

CIT Update

Michigan State University

Winter 2007

In this issue

Message from the Director	2
Trainee Research Eve	3
Superfund Update.....	4-5
Contracts and Grants Received.....	6
Notables	7
SOT MSU Friends Reception.....	7
Distinguished Scholars Series	8
Faculty Position Open.....	8

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Bauer appointed to CIT faculty

This Fall Dr. Alison K. Bauer, Ph.D., joined the MSU faculty with 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 TLR4 and the protective nature of TLR4 and the innate immune system in lung carcinogenesis.

Dr. Bauer earned her B.S. degree in biochemistry from Pennsylvania State University in 1994 and a Ph.D. in pharmacology from the University of Colorado Health Sciences Center in Denver in 2000. She was then a Postdoctoral Fellow in the Department of Biochemistry and Molecular Genetics, Chemical Industry Institute of Toxicology, Centers for Health Research, in Re-



Alison K. Bauer holds a joint appointment with the CIT and the Department of Pathobiology and Diagnostic Investigation.

search Triangle Park, North Carolina.

Most recently, she was a National Institutes of Health (NIH) Intramural Training Fellow at the Laboratory of Respiratory Biology, National Institute of Environmental Health Sciences, NIH, Research Triangle Park, North Carolina.

CIT launches new web site

The CIT web site recently underwent a complete redesign and is now active at <http://www.cit.msu.edu/>. The site aims to better inform prospective and current students about the opportunities in toxicology available at Michigan State University and also to continue to provide high visibility for toxicology in general at MSU.

One of the new site's features is a complete list of CIT-affiliated faculty that includes a synopsis of research interests, background information, and contact information for each faculty member as well as links to sites with more informa-

tion concerning the faculty member's laboratory.

A news and events section guides viewers to upcoming seminars being sponsored by the CIT as well as links to the weekly newsletter Toxicology Track, other CIT publications, and special announcements.

A superfund section, presents an overview of each of the seven projects and five cores currently active in the MSU-CIT Superfund Basic Research Program, funded through the National Institute of Environmental Health Sciences.

See *Website*, page 2



Message from the Director

The past year marked the initiation of a period of growth as well as realignment for the CIT and its graduate program in Environmental and Integrative Toxicological Sciences.

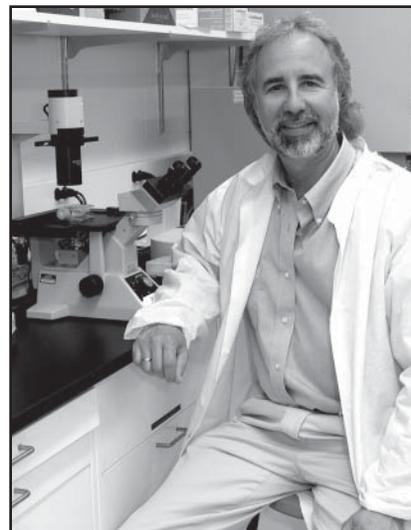
Most notable is the recruitment of Dr. Alison Bauer, assistant professor in the Department of Pathobiology and Diagnostic Investigation, from the National Institute of Environmental Health Sciences. Dr. Bauer's is the first of two faculty positions that will be filled by the CIT. A search is presently underway to recruit a second faculty member at the assistant or associate professor level in either the area of chemical carcinogenesis or developmental toxicology. Both positions are 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.

Other important efforts in the

area of environmental health sciences included a \$16 million award for an additional five years of funding from the National Institute of Environmental Health Sciences to conduct toxicology research within the Superfund Basic Research Program. The MSU Superfund Program is now in its fifth competitive renewal and eighteenth year of continuous funding.

The continuation of this program is a clear recognition of MSU's strength and leadership in the area of environmental toxicology and remediation engineering. A total of 27 investigators are involved in this NIH funded program project grant. In addition to MSU faculty, co-investigators from Rutgers, CIIT Centers for Health Research, Purdue and the US Environmental Protection Agency were recruited.

Our program focuses on environmental, microbial and mammalian biomolecular responses induced by dioxin and dioxin-like compounds. In



addition to funding basic and applied research, this award helps support numerous predoctoral and postdoctoral trainees who are participating in the seven projects and five support cores.

The graduate program in Environmental and Integrative Toxicological Sciences (EITS) is also undergoing changes and expansion. The CIT completed a comprehensive internal review of the graduate curriculum in 2006. As a result we are adopting a number of important recommendations 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.

Furthermore, 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 sixteen graduate programs from which the EITS program draws predoctoral trainees who wish to obtain a dual major in Environmental Toxicology.

Lastly, a major effort was undertaken to enhance the CIT web site. Our web site is not only our window to the world but also our primary mechanism for recruiting the highest caliber graduate and postdoctoral trainees. I welcome you to visit our new web site at www.cit.msu.edu.

The CIT will host a trainee and alumni reception at the Society of Toxicology Annual Meeting in Charlotte (see page 7 for more details). I hope you can join us.



CIT Home	Integrative Toxicology at MSU	
Graduate Program		
Postdoctoral Training		
NIHHS Training Grant	Notable	
News and Events	This spring the Center for Integrative Toxicology, in cooperation with the Department of Pharmacology and Toxicology, will begin the first annual Distinguished Scholars in Toxicology series on January 31, 2007 with speaker José Manautou, Ph.D., Department of Pharmaceutical Sciences, University of Connecticut presenting "Changes in Expression of Hepatobiliary Transport Proteins as a Compensatory Response to Drug-Induced Hepatotoxicity." More .	
Faculty	The MSU-CIT is seeking applicants for a tenure-track, academic year faculty position at the assistant or Associate Professor level in chemical carcinogenesis or developmental toxicology. More .	
Superfund		
Contact		
MSU Home		
Contact Info	Michigan State University's Center for Integrative Toxicology builds upon recognized research strength on the health and environmental effects of pollutants. With over 50 affiliated faculty who are distinguished in a wide range of scientific disciplines, the center offers an innovative and highly integrative environment for research, teaching and learning in toxicology. More .	
Center for Integrative Toxicology 165C Food Safety and Toxicology Building Michigan State University East Lansing, MI 48824 Phone 517/353-6469 Fax 517/355-4609 E-mail: cit@msu.edu		



CIT New Web site <http://www.cit.msu.edu>

The CIT welcomes your feedback on the new site. Send your comments and suggestions to Lois Furry, CIT editor and webmaster, furry@msu.edu.

CIT Hosts Annual Research Eve

The CIT hosted a research evening for faculty and students in the Center's graduate training program in Environmental and Integrative Toxicological Sciences (EITS) On November 30, 2006. Over 40 faculty, current trainees, and prospective trainees attended.

In addition to a poster session, three trainees presented their research in a platform session.

Cora Fong, a Biochemistry and EITS student, working with Professor Tim Zacharewski, presented "Tamoxifen Elicited Uterine Effects: A Toxicogenomic Approach." Fong began her graduate studies in 2002 and is currently investigating the interacting of ethynylestradiol and tamoxifen on gene expression in mouse uteri. Fong noted that studies of estrogenic chemicals typically involve the examination of the uterotrophic effect in immature, ovariectomized rodents. However, very little is known of the mechanism of action of these chemicals, particularly in non-classical estrogen target organs such as the liver. Her project uses microarray technology to characterize estrogen- and estrogenic chemical-induced temporal gene expression profiles of hepatic cultures from mouse, human and rat. By comparing in vitro to in vivo profiles, she hopes that a more comprehensive understanding of the effects of estrogen may be elucidated. Also in her investigations, the in vitro model system may potentially be employed as a diagnostic tool for examining estrogenic properties of novel chemicals.

Steve Carey, DVM, a Comparative Medicine & Integrative Biology and EITS trainee, presented "Mechanisms of Ozone-Induced Nasal Airway Injury in Infant Rhesus Monkeys." Carey is working in the laboratory of Professor Jack Harkema investigating the cellular and molecular mechanisms involved in the pathogenesis of airway injury caused by the inhalation of airborne



Cory Fong, Steve Carey and Jennifer Phillips, presented their research in platform sessions. All three are trainees in the CIT's Environmental and Integrative Toxicological Sciences program.

pollutants. Of particular importance in this pursuit is the characterization of the mechanisms of airway epithelial injury, adaptation, and repair after exposure to air pollutants. His current research is aimed at understanding the effects of ambient ozone, the principal oxidant pollutant in photochemical smog, on postnatal development in the infant and juvenile lung and nasal cavity. He is also utilizing image analysis, morphometric techniques, and computational biological methods to compare the relative susceptibility of different animal models and age groups to ozone-induced nasal injury. By investigating the differences in airway geometry, nasal histopathology, and molecular status of the nasal epithelium (pro-inflammatory cytokines, antioxidant capacity, mucus secretagogues), Carey hopes to further characterize the nasal and pulmonary response to ozone exposure during postnatal development, and provide insight to species differences that may affect data extrapolation for human risk assessment.

Jennifer Phillips, a Biochemistry and EITS graduate student, working with Professor Jay Goodman, presented "Identification of Genes Involved in Tumorigenesis that are Disregulated by Altered Methylation." Phillips, a second year biochemistry and molecular biology graduate student, was awarded second place in the Carcinogenesis specialty section at the 2006 Society of Toxicology Meeting in San Diego in March. She is investigating changes in DNA methylation (i.e. 5-methylcytosine) that occur in response to the nongenotoxic liver tumor promoter phenobarbital. Specifically, the work upon which her session was based identified several genes that exhibited phenobarbital-induced methylation changes that were unique to liver-tumor susceptible B6C3F1 mice as compared to the relatively resistant C57BL/6 mice. Her hypothesis is that these methylation changes are playing key roles in the tumorigenesis process in the sensitive mice. The next stage of her thesis work will involve expression analysis of these genes.

New 5-year Competitive Renewal Underway

MSU Superfund Basic Research Program

In the Spring of 2006, the MSU-CIT received a competitive grant renewal of \$16 million from the federal government's Superfund Basic Research Program. This grant renewal brings to more than \$52 million the center has received in Superfund grants since it was established nearly 20 years ago.



The research team of 27 investigators includes faculty at Michigan State University (20), CIIT Centers for Health Research (3), Rutgers, The State University of New Jersey (2), Purdue University (1), and the U.S. Environmental Protection Agency (1). Many are pictured here at the first meeting for the group held on the MSU campus.

Toxicological Assessment of Remediated Environmental Chemicals

One of the MSU research teams is a featured Research Brief, a monthly email series highlighting individual research projects supported by the NIEHS/EPA Superfund Basic Research Program on their website.

The following was excerpted from their report:

In the years since the Superfund Program was established, we have made great progress toward meeting goals to prevent or minimize the release of hazardous substances and to reduce the risk and danger to public health or the environment. Much work remains to be done and Dr. James Trosko of the Michigan State University SPRP has brought together a multi-disciplinary team of engineers and toxicologists to develop a method-

ological strategy to assess the efficacy of remediation strategies. This multi-disciplinary project has produced many important conceptual, technical, and experimental findings that have direct implications for assessment of the health risks of environmental contaminants that act via epigenetic mechanisms.

Dr. Trosko believes remediation engineers and managers should monitor not only the levels of destruction/removal of target contaminants, but also assess the toxicity of the remediated products.

The team is testing the hypothesis that many environmental toxicants inhibit gap junctional intercellular communication (GJIC), which has been demonstrated to be associated with the homeostatic regulation of the cell functions of proliferation, differentiation, apoptosis and adaptive functions of differentiated cells. Gap junctions are intercellular membrane channels that permit the diffusion of ions, small molecules and messengers between adjacent cells. Inhibition of GJIC alters regulation of cell behavior and can lead to cancers, immunological disorders, reproductive, and neurological dysfunctions. Dr. Trosko's team is evaluating interruption of GJIC

between normal mammalian cells as a biomarker for detecting chemicals which can cause a variety of toxic effects in living systems.

Dr. Trosko's team, consisting of Dr. Susan Masten (an MSU Environmental Engineer), Dr. Brad Upham (a MSU toxicologist) and Dr. Walter Weber, Jr. (an Environmental Engineer at the University of Michigan), developed and validated a simple, inexpensive and reproducible in vitro assay to detect chemicals that inhibit GJIC.

In the course of their work, the researchers have made discoveries that are relevant to risk assessment. Broadly, they found specific chemical structural motifs in environmental contaminants that inhibit GJIC. These results are directly applicable to the development of more accurate risk assessment of compounds of unknown toxicity but known chemical structures.

For more information on this project, go to http://www-apps.niehs.nih.gov/sbrp/researchbriefs/view.cfm?Brief_ID=143.

For more information on the MSU Superfund program, go to <http://www.cit.msu.edu/Superfund/superfund.html>.

MSU-CIT at NIEHS Superfund Annual Meeting

The MSU-CIT recently participated in the NIEHS Superfund 2006 Annual Meeting, held in December in San Diego, California entitled "New Technologies to Assess Environmental Exposure: Science and Policy."

Two MSU program participants were selected to give oral presentations and received travel awards.

Dina Shnaider, a predoctoral trainee working with Norb Kaminski, presented "Blimp-1 and Pax5 are Involved in the Suppression of B-Cell Differentiation by TCDD."

Her abstract follows:

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), a persistent environmental pollutant, is also a strong immunosuppressant known to alter the B cell differentiation. CH12.LX cells, a mouse B cell lymphoma, respond to bacterial lipopolysaccharide (LPS) by secreting immunoglobulin M (IgM), an effect suppressed by TCDD. The present study objective was to characterize the effects of TCDD on signaling events that control B cell differentiation.

LPS activation of CH12.LX reduced the expression of MHC class II (MHC II) and CD19, while TCDD produced an attenuation of MHC II downregulation. Surprisingly, CD19 was further downregulated by TCDD in LPS-activated cells. Pax5, a major repressor of spontaneous B cell differentiation was abnormally elevated at the mRNA and protein level in LPS-activated cells treated with TCDD. Blimp-1, an upstream transcriptional repressor of Pax5 acts by binding within the Pax5 promoter to repress Pax5 transcription. Blimp-1 mRNA was strongly induced by LPS treatment, and suppressed by TCDD. Blimp-1 DNA-binding activity within the Pax5 promoter was also suppressed by TCDD.

In summary, LPS drives CH12.LX cells to differentiate, in concordance with the increase in IgM secretion, as evidenced by the downregulation of MHC II, while TCDD attenuates this effect. Abnormal elevation of Pax5 protein and mRNA levels and the suppression of Blimp-1 mRNA levels and DNA-binding activity in the presence of TCDD further implicate the disruption of LPS-induced B cell differentiation as a critical component of the molecular mechanism responsible for TCDD-mediated suppression of the IgM response. (NIH grants R01 ES02520 and P42 ES04911).

Dr. Chris Learn, a postdoctoral fellow, working at the CIIT with Dr. Russell S. Thomas, presented "Modulation of the B-Cell Immunologic Program by Superfund Halogenated Aromatic Hydrocarbons."

His abstract follows:

Aryl-hydrocarbon receptor (Ahr) agonists are present at a significant number of Superfund Sites and are among the top contaminants with completed exposure pathways to humans. Previous studies have shown that altered immune function is one of the most sensitive endpoints for exposure to Ahr agonists. The immunological effects include the disruption of B-cell differentiation, proliferation and effector function through coordinate dysregulation of gene expression. Utilizing the prototypical AHR agonists 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD), we show that proliferation of a murine B cell line, CH12.LX, is significantly decreased following exposure. This effect was confirmed in primary CD19+ splenocytes.

To further investigate the impact of the Ahr on the gene expression cascade involved in B-cell differentiation, we have developed small inhibitory RNAs (siRNAs) that were able to knockdown Ahr mRNA and the corresponding induction of Cyp1a1 mRNA following TCDD exposure. Future experiments will involve time-course microarray analysis with and without knockdown of Ahr to identify critical genes in B-cell differentiation that are altered following TCDD exposure.

An additional seven students or staff scientists presented posters at the meeting:

• Anna K. Kopec, DR Boverhof, LD



Dina Shnaider was one of two MSU-CIT trainees selected for travel awards to give oral presentations at the NIEHS Superfund Annual Meeting.

Burgoon, C Tashiro, B Chittim and TR Zacharewski: **Comparative Toxicogenomic Examination of the Hepatotoxic Effects of 3,3',4,4',5-Pentachlorobiphenyl (PCB126) and 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (TCDD) in C57BL/6 Mice**

• Edward Dere, A Harney, S Proper, LD Burgoon and TR Zacharewski: **Comparative Analysis of Global Gene Expression Responses Elicited by TCDD in Human HEPG2, Mouse HEPA1C1C7 and Rat H4IIE Cell Lines**

• Jared Ganis, SMN Chadhain and G Zylstra: **Alkane Hydroxylase Diversity in Enrichment Cultures from the Arthur Kill, NJ During Alkane Degradation**

• Cun Liu, SA Boyd, H Li and BJ Teppen: **Smectite Clay as a Natural Reservoir for Dioxins**

• Sinead M. Ni Chadhain, B Wawrik, JJ Kukor, and G Zylstra: **Metagenomic Libraries as Sources of Novel Hydrocarbon Degradation Genes and Pathways**

• Qiang Zhang, RS Thomas, NE Kaminski, RB Conolly and ME Anderson: **Computational Modeling of TCDD Disruption of B-cell Terminal Differentiation**

• Erick Cardenas, JR Cole, S Kulam-Syed-Mohideen, B Upham, S Hashsham: **Technology Transfer Personal Interaction and the Internet**

Grants/contracts received by CIT faculty affiliates

Over 7 Million Accepted by MSU Board

Faculty affiliated with the CIT had the following contracts and grants totaling \$7,098,052 accepted by the MSU Board of Trustees at their July, September and November 2006 meetings.

William Atchison received \$147,452 from the National Institute of Environmental Health Sciences for "Potential Contribution of Environmental Metals to ALS"; and \$226,500 from the National Institutes of Health for "Mechanisms of PB-Induced Hypertension: Role of Altered Calcium Homeostasis."

Steve Bursian received \$169,178 from Industrial Economics, Inc. for "Hudson River Mink Feeding Study."

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."

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."

John Giesy received \$247,243 from Entix, Inc. for "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 Com-

pany for "Altered DNA Methylations in Carcinogenesis."

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 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, V Tarabara and **James Tiedje** received \$600,000 from the EPA for "On-chip PCR Nanoparticles and Virulence/Marker Genes."

Robert Hollingworth received \$26,800 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"; \$106,805 from Rutgers University for "IR-4 Minor Crop Pest Management."

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 Pparγ."

John Kaneene received \$329,022 from the USDA for "Bovine Tuberculosis: Epidemiology, Diagnosis, and Pathogenesis"; \$14,000 from Michigan Agriculture for "Evaluating the Knowledge Base of Cattle Producer in Michigan"; and \$24,000 from the USDA for "Michigan Jones Disease Control Program."

John LaPres received \$272,838 from the National Institutes of Health for "Hypoxia and an Epigenetic Mechanism for Toxicity."

L. Karl Olson received \$49,997 from

the American Diabetes Association for "Lipid Metabolism and B Cell Dysfunction."

Nigel Paneth received \$35,464 from the Children's Hospital of Boston for "Molecular Antecedents of Brain Damage in Preterm Infants."

James Pestka received \$327,605 from the National Institutes of Health for "Mechanisms of Trichothecene Toxicity." Pestka also received \$202,784 from the National Institutes of Health 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."

Ken Rosenman received \$28,400 from the Michigan Department of Community Health for "State-wide Asthma Mortality Review." Rosenman also received \$22,120 from the Center for Disease Control 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 Center for Integrative Toxicology. Roth also received \$226,280 from the National Institutes of Health for "Inflammation and Drug Idiosyncrasy."

Greg Swain received \$190,000 from the National Aeronautics and Space Administration for "Electrochemical-Based Monitoring of Spacecraft Water." Swain also received \$139,746 from the National Institutes of Health for "Sympathetic Neural Control Mechanisms in Hypertension."

Please see Grants, page 7

Notables

Trosko Presents at Canadian SOT/UK Epidemiologists

Dr. James Trosko, professor of pediatrics and human development, recently gave a symposium at the Canadian Society of Toxicology, titled "Epigenetic Mechanisms and Risk Assessment: or Were Chemical Genotoxins the WMD's of Environmental Toxicology?" Dr. Trosko also presented at the 10th Anniversary of the United Kingdom Epidemiological Group. He spoke about "chemical carcinogens as mutagens" and "molecular epidemiology of cancer as bankrupt paradigms" and presented "Stem Cells, Altered Cell-Cell Communication and Epigenetic Mechanisms as Ignored Concepts."

Hashsham Receives 21st Century Jobs Fund Award

Governor Jennifer Granholm visited MSU in September to congratulate those who received awards from Michigan's 21st Century Jobs Fund. Syed Hashsham, professor of civil and environmental engineering and CIT-affiliated faculty, was one of 11 MSU projects funded this year. His project entitled "A PCR-Chip for Air and Water Safety" aims to develop a hand-held platform for highly parallel and sensitive analysis of genetic signatures.

Hashsham plans for the portable device to be an all-in-one pathogen testing center, capable of detecting as many as 50 microbial threat agents in air, water, or food.

The project was awarded \$966,608 and is funded for three years. James Tiedje, University Distinguished Professor and also affiliated with the CIT, and Erdogan Gulari, professor of chemical engi-



The CIT recently hosted David Warheit, Ph.D., from DuPont Haskell Laboratory for Health and Environmental Sciences, to present a lecture on the impact of nanoparticles on respiratory health effects. Over 50 faculty, students, and external scientists attended.

neering at the University of Michigan, are co-principle investigators on this project. Six graduate students and technicians are at work on project.

The 21st Century Jobs Fund is part of Michigan's 1999 settlement from tobacco companies, allocated to support research and industry in hopes of diversifying and advancing Michigan's economy.

This funding will help the team develop and commercialize the device.

SOT MSU Reception

The MSU-CIT will host a MSU Alumni and Friends reception at the Society of Toxicology's Annual Meeting in Charlotte, NC, March 25-29, 2007.

The reception will be held on Monday, March 26, from 9 to 11 p.m., in the Westin Hotel's Trade Room. The event will include desserts and a cash bar.

All current and past students, faculty, and other affiliates are invited to attend.

For more information on SOT meeting, go to <http://www.toxicology.org>.

Grants, from page 6

James Tiedje and Konstantinos Konstantinidis received \$217,482 from the National Science Foundation for "Genomic Approaches to Advance the Species Definition of Prokaryotes." Tiedje, James Cole, and George Garrity received \$345,751 from the US Department of Energy for "The Ribosomal Database Project: Automation, Integration and Education". Tiedje, James Cole, and George Garrity also received \$150,000 from the National Science Foundation for "The Ribosomal Database Project: Automation, Integration, and Education."

Bruce Uhal received \$237,677 from the US Public Health Service for "Control of Type II Pneumocyte Proliferation."

James Wagner and Jack Harkema received \$282,013 from North Carolina University 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."

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Distinguished Scholars in Toxicology Lecture Series

The CIT has launched the 2007 Distinguished Scholars in Toxicology Seminar Series. The series will bring investigators to the MSU campus who have made substantial scientific contributions to the discipline of toxicology. Each year, the CIT will partner with an affiliated academic unit to select and host the speakers.

This year's series is being hosted in cooperation with the Department of Pharmacology and Toxicology. The following seminars are planned. For additional details, see the CIT website (<http://www.cit.msu.edu>) or contact Amy Swagart at 517-353-6469; swagart@msu.edu.



Jose Manautou, the first speaker in the lecture series, received the 2006 Society of Toxicology Achievement Award. He is pictured here with Professor Patti Ganey.

January 31, 2007

Jose Manautou, Ph.D.,
Department of Pharmaceutical Sciences,
University of Connecticut

"Changes in Expression of Hepatobiliary Transport Proteins as a Compensatory Response to Drug-Induced Hepatotoxicity"

March 14, 2007

David Sherr, Ph.D.,
Environmental Health; Pathology
and Laboratory Medicine
Boston University

"The Role of the AhR, an Environmental Chemical Receptor, in Mammary Tumor Growth and Invasion"

MSU-CIT Faculty Position Open

The CIT is inviting candidates to apply for a tenure-track academic year faculty position at the Assistant or Associate Professor level. Candidates are sought with expertise in either chemical carcinogenesis or developmental toxicology to strengthen a growing interest in these areas. Candidates should have a Ph.D. degree in Toxicology or a related discipline, postdoctoral research experience and demonstrated success in obtaining extramural funding.

This position involves a joint appointment in the CIT and in a biomedical science department (e.g., Biochemistry & Molecular Biology, Food Science and Human Nutrition, Pharmacology & Toxicology, Physiology) consistent with his/her expertise and interests. In addition to contributing to the CIT, the candidate will have the opportunity to participate in one or more other interdisciplinary research and training programs including the National

Food Safety and Toxicology Center, the Center for Biological Modeling, Breast Cancer and the Environment Research Centers and the Genetics and Neuroscience Programs. He/she will be expected to establish and maintain an independent and extramurally-funded research program and to contribute to the teaching and service missions of the department and the CIT.

Interested individuals should send their curriculum vitae, statement of research interests and future research plans, and 3 letters of recommendation to: Chair, Faculty Search Committee, Center for Integrative Toxicology, 165C Food Safety and Toxicology Building, Michigan State University, East Lansing, MI 48824. Electronic submissions may be sent to: swagart@msu.edu. Review of applications will begin February 2007 and will continue until the position is filled. MSU is an Affirmative Action/Equal Opportunity Institution.

