An in vitro/in vivo comparison. Charles GD, Gennings C, Tornesi B, Kan HL, Zacharewski TR, Bhaskar Gollapudi B, Carney EW. *Toxicol Appl Pharmacol*. 2007 Feb 1;218(3):280-8.

Comparative toxicogenomic analysis of the hepatotoxic effects of TCDD in sprague dawley rats and C57BL/6 mice. Boverhof DR, Burgoon LD, Tashiro C, Sharratt B, Chittim B, Harkema JR, Mendrick DL, Zacharewski TR. *Toxicol Sci*. 2006 Dec;94(2):398-416.

Identification and characterization of genes susceptible to transcriptional cross talk between the hypoxia and dioxin signaling cascades. Lee K, Burgoon LD, Lamb L, Dere E, Zacharewski TR, Hogenesch JB, LaPres JJ. *Chem Res Toxicol*. 2006 Oct;19(10):1284-93. Erratum in: *Chem Res Toxicol*. 2006 Dec;19(12):1702.

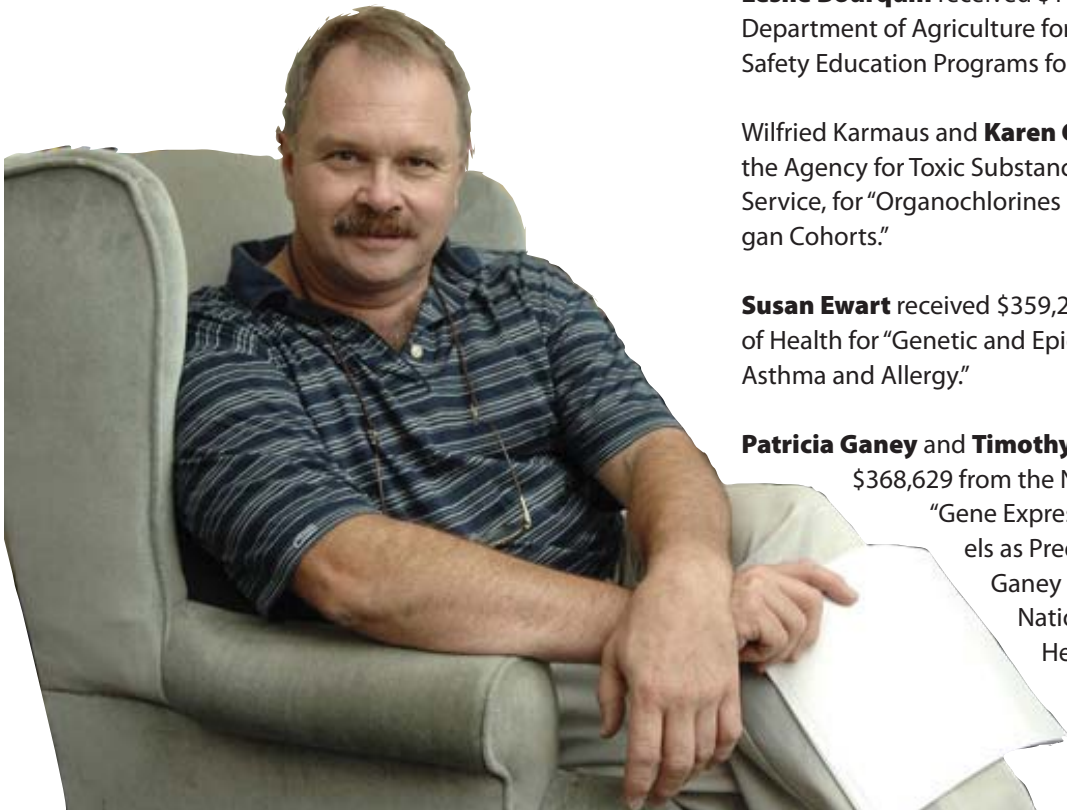
Effects of culture conditions on estrogen-mediated hepatic in vitro gene expression and correlation to in vivo responses. Fong CJ, Burgoon LD, Zacharewski TR. *Toxicol Appl Pharmacol*. 2006 Aug 15;215(1):37-50.

## FUNDING

**M**SU-CIT-affiliated faculty finished the fiscal year with over 23 million dollars in research contracts and grants accepted by the MSU Board of Trustees.

These awards came from the National Institutes of Health (NIH) and the Public Health Service (PHS), as well as other federal and state government agencies, corporations, and universities. The majority of the awards represent just one year in a multi-year funding cycle.

One of the largest single grant amounts accepted by the MSU board during this fiscal year was, once again, the continuation of the previous five-year Superfund Basic Research Program Grant (SBRG) from the National Institute of Environmental Health Sciences (NIEHS) to the CIT at \$3,006,609.



*Dr. William Atchison, professor of pharmacology and toxicology, received external funding for three toxicology related projects including one on the potential contribution of environmental metals to amyotrophic lateral sclerosis (ALS) disease.*

The following list of grants and contracts includes the principal investigator (PI), co-PIs, amount, agency, and title.

**William Atchison** received \$329,897 from the National Institutes of Health (NIH) for “Murine Models of Presynaptic Neuromuscular Disease” and \$226,500 from the NIH for “Potential Contribution of Environmental Metals to ALS.” Atchison and Gregory Fink received \$290,352 from the National Institute of Environmental Health Sciences for “Mechanisms of PB-Induced Hypertension: Role of Altered Calcium Homeostasis.”

**Alison Bauer** received \$107,440 from the National Institute of Environmental Health Sciences for “The Role of Toll-Like Receptor 4 in O3-Induced Lung Inflammation and Injury.”

**Stephen Boyd** received \$286,370 from from the National Institute of Environmental Health Sciences as part of the MSU-CIT Superfund Project.

**Steven Bursian** received \$169,178 from Industrial Economics, Inc. for “Hudson River Mink Feeding Study” and \$20,000 from the Fur Commission for “Research on Nutrition, Toxicology Behavior, and Management of Mink.” Bursian and Matthew Zwiernik received \$941,958 from the Dow Chemical Company for “Mink Furan Exposure Study.”

**Leslie Bourquin** received \$117,810 from the Michigan Department of Agriculture for “Coordinated Consumer Food Safety Education Programs for Michigianians.”

Wilfried Karmaus and **Karen Chou** received \$190,000 from the Agency for Toxic Substances and Disease, Public Health Service, for “Organochlorines and Sex Steroids in Two Michigan Cohorts.”

**Susan Ewart** received \$359,286 from the National Institutes of Health for “Genetic and Epidemiological Cohort Study of Asthma and Allergy.”

**Patricia Ganey** and **Timothy Zacharewski** received \$368,629 from the National Institutes of Health for “Gene Expression in Drug-Inflammation Models as Predictive of Idiosyncratic ADRS.” Ganey also received \$282,316 from the National Institute of Environmental Health Sciences as part of the MSU-CIT Superfund Project.

**John Giesy** received \$247,243 from Entix, Inc. for



*Dr. Colleen Hegg, pharmacology and toxicology, received over \$200,000 from the NIH for her research on olfactory receptor neurons.*



*Dr. Ken Rosenman, medicine, received nearly \$900,000 from the Center for Disease Control for his work in occupational health surveillance.*



*Dr. Greg Swain, chemistry, received over \$700,000 in research funding from the NIH, NASA, DOE, and NSF.*

“Standardization and Refinement of the H295r Cell Based Assay to Identify Chemical Modulators of Steroidogenesis.”

**Jay Goodman** received \$200,000 from the RJ Reynolds Tobacco Company for “Altered DNA Methylations in Carcinogenesis.”

**John Goudreau** received \$58,046 from Teva Neuroscience, Inc. for “A Multicenter, Double-Blind, Randomized Start, Placebo-Controlled, Parallel-group Study to Assess Rasagiline,” \$166,455 from the National Institutes of Health (NIH) for “Apocynin Neuroprotection in a Parkinsons Disease Model,” and \$70,970 from the NIH for “The MSU Parkinsons Disease Clinical Center.”

**Jack Harkema** received \$140,371 from the University of California for “The Role of Oxidative Stress in the Susceptibility to PM-Induced Adverse Health Effects” and \$3,703 from the University of Rochester for general research. Harkema and **James Wagner** received \$112,848 from the Electric Power Research Institute for “Cardiopulmonary Toxicity Induced by Particulate Matter: Inhalation Toxicology Studies Using a Mobile Particle Concentra.”

**Syed Hashsham** and **James Tiedje** received \$966,608 from the Michigan Economic Development Corporation for “A PCR-CHIP for Simultaneous Detection of 50 Threat Agents Relevant to Air and Water Safety.” Hashsham, Volodymyr Tarabara, and Tiedje received \$600,000 from the Environmental Protection Agency for “On-chip PCR Nanoparticles and Virulence/Marker Genes.”

**Colleen Hegg** received \$215,201 from the National Institutes of Health for “Injury-Evoked Regeneration Mechanism in Olfactory System.”

**Robert Hollingworth** and Satoru Miyazaki received \$138,167 from Rutgers University for “IR-4 Field Research,” \$10,000 from the United States Department of Agriculture for “Herbicides for

Minor Use in Food Crops,” and \$106,805 from Rutgers University for “IR-4 Minor Crop Pest Management.” Hollingworth, Miyazaki, Wayne Jiang, and Zhongxiao Chen also received \$1,550,000 from the United States Department of Agriculture for “NC Region IR-4 Leader Lab Program to Clear Pest Control Agents for Minor Uses.”

**Norbert Kaminski** received \$310,943 from the National Institutes of Health (NIH) for “Impairment of B Cell Differentiation by TCDD.” Kaminski also received \$309,812 from the NIH for “IL-2 Suppression by Encocannabinoid Activation of Peroxisome Proliferator Activated Receptor Gamma” and \$248,068 from the National Institutes of Health for “CB1/CB2 Dependent and Independent T Cell Modulation.” Kaminski also received \$3,006,609 from the National Institute of Environmental Health Sciences for the MSU-CIT Superfund Program “Environmental, Microbial, and Mammalian Biomolecular Responses to AHR Ligands.”

**John Kaneene** received \$329,022 from the USDA for “Bovine Tuberculosis: Epidemiology, Diagnosis, and Pathogenesis,” \$14,000 from Michigan Department of Agriculture for “Evaluating the Knowledge Base of Cattle Producer in Michigan,” \$24,000 from the United States Department of Agriculture for “Michigan Johnes Disease Control Program,” and \$63,334 from the Michigan Department of Community Health for “Michigan-Stride System to Report Integrated Disease Events: 2007.”

**John LaPres** received \$272,838 from the National Institutes of Health for “Hypoxia and an Epigenetic Mechanism for Toxicity.” LaPres also received \$220,462 from the National Institute of Environmental Health Sciences as part of the MSU-CIT Superfund Project.

**David Long** and John Giesy received \$473,594 from the Michigan Department of Environmental Quality for “A Strategic Environmental Quality Monitoring Program for Michigan Surface Waters: The Inland Lakes Sediment.”



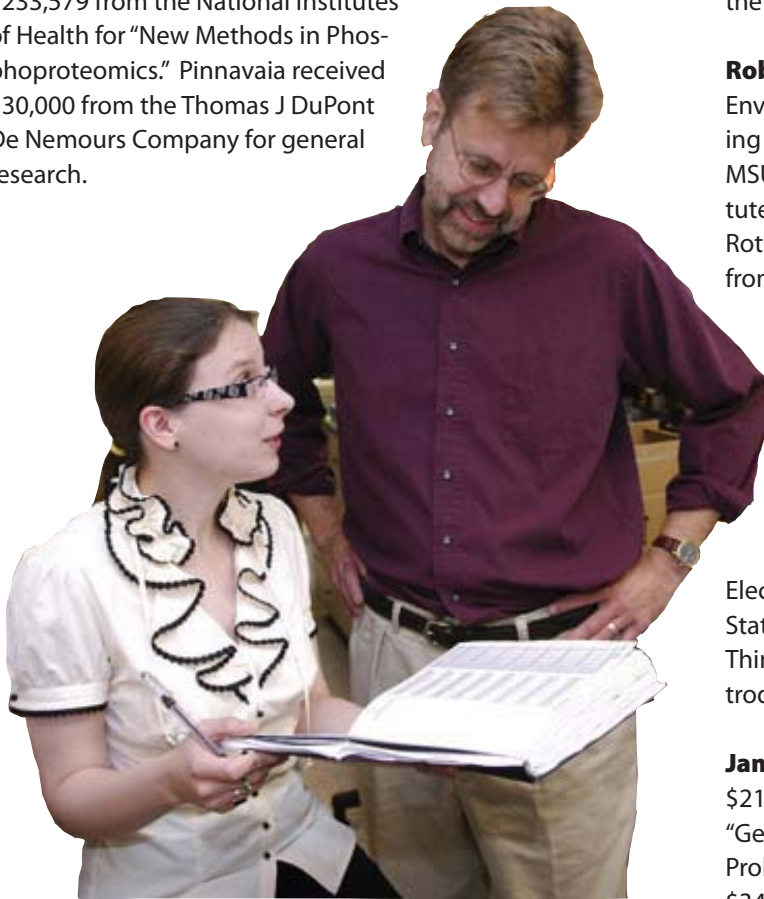
**Thomas Mullaney** received \$50,000 from the U.S. Department of Agriculture for "NAHLIN: Michigan."

**L. Karl Olson** received \$99,993 from the American Diabetes Association for "Lipid Metabolism and B Cell Dysfunction" and \$5,000 from Complegen, Inc. for "Effect of CDK5 Inhibitor on Glucose-Induced Insulin Release."

**Nigel Paneth** received \$47,081 from the Children's Hospital of Boston for "Molecular Antecedents of Brain Damage in Preterm Infants." Paneth and Herbert Davies received \$351,912 from the National Institutes of Health for "Training Program in Perinatal Epidemiology." Paneth and Mohammad Rahbar received \$133,620 from the New York Medical College for "Phase 1 Study of Thyroid Hormone in Prematures."

**James Pestka** received \$389,950 from the National Institutes of Health (NIH) for "Mechanisms of Trichothecene Toxicity" and \$246,129 from the NIH for "Dietary Lipids and Experimental IGA Nephropathy."

**Thomas Pinnavaia**, Jetze PM Tepe, and **John LaPres** received \$233,579 from the National Institutes of Health for "New Methods in Phosphoproteomics." Pinnavaia received \$30,000 from the Thomas J DuPont De Nemours Company for general research.



*Dr. James Pestka, professor of food science and human nutrition, received funding from the National Institutes of Health for two projects including ongoing research on the toxicological mechanisms of trichothecene mycotoxin (T-2), a naturally occurring toxin produced by fungi.*

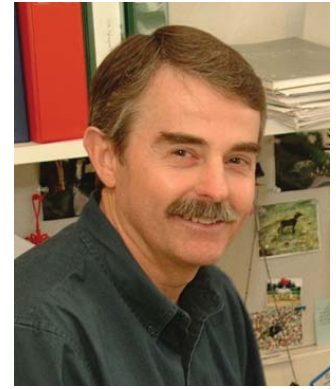
**N. Edward Robinson** received \$18,055 from Stirling Products, Ltd., for "Dose Range Finding Study of R-Albuterol (R-Salbutamol) in Horses with Heaves (RAO)."

**Ken Rosenman** received \$866,831 from the Center for Disease Control (CDC) for "Enhanced Program in Occupational Injury and Illness Surveillance." Rosenman also received \$78,400 from the Michigan Department of Community Health (MDCH) for "State-Wide Asthma Mortality Review," \$10,000 from the MDCH for "The Work-Related Asthma Education Project"; \$25,000 from the MDCH for "Sudden Cardiac Death Review," and \$66,228 from the Michigan Consumer Industries Service-Medicine for "Fatality Assessment and Control Evaluation." Rosenman also received \$22,120 from the CDC for "Ables."

**Robert Roth** received \$234,084 from the National Institute of Environmental Health Sciences for the Multidisciplinary Training Program in Environmental Toxicology, administered by the MSU-CIT. Roth also received \$226,280 from the National Institutes of Health (NIH) for "Inflammation and Drug Idiosyncrasy." Roth, **Patricia Ganey**, and **John LaPres** received \$278,580 from the NIH for "Neutrophils and Hepatotoxicity."

**Greg Swain** received \$190,000 from the National Aeronautics and Space Administration for "Advanced Diamond Electrodes for Electrochemical-Based Monitoring of Spacecraft Water," \$139,746 from the National Institutes of Health for "Sympathetic Neural Control Mechanisms in Hypertension," \$306,000 from the National Science Foundation for "Optically Transparent Diamond Electrodes for Chemical Analysis," and \$85,000 from the United States Department of Energy for "Metal/Diamond Composite Thin-Film Electrodes: New Carbon Supported Catalytic Electrodes."

**James Tiedje** and Konstantinos Konstantinidis received \$217,482 from the National Science Foundation (NSF) for "Genomic Approaches to Advance the Species Definition of Prokaryotes." Tiedje, James Cole, and George Garrity received \$345,751 from the United States Department of Energy (USDE) and \$150,000 from the NSF for "The Ribosomal Database Project; Automation; Integration and Education". Tiedje also received \$350,000 from the USDE for "Integrated Genome-Based Studies of Shewanella Ecophysiology" and \$33,000 from



*Robert Roth, pharmacology and toxicology, received over \$200,000 from the NIH to continue research on the idiosyncratic effects of drugs on inflammation.*



the Michigan University Community Initiative Challenge Fund for “Commercialization of a Microfluidic DNA Biochip to Detect 20 Pathogens Together.” Tiedje also receive \$350,127 from the National Institute of Environmental Health Sciences as part of the MSU-CIT Superfund Project.

**James Trosko** received \$210,410 from the National Institute of Environmental Health Sciences as part of the MSU-CIT Superfund Project.

**Bruce Uhal** received \$237,677 from the United States Public Health Service for “Control of Type II Pneumocyte Proliferation” and \$26,000 from the American Heart Association for “Regulation of Angiotensinogen Gene Expression by Transforming Growth Factor-Beta 1 in Lung Fibroblasts.”

**Brad Upham** received \$358,625 from the National Institutes of Health for “Epigenetic Toxicity of Polycyclicaromatic Hydrocarbons.”

**Thomas Voice**, Volodymyr Tarabara, and Merlin Bruening received \$462,140 from the National Science Foundation for “Ukraine-France-Russia Partnership New Generation Synthetic Membranes: Nanotechnology for Drinking Water Safety.” Voice and David Long received \$144,500 from the David T. Fogarty International Center-National Institutes of Health for “Training and Research in Environmental Health in the Balkans.”

**James Wagner** and **Jack Harkema** received \$282,013 from the University of North Carolina for “Preclinical Evaluation of CAM Therapies for Asthma (Project 2).”

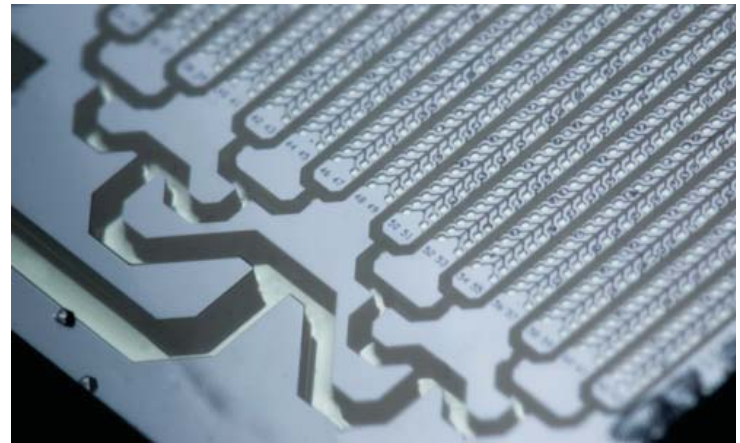
**Timothy Zacharewski**, Chia-Cheng Chang, Cristina Chan and **Jack Harkema** received \$368,629 from the National Institutes of Health for “Human Stem Cells for Toxicity Screening.” Zacharewski and Harkema also received \$565,784 from the National Institutes of Health for “Metabolic Assessment of Estrogenic Endocrine Disruptors.” Zacharewski received \$289,389 from the National Institute of Environmental Health Sciences as part of the MSU-CIT Superfund Project.



## 21st Century Jobs Fund Awarded to Hashsham

Dr. Syed Hashsham, professor of Civil and Environmental Engineering and CIT-affiliated faculty, received a Michigan’s 21st Century Jobs Fund Award to help develop a hand-held device that can detect as many as 50 microbial threat agents in air, water, or food.

His project, titled “A PCR-Chip for Air and Water Safety” was one of 11 MSU projects to receive these awards. The device Dr. Hashsham has envisioned will conduct highly parallel and sensitive analysis of genetic signatures.



*Close-up of a computer chip from Professor of Civil and Environmental Engineering Syed Hashsham’s lab.*

The project was awarded \$966,608 and is funded for three years. James Tiedje, University Distinguished Professor and CIT affiliate, and Erdogan Gulari, professor of chemical engineering at the University of Michigan, are co-principle investigators on the project. Six graduate students and technicians are assisting.

The funding program, focused at the state level on diversifying and advancing the Michigan economy, will help Dr. Hashsham’s team to develop and commercialize the device.

## AFFILIATES

### Faculty Affiliated with the Center:

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

**Alison K. Bauer**, Assistant Professor, Pathobiology and Diagnostic Investigation

**Leslie D. Bourquin**, Associate Professor, Food Science and Human Nutrition

**Stephen A. Boyd**, University Distinguished Professor, Crop and Soil Sciences

**Daniel A. Bronstein**, Professor, Community, Agriculture, Recreation and Resource Studies; Professor, Psychiatry

**Steven J. Bursian**, Professor, Animal Science

**Karen Chou**, Associate Professor, Animal Science

**Susan L. Ewart**, Associate Professor, Large Animal Clinical Sciences; Associate Dean, College of Veterinary Medicine

**Patricia E. Ganey**, Professor, Pharmacology and Toxicology

**John Giesy**, Distinguished Professor, Zoology (Emeritus, Jan. 2007)

**Jay I. Goodman**, Professor, Pharmacology and Toxicology

**John L. Goudreau**, Associate Professor, Pharmacology and Toxicology

**Jack R. Harkema**, University Distinguished Professor, Pathobiology and Diagnostic Investigation

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**Collen C. Hegg**, Assistant Professor, Pharmacology and Toxicology

**Robert M. Hollingworth**, Professor, Entomology

**Norbert E. Kaminski**, Director, Center for Integrative Toxicology; Professor, Pharmacology and Toxicology

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**Barbara Lee Faubert Kaplan**, Assistant Professor, Center for Integrative Toxicology

**John J. LaPres**, Associate Professor, Biochemistry and Molecular Biology

**John E. Linz**, Professor, Food Science and Human Nutrition; Professor, Microbiology and Molecular Genetics

**David T. Long**, Professor, Geological Sciences

**Jane F. Maddox**, Assistant Professor, Pharmacology and Toxicology

**Burra V. Madhukar**, Associate Professor, Pediatrics and Human Development

**Veronica M. Maher**, University Distinguished Professor, Microbiology and Molecular Genetics; University Distinguished Professor, Biochemistry and Molecular Biology

**J. Justin McCormick**, University Distinguished Professor, Microbiology and Molecular Genetics; University Distinguished Professor, Biochemistry and Molecular Biology

**Victoria L. McGuffin**, Professor, Chemistry

**Thomas P. Mullaney**, Professor, Pathobiology and Diagnostic Investigation

**Lawrence Karl Olson**, Associate Professor, Physiology

**Nigel Paneth**, Professor, Epidemiology and Pediatrics; Associate Dean of Research, College of Human Medicine

**James J. Pestka**, Professor, Food Science and Human Nutrition

**Thomas J. Pinnavaia**, University Distinguished Professor, Chemistry

**N. Edward Robinson**, Professor, Physiology; Matilda R. Wilson Professor, Large Animal Clinical Sciences

**Kenneth D. Rosenman**, Professor, Medicine; Chief of the Division, Occupational and Environmental Medicine

**Robert A. Roth**, Professor, Pharmacology and Toxicology; Graduate Program Director, Environmental and Integrative Toxicological Sciences, Center for Integrative Toxicology; Associate Director, National Food Safety and Toxicology Center

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**Brian J. Teppen**, Associate Professor, Crop and Soil Sciences

## AFFILIATES

**James M. Tiedje**, University Distinguished Professor, Crop and Soil Sciences; University Distinguished Professor, Microbiology and Molecular Genetics; Director, Center for Microbial Ecology

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**Bruce D. Uhal**, Professor, Physiology

**Brad L. Upham**, Assistant Professor, Pediatrics and Human Development

**Thomas C. Voice**, Professor, Civil and Environmental Engineering; Associate Director, Midwest Hazardous Substance Research Center

**James G. Wagner**, Assistant Professor, Pathobiology and Diagnostic Investigation

**Timothy R. Zacharewski**, Professor, Biochemistry and Molecular Biology

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**Jeffrey D. Armstrong**, College of Agriculture and Natural Resources

**Satish S. Upda**, College of Engineering

**Marsha D. Rappley**, College of Human Medicine

**William D. Strampel**, College of Osteopathic Medicine

**R. James Kirkpatrick**, College of Natural Science

**Marietta L. Baba**, College of Social Science

and **Steven G. Pueppke**, Director, Michigan Agricultural Experiment Station

## Academic Departments/Disciplinary Ph.D. programs:

*(participating in the CIT's Environmental and Integrative Toxicological Sciences graduate programs)*

Animal Science

Biochemistry and Molecular Biology

Cell and Molecular Biology

Chemistry

Civil and Environmental Engineering

Comparative Medicine and Integrative Biology

Crop and Soil Science

Fisheries and Wildlife

Food Science and Human Nutrition

Forestry

Geological Sciences

Microbiology and Molecular Genetics

Pathobiology and Diagnostic Investigation

Pharmacology and Toxicology

Zoology

## CIT Staff:

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**Robert A. Roth, Ph.D., Graduate Program Director**

**Carol Chvojka, Financial Manager**

**Amy Swagart, Administrative Assistant**

**Lois Furry, M.A., Editor**