

# CIT Update

Michigan State University

Winter 2004

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## Center for Integrative Toxicology

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## New Name, New Director

MSU toxicology has a new leader and is taking on a new, expanded mission, reflected in a name change.

The Center for Integrative Toxicology (CIT), formerly the Institute for Environmental Toxicology, will be led by Norbert Kaminski, a professor of pharmacology and toxicology. Lawrence Fischer, the director since 1984, recently retired (see article, page 2).

Over the past decade, MSU's toxicology research efforts have grown in breadth and depth. The CIT will capitalize on efforts that now span investigations of environmental, occupational, food-borne and pharmaceutical agents. An integrative approach encompasses the exploration of toxicological mechanisms at the whole organism, cellular, biochemical, molecular and

genomic levels.

The name change conveys this broader focus, Kaminski said.

***"We believe that the CIT under Dr. Kaminski's capable leadership will reaffirm MSU's reputation as a premier institution in toxicology."***

***--Dr. Lonnie King, CVM Dean***

"Although our scientists are best known for their research in environmental toxicology, especially concerning agents such as polychlorinated biphenyls and dioxins, there are also

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## Director's Message

My first six months as Director of the Center for Integrative Toxicology, formerly known as the Institute for Environmental Toxicology, has been an exciting time. A significant part of our current efforts, including the renaming of our unit, has been directed at the implementation of a strategic plan developed by MSU toxicology faculty last year. This five-year strategic plan builds on our existing strengths while at the same time advantageously positioning toxicology activities at MSU in a way that will allow us to capitalize on new opportunities and respond effectively to new challenges.

Support for toxicology at MSU continues to be strong. The CIT has been granted two new tenure-stream faculty positions. Recruitment for the first of these two new faculty positions begins this fall. We intend to make strategic hires that will complement current research strengths and promote successful competition for individual and multi-investigator



*Dr. Norb Kaminski*

**See Message, page 3**



# Fischer Retires from Director Position

After nearly twenty years at the helm of the MSU Institute for Environmental Toxicology, now the Center for Integrative Toxicology, Lawrence Fischer has retired.

College of Veterinary Medicine Dean Lonnie King noted that Fischer deserves credit for establishing and building MSU's nationally and internationally renowned program in environmental toxicology.

At a recent retirement reception held in his honor, Fischer was recognized as being a key collaborator with dozens of MSU faculty who had an interest in toxicology, supporting new initiatives and encouraging and connecting researchers. He was also lauded for his expertise in public policy, providing a balanced scientific view of environmental hazards and risks to human health to decision makers

and the lay public.

Under his leadership, MSU was able to attract larger and more long-term funding for toxicology research and outreach. He spearheaded the acquisition of a Superfund Basic Research Program project grant, going into its seventeenth year of funding, bringing millions of dollars in research funding to MSU and its collaborators.

The training opportunities for students also greatly expanded during Fischer's tenure. The ongoing National Institute of Environmental Health Sciences training grant was initiated by Fischer and has been renewed four times under his direction, a campus record. Over 100 predoctoral and postdoctoral students have established significant careers based on their toxicology training at MSU.

Throughout his career, Fischer conducted basic research in the area of biochemical toxicology with a particular emphasis on understanding the mechanism of action of chemicals that damage the endocrine system. He has published over 100 peer-reviewed research manuscripts and has held positions on the Editorial Advisory Boards of three scientific journals.

He served for six years on the Board of Scientific Counselors, Division of Cancer Etiology of the National Cancer Institute. He is Chairman of the Michigan Environmental Science Board, a group of nine scientists appointed by the governor of Michigan to provide advice to the State regarding environmental issues of current importance.

He has held visiting professorships at the University of Geneva (Switzerland), University of Uppsala (Sweden) and the University of Arizona. Most recently, he served as a visiting scientist for the NIEHS National Toxicology Program and will continue to serve as an expert on their acrylamide panel.

Fischer will also continue working as a consultant with the CIT over the next year in efforts to prepare a competing renewal application to the Superfund Basic Research Program.

## Roth Named Graduate Director

Robert Roth, professor of pharmacology and toxicology, was recently named graduate director for the Center for Integrative Toxicology.

Roth takes charge of the multidisciplinary training program in Environmental and Integrative Toxicological Sciences (EITS), which recently received a National Institutes of Environmental Health Sciences grant (see page 2) under his leadership.

Since 1968, when Dr. Robert Roth, Ph.D., started out as a graduate assistant in biochemical toxicology, his professional career has surged forward. Combining

research and teaching, Roth is one of a few at Michigan State University with the title of "Distinguished Professor." His research interests involve liver injury and inflammation and response to toxic chemicals. He has produced a long list of published research papers in peer-reviewed journals, book chapters/reviews and abstracts, the sum total of which numbers over 200.

Roth received his B.A in Chemistry in 1968 from Duke University and his Ph.D. in Biochemical Toxicology in 1975 from Johns Hopkins University.

Between 1969-71 he worked as a Toxicological Screening Specialist, in the Toxicology Division, U.S. Army Environmental Hygiene Agency. From 1975-77 he was a Research Fellow in Pulmonary Pharmacology, Yale University School of Medicine, Department of Anesthesiology and Pharmacology.

He was an assistant professor from 1977-82 at MSU's Department of Pharmacology and Toxicology and rose to associate professor in 1982 and became a full professor in 1987.

Roth has been the Associate Director for the MSU National Center for Food Safety and Toxicology since 1995.

Norbert Kaminski, CIT director said "I am thrilled that Dr. Roth has agreed to assume this important role in our graduate training program. Both his scientific expertise and his leadership skills will be a great asset to the program."



Dr. Bob Roth (left) with graduate trainee Jim Luyendyk.

# NIEHS Training Grant Awarded

For the fourth time, the MSU Center for Integrative Toxicology has received a training grant from the National Institute of Environmental Health Sciences. The level of support is approximately 1.6 million dollars.

The training grant will fund nine doctoral and postdoctoral fellows in toxicological science per year for the next five years. The new grant marks the sixteenth continuous year the MSU program has received the competitive funding, a campus record. It is one of only five training grants currently held by MSU.

Robert Roth, the newly named director (see page 2) of the training program in Environmental and Integrative Toxicological Sciences (EITS) and principal investigator for the grant, says the funding will be used to help defray the cost of tuition, stipend support and other expenses for students to gain research-based expertise in MSU laboratories. As in the past,

## *Message, from page 1*

research grants in toxicology. In addition, the University has provided the CIT with new administrative offices. Our new offices will be located in the Food Safety and Toxicology Building, where they will be in close proximity to toxicology faculty and trainees.

Graduate and post-graduate training in toxicology continues to be a recognized strength at MSU and a primary focus of CIT activities. Recently, Dr. Robert Roth was appointed as the Director of the training program in Environmental and Integrative Toxicological Sciences, which presently has over 30 predoctoral trainees. I am thrilled to announce that through the efforts of Drs. Roth and Larry Fischer and due to the high quality of trainees that continue to be recruited to MSU, our Training Grant in Environmental Toxicology funded by the National Institute for Environmental Health Sciences was renewed for five more years (see article above). Our NIEHS Training Grant in Environment Toxicology,

students will participate in a degree-granting program such as food science, pharmacology, biochemistry or zoology, in addition to toxicology.

Roth said that the highly competitive NIEHS grant funding aids in designating MSU as a premier institution to study toxicological sciences.

"Our status as an ongoing NIEHS training grant site aids in designating MSU as a premier institution to study the toxicological sciences," Roth said.

MSU CIT Director, Norbert Kaminski, noted the success of the grant application was largely due to the efforts of Roth as the current principal investigator and Lawrence Fischer, professor and director emeritus, who served as the founding and principal investigator during the previous 15 years of funding.

In addition to the support available through the grant, MSU is also providing similar training support to CIT-affiliated students.

which is presently in its sixteenth year, has been the longest continuously funded NIH training grant at MSU. Based on the ongoing success of our graduate training program, the Graduate School has made a five-year \$300,000 commitment to fund additional toxicology predoctoral trainees not supported by the training grant.

I would also like to take this opportunity to acknowledge the excellent leadership that Dr. Fischer has provided for toxicology at MSU. He served as the Director of the Institute for Environmental Toxicology from 1984 until his retirement in June of this year. Under his stewardship, graduate and postgraduate training in toxicology as well as toxicology research at MSU has maintained an international reputation of excellence. Dr. Fischer's commitment, devotion and numerous contributions to the discipline of toxicology are greatly appreciated by all that have been part of the IET and more recently the CIT.

To receive more information concerning the EITS program and the availability of fellowships, call 517-353-6469 or e-mail [tox@msu.edu](mailto:tox@msu.edu).

## *New, from page 1*

significant ongoing research efforts investigating the toxicity of naturally occurring materials and pharmaceutical agents, including the mechanisms of adverse drug reactions and food borne toxicants."

Numerous departments and faculty will continue to be involved and contribute. The CIT will also soon begin recruitment of two new faculty members to blend with MSU research capacities.

"The CIT brings together a community of interdisciplinary scholars who have a common interest in toxicology," Kaminski said. "The resulting new research collaborations have often led to significant extramural funding."

Kaminski, a Chicago native, earned a bachelor's degree in chemistry from Loyola University in 1978, and a master's degree in toxicology and a doctorate in toxicology and physiology from North Carolina State University in 1981 and 1985, respectively.

His postdoctoral training in immunotoxicology was completed at the Medical College of Virginia where he subsequently stayed on as a faculty member until 1993. Kaminski was recruited to MSU in 1993.

His research interests are immunotoxicology and immunopharmacology, which involve him in studying the effects of chemicals and drugs on the immune system.

He holds leadership positions in several professional organizations and was recently named treasurer-elect of the Society of Toxicology. He serves on the editorial boards of several professional journals.

Lonnie King, Dean of the College of Veterinary Medicine noted, "We believe that the CIT under Dr. Kaminski's capable leadership will reaffirm MSU's reputation as a premier institution in toxicology."

# CIT Toxicology Research Evening

The Center for Integrative Toxicology hosted a research evening for faculty and students in the Center's training program in Environmental and Integrative Toxicological Sciences on Tuesday, November 15, 2004. Over 40 faculty, current trainees and prospective trainees attended.

CIT Director, Norbert Kaminski announced the availability of student training fellowships administered by the Center with funding from the National Institute of Environmental Health Sciences as well as from the MSU Graduate School.

Bob Roth, the Center's Graduate Program Director, gave an overview on the multidisciplinary nature and flexibility of the training program.

Two current trainees gave

presentations on their research. James Luyendyk, from Roth's lab, presented "Zantac—Heartburn Relief, Hepatotoxicity and Gene Array." Evelyne Mbandi, from James Pestka's lab, presented "Immunotoxic Effects of

Deoxynivalenol and Satratoxin" (see below).

In addition, a poster session was held with the work of current students on display. The poster authors were on hand to discuss their work and field questions.



*Faculty and students gathered for short presentations at the CIT Research Eve.*

## Trainee profile: Evelyne Mbandi Post Doc Adds Toxicology to Training

When Evelyne Mbandi began her post doctoral training at MSU-CIT with James Pestka, she checked off one big item from her professional training wish list.



*Dr. Evelyne Mbandi, post doctoral trainee and NIEHS fellow.*

While completing her Ph.D. in food microbiology at Wayne State University, on the heels of M.S. and B.S. degrees in microbiology from the University of Ibadan in Nigeria, she hoped to find a way to integrate her food safety background with toxicology.

Pestka, professor of food science and human nutrition and of microbiology and molecular genetics, provided a way and a CIT fellowship through the National Institutes of Environmental Health Sciences provided the means.

"Being able to work with someone as accomplished as Dr. Pestka and at an institution so renowned as MSU was thrilling," Mbandi said.

Her research in Pestka's lab has included examining the interaction of bacterial pathogens and mycotoxins, relative to the induction of pro-inflammatory cytokines and chemokines in vitro and in vivo. She is working to optimize the production of Satratoxin G from a fungus named *Stachybotrys chartarum*. She notes that this

fungus is common in agricultural materials such as hay and straw but is also prevalent in mold-contaminated moist buildings. It causes stachbotryotoxicosis in large domestic animals and is a potential cause of adverse health responses in humans.

She is investigating using serological and chromatographic techniques to extract, identify and purify Satratoxin G. She also is coordinating the collection and analysis of environmental samples for the presence of *Stachybotrys chartarum* and Satratoxin G.

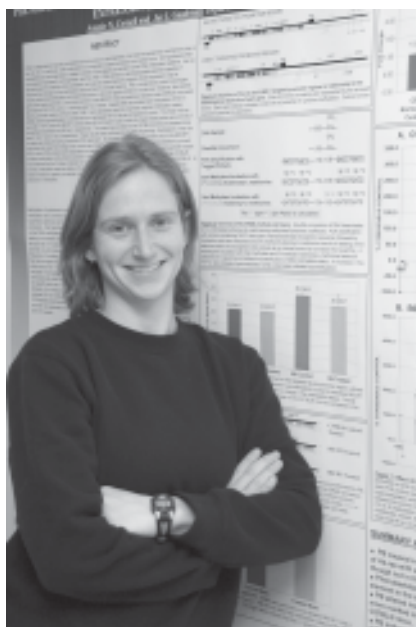
She recently shared her research results with MSU-CIT graduate students at a research evening. She also published an abstract with Pestka at the 2004 Society of Toxicology Annual Meeting and presented at a recent American Society for Microbiology meeting.

A native of Cameroon, Mbandi plans to continue directing her research toward issues of concern in Africa, particularly involving the preservation of harvested foods.

# MSU Strong at 2004 SOT Meeting

Former and present MSU graduate students and faculty were honored at the 2004 Annual Meeting of the Society of Toxicology, the largest scientific society for the discipline of toxicology.

Over 40 abstracts were presented by MSU scientists. In addition, several notable awards were conferred.



*Trainee Ammie Carnell.*

Jim Luyendyk, a trainee in Professor Bob Roth's lab, received the Novartis Graduate Student Award, the only graduate fellowship awarded by the SOT. Darrell Boverhof, trainee with Associate Professor Timothy Zacharewski, was a finalist for this award.

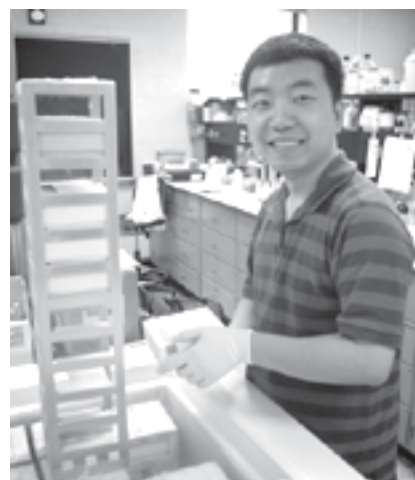
Quanshan Jia, a student in Professor James Pestka's lab, won the Taylor and Francis Award from the Food Safety Specialty Section. Pestka and his colleagues received the "best paper" award from the Immunotoxicology Specialty Section.

Ammie Carnell, a senior graduate student working with Professor Jay Goodman, received a travel award from the Regulatory and Safety Evaluation Specialty Section and a second place award from the Carcinogenesis Specialty Section. Cheryl E. Rockwell, a

graduate student working with Professor and CIT Director Norbert Kaminski also received a travel award.

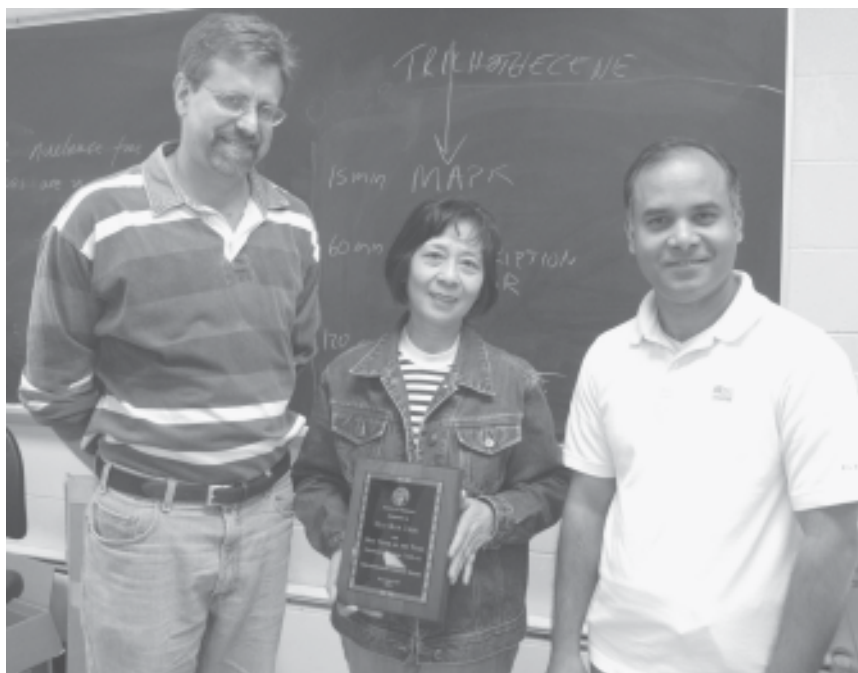
MSU is also well represented in the SOT administration. Kaminski was elected to a three-year term as SOT Treasurer and Professor Jack Harkema was elected to the Membership Committee. Jim Luyendyk, serves as Chair of the Student Advisory Committee to the SOT Council.

Several MSU toxicology alumni were elected to important SOT positions. Elaine Faustman, MSU alumnae was elected to a two-year term as SOT Counselor. Ken Wallace, who graduated from MSU's Dept. of Physiology, moved up in the presidential chain to SOT President Elect in May and will assume the role of president in 2005.



*Trainee Quanshan Jia.*

Wallace will be the sixth SOT president who has had an association with MSU either as a faculty member or post trainee.



*Dr. James Pestka (left) and colleagues Hui-Ren Zhou and Zahidul Islam.*

## Michigan SOT Meeting Hosted by MSU

The Michigan Society of Toxicology held its annual fall meeting at the MSU Kellogg Center on November 12, 2004. Speakers included Bob Roth, MSU-CIT graduate program director, who presented "Inflamma-

tion as a Susceptibility Factor for Hepatotoxicity: A Connection to Drug Idiosyncrasy?" A poster session was held, with eight of the 12 abstracts presented by MSU scientists.

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## Faculty Spotlight: Stephen Boyd Jackson Soil Science Award Received

The Soil Science Society of America recently awarded Stephen Boyd, CIT affiliated faculty member and professor of environmental chemistry in the Department of Crop and Soil Sciences, with the Marion L. and Chrystie M. Jackson Soil Science Award. The award recognizes mid-career soil scientists who have made outstanding contributions in the areas of soil chemistry and mineralogy.

The principal criteria for the award are significance and originality of research, excellence in creative reasoning, quality of teaching, and total impact of contributions on soil science and other fields.

Boyd's research program focuses on the environmental chemistry of organic contaminants and pesticides in soils, especially their interactions with clays and organic matter and how this influences bioavailability.

He is a Fellow of the SSSA and previous recipient of the SSSA's Soil Science Research Award.

He is currently serving as the Associate Director of the Environmental Science and Policy Program at MSU. He earned his B.S. degree

in Chemistry at Central Michigan University and his M.S. and Ph.D. degrees in soil chemistry at Purdue.



*Dr. Stephen Boyd and his trainee Jacqueline Arroyo who recently graduated.*

## Trainee Spotlight: Jacqueline Arroyo Recent Graduate Awarded by SSSA

Jacqueline Arroyo, a recent CIT graduate, received one of two Joe B. and Martha Dixon Soil Mineralogy Awards for 2004 from the Soil Science Society of America.

Arroyo was a trainee with Drs. Stephen Boyd and Brian Teppen in the Department of Crop and Soil Sciences from 1999 to July 2004. She came to MSU on a Fulbright Fellowship and received her Ph.D. in Environmental Soil Chemistry and Environmental Toxicology.

Her research objective was to elucidate the role and mechanistic function of clay minerals as sorbent phases for pesticide retention in soils. Her investigations focused on the environmental chemistry of metals, organic pollutants and

pesticides related to their transport and fate in natural environments. Her winning paper, presented at the SSSA's annual meeting, was "Influence of Clay Preparation Method on Sorption and Degradation of Carbaryl by Reference Smectite Clay SWy-2." The authors of the paper were L.J. Arroyo, H. Li, B.J. Teppen, C.T. Johnson, and S.A. Boyd.

Arroyo was born in Quito, Ecuador where she earned her undergraduate degree in biochemistry/pharmacy from the Universidad Central del Ecuador.

She was previously a research fellow in pharmacology/toxicology at the Universitats Klinikum Essen in Germany and attended the Center

for Environmental Sanitation in Ghent, Belgium for training courses in Assessment and Management of Environmental Pollution.

She credits her interest in pesticides to discovering that Ecuador placed no restrictions on pesticide use for growing long stemmed roses, one of the country's largest exports. With a great personal concern for the contamination of water, her training in soil science has been directed toward understanding the movement of organic contaminants and how they might be degraded.

Arroyo recently began post doctorate training at Purdue University.

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## Faculty Spotlight: Jay Goodman British Toxicology Society Top Honor

Dr. Jay Goodman has been awarded the 2005 John Barnes Prize Lecture making him a keynote speaker for the British Toxicological Society (BTS) Annual Congress being held in March.

His lecture will be titled "Epigenetics, DNA Methylation and Carcinogenesis: Implications for Safety Assessment."

The prize lectureship, established in memory of Dr. John Barnes, a pioneer in scientific toxicology and the first director of the Toxicology Research Unit of the British Medical Council, has been awarded biannually since 1979.

Candidates for the award are proposed by the BTS membership and a winner is selected by a scientific sub-committee and the executive committee.

Goodman's research interests are in the area of carcinogenesis and focused specifically on the role(s) that altered DNA methylation (5—methylcytosine content of DNA) plays as an epigenetic mechanism underlying the transformation of a normal cell to a frank carcinoma. He is testing the hypothesis that susceptibility to tumorigenesis is related inversely to the capacity to maintain normal patterns of DNA methylation.

Goodman's previous honors include a Distinguished Alumnus Award in 2000 from the University of Michigan, where he received his doctoral degree in pharmacology.

He served as president for the Society of Toxicology in 1999-2000 and has been a faculty member of the MSU Department of Pharmacology and Toxicology since 1971.



*Jay Goodman will present the Barnes Lecture at the BTS Annual Congress.*

## Faculty Serve on NAS NRC committees

Four MSU-CIT faculty are currently serving on several important National Academy of Science's (NAS) National Research Council (NRC) committees or subcommittees, impacting federal policy decisions on issues ranging from the health risks of dioxin exposure and genetically modified foods to the air quality of Naval submarines.

Norbert Kaminski, CIT director and professor of pharmacology and toxicology, serves on an expert committee of the Board on Environmental Studies and Toxicology to review the Environmental Protection Agencies' (EPA) assessment of health implications related to dioxin exposure. This committee will review the EPA's 2003 draft reassessment of the risks of dioxin and dioxin-like compounds to assess whether EPA risk estimates are scientifically robust and whether there is a clear delineation of all substantial uncertainties and variability. The committee will review the breadth of the uncertainty and variability, particularly

associated with the analysis of food sampling and human dietary intake. Identifying gaps in scientific knowledge critical to understanding dioxin reassessment is also a priority.

Timothy Zacharewski, associate professor of biochemistry and molecular biology, serves as a panel member on two committees. The first is the Committee on Identifying and Assessing Unintended Effects of Genetically Engineered Foods on Human Health. This group assists policy makers in evaluating appropriate scientific methods for detecting unintended changes in food and assessing the potential for adverse health effects from genetically modified products.

Zacharewski also serves on the Committee on Emerging Issues and Data on Environmental Contaminants. This group provides a public forum for communication among government, industry, environmental groups and the academic community about emerging evidence and issues in toxicogenomics, environ-

mental toxicology, risk assessment, exposure assessment and other related fields. More information can be found on the committee's web page at <http://dels.nas.edu/emergingissues/index.asp>.

John Giesy, professor of zoology, is currently serving as chairperson of the Committee on Strengthening Science-based Decision-making on Persistent Organic Pollutants (POPs) in China. The group is developing a virtual center on environmental issues with China and is a joint project with the Chinese Academy of Sciences. In June 2004, Giesy co-chaired a workshop on the topic in Beijing. This is the sixth NRC committee, Giesy has served on since 1997.

Jack Harkema, professor of pathobiology and diagnostic investigations, serves on the Subcommittee on Emergency and Continuous Exposure Guidance Levels for Selected Submarine Contaminants. This subcommittee of the Committee on Toxicology was convened to

**See NAS, page 8**

# CIT Notables

## New Mouse Model for Cystic Fibrosis

- Jack Harkema, professor of pathobiology and diagnostic investigations, collaborated with researchers at the University of North Carolina, to unveil a new model, revealing a key aspect of the disease's mechanism, as published in May 2004 issue of *Nature Medicine*.

## FDA Advisory Committee

- Bob Roth, professor of pharmacology and toxicology, was recently appointed to the Contaminants and Natural Toxicants Subcommittee, charged with reviewing and evaluating data and making recommendations to the Director of the FDA's Center for Food Safety and Applied Nutrition regarding the safety of new foods and food ingredients, safe exposure limits for food contaminants, and the labeling of foods.

## American Society of Microbiology

- James Tiedje, professor of microbiology and molecular genetics, President Elect, 2004

## ASPET

American Society for Pharmacology and Experimental Therapeutics: Division of Toxicology Best Paper,

- Jim Luyendyk, student of Bob Roth

## EPA

- John Giesy, permanent member of the Environmental Protection Agency Scientific Advisory Panel

## Journal of Current Analytical Chemistry

- James Watson, professor of biochemistry and molecular biology, Editorial Board

## MI Department of Environmental Quality

- Victoria McGuffin, professor of chemistry, Advisory Committee Member on water quality-based effluent limits

## MSU Environmental Science and Policy

- Stephen Boyd, appointed Associate Director of the program

## NAS NRC Committees

National Academy of Science National Research Council Committee Service (see page 7):

- Norbert Kaminski, CIT director and professor of pharmacology and toxicology
- Timothy Zacharewski, associate professor of biochemistry and molecular biology
- John Giesy, professor of zoology
- Jack Harkema, professor of pathobiology and diagnostic investigations

## NIEHS

National Toxicology Program:

- Lawrence Fischer, director emeritus, appointed as visiting scientist, served on expert acrylamide panel
- John Giesy appointed to the Board of Scientific Councilors

## Society of Toxicology

- Norbert Kaminski, CIT director and professor of pharmacology and toxicology, Treasurer Elect (see page 5)

## Soil Science Society of America

- Joe B. and Martha Dixon Soil Mineralogy Award: Jacqueline Arroyo, student of Stephen Boyd and Brian Teppen, Spring 2004
- M.L. Jackson Soil Science Award: Stephen Boyd, professor of environmental chemistry, Fall 2004 (see page 6)

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## NAS, from page 7

evaluate the U.S. Navy's current and proposed 1-hour and 24-hour emergency exposure guidance levels and 90-day continuous exposure guidance levels for selected chemical contaminants (e.g., carbon dioxide, ozone, xylene, formaldehyde) that may be found in the air within the cabins of submarines.





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*Dr. Norb Kaminski*

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College of Veterinary Medicine Dean Lonnie King noted that Fischer deserves credit for establishing and building MSU's nationally and internationally renowned program in environmental toxicology.

At a recent retirement reception held in his honor, Fischer was recognized as being a key collaborator with dozens of MSU faculty who had an interest in toxicology, supporting new initiatives and encouraging and connecting researchers. He was also lauded for his expertise in public policy, providing a balanced scientific view of environmental hazards and risks to human health to decision makers

and the lay public.

Under his leadership, MSU was able to attract larger and more long-term funding for toxicology research and outreach. He spearheaded the acquisition of a Superfund Basic Research Program project grant, going into its seventeenth year of funding, bringing millions of dollars in research funding to MSU and its collaborators.

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He served for six years on the Board of Scientific Counselors, Division of Cancer Etiology of the National Cancer Institute. He is Chairman of the Michigan Environmental Science Board, a group of nine scientists appointed by the governor of Michigan to provide advice to the State regarding environmental issues of current importance.

He has held visiting professorships at the University of Geneva (Switzerland), University of Uppsala (Sweden) and the University of Arizona. Most recently, he served as a visiting scientist for the NIEHS National Toxicology Program and will continue to serve as an expert on their acrylamide panel.

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research and teaching, Roth is one of a few at Michigan State University with the title of "Distinguished Professor." His research interests involve liver injury and inflammation and response to toxic chemicals. He has produced a long list of published research papers in peer-reviewed journals, book chapters/reviews and abstracts, the sum total of which numbers over 200.

Roth received his B.A in Chemistry in 1968 from Duke University and his Ph.D. in Biochemical Toxicology in 1975 from Johns Hopkins University.

Between 1969-71 he worked as a Toxicological Screening Specialist, in the Toxicology Division, U.S. Army Environmental Hygiene Agency. From 1975-77 he was a Research Fellow in Pulmonary Pharmacology, Yale University School of Medicine, Department of Anesthesiology and Pharmacology.

He was an assistant professor from 1977-82 at MSU's Department of Pharmacology and Toxicology and rose to associate professor in 1982 and became a full professor in 1987.

Roth has been the Associate Director for the MSU National Center for Food Safety and Toxicology since 1995.

Norbert Kaminski, CIT director said "I am thrilled that Dr. Roth has agreed to assume this important role in our graduate training program. Both his scientific expertise and his leadership skills will be a great asset to the program."



*Dr. Bob Roth (left) with graduate trainee Jim Luyendyk.*

# NIEHS Training Grant Awarded

For the fourth time, the MSU Center for Integrative Toxicology has received a training grant from the National Institute of Environmental Health Sciences. The level of support is approximately 1.6 million dollars.

The training grant will fund nine doctoral and postdoctoral fellows in toxicological science per year for the next five years. The new grant marks the sixteenth continuous year the MSU program has received the competitive funding, a campus record. It is one of only five training grants currently held by MSU.

Robert Roth, the newly named director (see page 2) of the training program in Environmental and Integrative Toxicological Sciences (EITS) and principal investigator for the grant, says the funding will be used to help defray the cost of tuition, stipend support and other expenses for students to gain research-based expertise in MSU laboratories. As in the past,

## *Message, from page 1*

research grants in toxicology. In addition, the University has provided the CIT with new administrative offices. Our new offices will be located in the Food Safety and Toxicology Building, where they will be in close proximity to toxicology faculty and trainees.

Graduate and post-graduate training in toxicology continues to be a recognized strength at MSU and a primary focus of CIT activities. Recently, Dr. Robert Roth was appointed as the Director of the training program in Environmental and Integrative Toxicological Sciences, which presently has over 30 predoctoral trainees. I am thrilled to announce that through the efforts of Drs. Roth and Larry Fischer and due to the high quality of trainees that continue to be recruited to MSU, our Training Grant in Environmental Toxicology funded by the National Institute for Environmental Health Sciences was renewed for five more years (see article above). Our NIEHS Training Grant in Environment Toxicology,

students will participate in a degree-granting program such as food science, pharmacology, biochemistry or zoology, in addition to toxicology.

Roth said that the highly competitive NIEHS grant funding aids in designating MSU as a premier institution to study toxicological sciences.

"Our status as an ongoing NIEHS training grant site aids in designating MSU as a premier institution to study the toxicological sciences," Roth said.

MSU CIT Director, Norbert Kaminski, noted the success of the grant application was largely due to the efforts of Roth as the current principal investigator and Lawrence Fischer, professor and director emeritus, who served as the founding and principal investigator during the previous 15 years of funding.

In addition to the support available through the grant, MSU is also providing similar training support to CIT-affiliated students.

which is presently in its sixteenth year, has been the longest continuously funded NIH training grant at MSU. Based on the ongoing success of our graduate training program, the Graduate School has made a five-year \$300,000 commitment to fund additional toxicology predoctoral trainees not supported by the training grant.

I would also like to take this opportunity to acknowledge the excellent leadership that Dr. Fischer has provided for toxicology at MSU. He served as the Director of the Institute for Environmental Toxicology from 1984 until his retirement in June of this year. Under his stewardship, graduate and postgraduate training in toxicology as well as toxicology research at MSU has maintained an international reputation of excellence. Dr. Fischer's commitment, devotion and numerous contributions to the discipline of toxicology are greatly appreciated by all that have been part of the IET and more recently the CIT.

To receive more information concerning the EITS program and the availability of fellowships, call 517-353-6469 or e-mail [tox@msu.edu](mailto:tox@msu.edu).

## *New, from page 1*

significant ongoing research efforts investigating the toxicity of naturally occurring materials and pharmaceutical agents, including the mechanisms of adverse drug reactions and food borne toxicants."

Numerous departments and faculty will continue to be involved and contribute. The CIT will also soon begin recruitment of two new faculty members to blend with MSU research capacities.

"The CIT brings together a community of interdisciplinary scholars who have a common interest in toxicology," Kaminski said. "The resulting new research collaborations have often led to significant extramural funding."

Kaminski, a Chicago native, earned a bachelor's degree in chemistry from Loyola University in 1978, and a master's degree in toxicology and a doctorate in toxicology and physiology from North Carolina State University in 1981 and 1985, respectively.

His postdoctoral training in immunotoxicology was completed at the Medical College of Virginia where he subsequently stayed on as a faculty member until 1993. Kaminski was recruited to MSU in 1993.

His research interests are immunotoxicology and immunopharmacology, which involve him in studying the effects of chemicals and drugs on the immune system.

He holds leadership positions in several professional organizations and was recently named treasurer-elect of the Society of Toxicology. He serves on the editorial boards of several professional journals.

Lonnie King, Dean of the College of Veterinary Medicine noted, "We believe that the CIT under Dr. Kaminski's capable leadership will reaffirm MSU's reputation as a premier institution in toxicology."

# CIT Toxicology Research Evening

The Center for Integrative Toxicology hosted a research evening for faculty and students in the Center's training program in Environmental and Integrative Toxicological Sciences on Tuesday, November 15, 2004. Over 40 faculty, current trainees and prospective trainees attended.

CIT Director, Norbert Kaminski announced the availability of student training fellowships administered by the Center with funding from the National Institute of Environmental Health Sciences as well as from the MSU Graduate School.

Bob Roth, the Center's Graduate Program Director, gave an overview on the multidisciplinary nature and flexibility of the training program.

Two current trainees gave

presentations on their research. James Luyendyk, from Roth's lab, presented "Zantac—Heartburn Relief, Hepatotoxicity and Gene Array." Evelyne Mbandi, from James Pestka's lab, presented "Immunotoxic Effects of

Deoxynivalenol and Satratoxin" (see below).

In addition, a poster session was held with the work of current students on display. The poster authors were on hand to discuss their work and field questions.



*Faculty and students gathered for short presentations at the CIT Research Eve.*

## Trainee profile: Evelyne Mbandi Post Doc Adds Toxicology to Training

When Evelyne Mbandi began her post doctoral training at MSU-CIT with James Pestka, she checked off one big item from her professional training wish list.



*Dr. Evelyne Mbandi, post doctoral trainee and NIEHS fellow.*

While completing her Ph.D. in food microbiology at Wayne State University, on the heels of M.S. and B.S. degrees in microbiology from the University of Ibadan in Nigeria, she hoped to find a way to integrate her food safety background with toxicology.

Pestka, professor of food science and human nutrition and of microbiology and molecular genetics, provided a way and a CIT fellowship through the National Institutes of Environmental Health Sciences provided the means.

"Being able to work with someone as accomplished as Dr. Pestka and at an institution so renowned as MSU was thrilling," Mbandi said.

Her research in Pestka's lab has included examining the interaction of bacterial pathogens and mycotoxins, relative to the induction of pro-inflammatory cytokines and chemokines in vitro and in vivo. She is working to optimize the production of Satratoxin G from a fungus named *Stachybotrys chartarum*. She notes that this

fungus is common in agricultural materials such as hay and straw but is also prevalent in mold-contaminated moist buildings. It causes stachbotryotoxicosis in large domestic animals and is a potential cause of adverse health responses in humans.

She is investigating using serological and chromatographic techniques to extract, identify and purify Satratoxin G. She also is coordinating the collection and analysis of environmental samples for the presence of *Stachybotrys chartarum* and Satratoxin G.

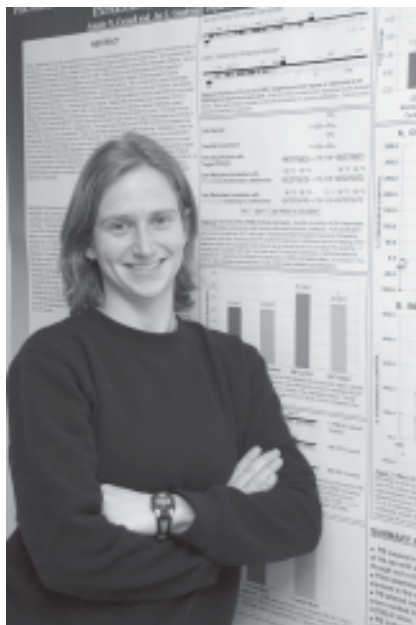
She recently shared her research results with MSU-CIT graduate students at a research evening. She also published an abstract with Pestka at the 2004 Society of Toxicology Annual Meeting and presented at a recent American Society for Microbiology meeting.

A native of Cameroon, Mbandi plans to continue directing her research toward issues of concern in Africa, particularly involving the preservation of harvested foods.

# MSU Strong at 2004 SOT Meeting

Former and present MSU graduate students and faculty were honored at the 2004 Annual Meeting of the Society of Toxicology, the largest scientific society for the discipline of toxicology.

Over 40 abstracts were presented by MSU scientists. In addition, several notable awards were conferred.



*Trainee Ammie Carnell.*

Jim Luyendyk, a trainee in Professor Bob Roth's lab, received the Novartis Graduate Student Award, the only graduate fellowship awarded by the SOT. Darrell Boverhof, trainee with Associate Professor Timothy Zacharewski, was a finalist for this award.

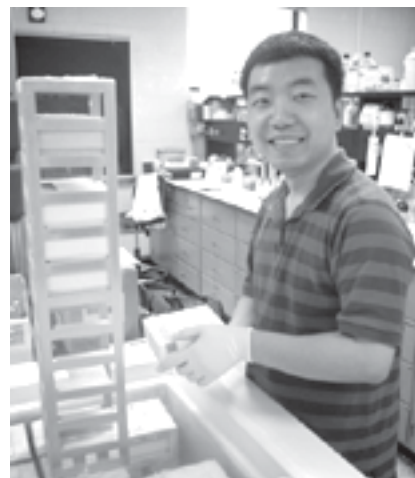
Quanshan Jia, a student in Professor James Pestka's lab, won the Taylor and Francis Award from the Food Safety Specialty Section. Pestka and his colleagues received the "best paper" award from the Immunotoxicology Specialty Section.

Ammie Carnell, a senior graduate student working with Professor Jay Goodman, received a travel award from the Regulatory and Safety Evaluation Specialty Section and a second place award from the Carcinogenesis Specialty Section. Cheryl E. Rockwell, a

graduate student working with Professor and CIT Director Norbert Kaminski also received a travel award.

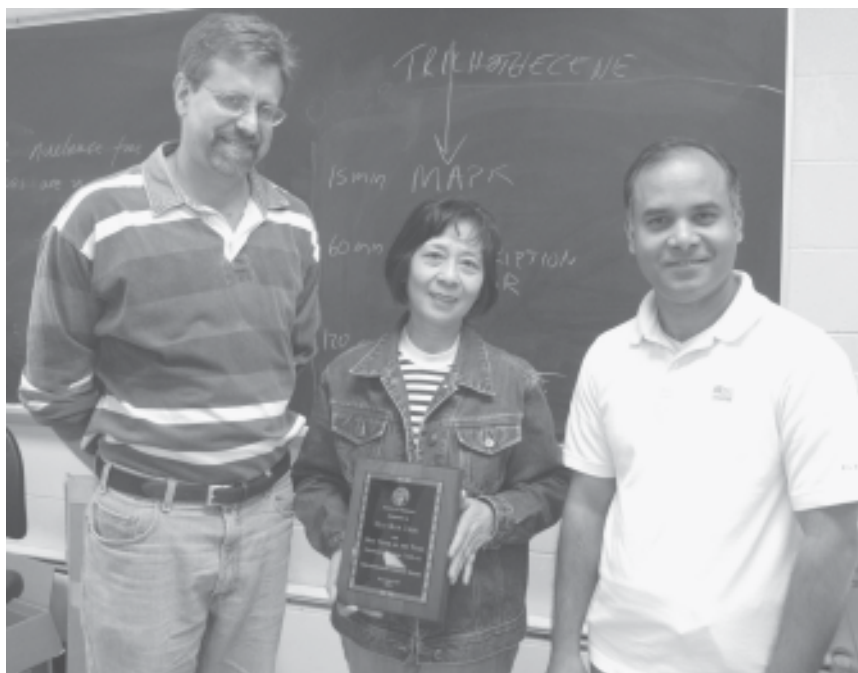
MSU is also well represented in the SOT administration. Kaminski was elected to a three-year term as SOT Treasurer and Professor Jack Harkema was elected to the Membership Committee. Jim Luyendyk, serves as Chair of the Student Advisory Committee to the SOT Council.

Several MSU toxicology alumni were elected to important SOT positions. Elaine Faustman, MSU alumnae was elected to a two-year term as SOT Counselor. Ken Wallace, who graduated from MSU's Dept. of Physiology, moved up in the presidential chain to SOT President Elect in May and will assume the role of president in 2005.



*Trainee Quanshan Jia.*

Wallace will be the sixth SOT president who has had an association with MSU either as a faculty member or post trainee.



*Dr. James Pestka (left) and colleagues Hui-Ren Zhou and Zahidul Islam.*

## Michigan SOT Meeting Hosted by MSU

The Michigan Society of Toxicology held its annual fall meeting at the MSU Kellogg Center on November 12, 2004. Speakers included Bob Roth, MSU-CIT graduate program director, who presented "Inflamma-

tion as a Susceptibility Factor for Hepatotoxicity: A Connection to Drug Idiosyncrasy?" A poster session was held, with eight of the 12 abstracts presented by MSU scientists.

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## Faculty Spotlight: Stephen Boyd Jackson Soil Science Award Received

The Soil Science Society of America recently awarded Stephen Boyd, CIT affiliated faculty member and professor of environmental chemistry in the Department of Crop and Soil Sciences, with the Marion L. and Chrystie M. Jackson Soil Science Award. The award recognizes mid-career soil scientists who have made outstanding contributions in the areas of soil chemistry and mineralogy.

The principal criteria for the award are significance and originality of research, excellence in creative reasoning, quality of teaching, and total impact of contributions on soil science and other fields.

Boyd's research program focuses on the environmental chemistry of organic contaminants and pesticides in soils, especially their interactions with clays and organic matter and how this influences bioavailability.

He is a Fellow of the SSSA and previous recipient of the SSSA's Soil Science Research Award.

He is currently serving as the Associate Director of the Environmental Science and Policy Program at MSU. He earned his B.S. degree

in Chemistry at Central Michigan University and his M.S. and Ph.D. degrees in soil chemistry at Purdue.



*Dr. Stephen Boyd and his trainee Jacqueline Arroyo who recently graduated.*

## Trainee Spotlight: Jacqueline Arroyo Recent Graduate Awarded by SSSA

Jacqueline Arroyo, a recent CIT graduate, received one of two Joe B. and Martha Dixon Soil Mineralogy Awards for 2004 from the Soil Science Society of America.

Arroyo was a trainee with Drs. Stephen Boyd and Brian Teppen in the Department of Crop and Soil Sciences from 1999 to July 2004. She came to MSU on a Fulbright Fellowship and received her Ph.D. in Environmental Soil Chemistry and Environmental Toxicology.

Her research objective was to elucidate the role and mechanistic function of clay minerals as sorbent phases for pesticide retention in soils. Her investigations focused on the environmental chemistry of metals, organic pollutants and

pesticides related to their transport and fate in natural environments. Her winning paper, presented at the SSSA's annual meeting, was "Influence of Clay Preparation Method on Sorption and Degradation of Carbaryl by Reference Smectite Clay SWy-2." The authors of the paper were L.J. Arroyo, H. Li, B.J. Teppen, C.T. Johnson, and S.A. Boyd.

Arroyo was born in Quito, Ecuador where she earned her undergraduate degree in biochemistry/pharmacy from the Universidad Central del Ecuador.

She was previously a research fellow in pharmacology/toxicology at the Universitats Klinikum Essen in Germany and attended the Center

for Environmental Sanitation in Ghent, Belgium for training courses in Assessment and Management of Environmental Pollution.

She credits her interest in pesticides to discovering that Ecuador placed no restrictions on pesticide use for growing long stemmed roses, one of the country's largest exports. With a great personal concern for the contamination of water, her training in soil science has been directed toward understanding the movement of organic contaminants and how they might be degraded.

Arroyo recently began post doctorate training at Purdue University.

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## Faculty Spotlight: Jay Goodman British Toxicology Society Top Honor

Dr. Jay Goodman has been awarded the 2005 John Barnes Prize Lecture making him a keynote speaker for the British Toxicological Society (BTS) Annual Congress being held in March.

His lecture will be titled "Epigenetics, DNA Methylation and Carcinogenesis: Implications for Safety Assessment."

The prize lectureship, established in memory of Dr. John Barnes, a pioneer in scientific toxicology and the first director of the Toxicology Research Unit of the British Medical Council, has been awarded biannually since 1979.

Candidates for the award are proposed by the BTS membership and a winner is selected by a scientific sub-committee and the executive committee.

Goodman's research interests are in the area of carcinogenesis and focused specifically on the role(s) that altered DNA methylation (5—methylcytosine content of DNA) plays as an epigenetic mechanism underlying the transformation of a normal cell to a frank carcinoma. He is testing the hypothesis that susceptibility to tumorigenesis is related inversely to the capacity to maintain normal patterns of DNA methylation.

Goodman's previous honors include a Distinguished Alumnus Award in 2000 from the University of Michigan, where he received his doctoral degree in pharmacology.

He served as president for the Society of Toxicology in 1999-2000 and has been a faculty member of the MSU Department of Pharmacology and Toxicology since 1971.



*Jay Goodman will present the Barnes Lecture at the BTS Annual Congress.*

## Faculty Serve on NAS NRC committees

Four MSU-CIT faculty are currently serving on several important National Academy of Science's (NAS) National Research Council (NRC) committees or subcommittees, impacting federal policy decisions on issues ranging from the health risks of dioxin exposure and genetically modified foods to the air quality of Naval submarines.

Norbert Kaminski, CIT director and professor of pharmacology and toxicology, serves on an expert committee of the Board on Environmental Studies and Toxicology to review the Environmental Protection Agencies' (EPA) assessment of health implications related to dioxin exposure. This committee will review the EPA's 2003 draft reassessment of the risks of dioxin and dioxin-like compounds to assess whether EPA risk estimates are scientifically robust and whether there is a clear delineation of all substantial uncertainties and variability. The committee will review the breadth of the uncertainty and variability, particularly

associated with the analysis of food sampling and human dietary intake. Identifying gaps in scientific knowledge critical to understanding dioxin reassessment is also a priority.

Timothy Zacharewski, associate professor of biochemistry and molecular biology, serves as a panel member on two committees. The first is the Committee on Identifying and Assessing Unintended Effects of Genetically Engineered Foods on Human Health. This group assists policy makers in evaluating appropriate scientific methods for detecting unintended changes in food and assessing the potential for adverse health effects from genetically modified products.

Zacharewski also serves on the Committee on Emerging Issues and Data on Environmental Contaminants. This group provides a public forum for communication among government, industry, environmental groups and the academic community about emerging evidence and issues in toxicogenomics, environ-

mental toxicology, risk assessment, exposure assessment and other related fields. More information can be found on the committee's web page at <http://dels.nas.edu/emergingissues/index.asp>.

John Giesy, professor of zoology, is currently serving as chairperson of the Committee on Strengthening Science-based Decision-making on Persistent Organic Pollutants (POPs) in China. The group is developing a virtual center on environmental issues with China and is a joint project with the Chinese Academy of Sciences. In June 2004, Giesy co-chaired a workshop on the topic in Beijing. This is the sixth NRC committee, Giesy has served on since 1997.

Jack Harkema, professor of pathobiology and diagnostic investigations, serves on the Subcommittee on Emergency and Continuous Exposure Guidance Levels for Selected Submarine Contaminants. This subcommittee of the Committee on Toxicology was convened to

**See NAS, page 8**

# CIT Notables

## New Mouse Model for Cystic Fibrosis

- Jack Harkema, professor of pathobiology and diagnostic investigations, collaborated with researchers at the University of North Carolina, to unveil a new model, revealing a key aspect of the disease's mechanism, as published in May 2004 issue of *Nature Medicine*.

## FDA Advisory Committee

- Bob Roth, professor of pharmacology and toxicology, was recently appointed to the Contaminants and Natural Toxicants Subcommittee, charged with reviewing and evaluating data and making recommendations to the Director of the FDA's Center for Food Safety and Applied Nutrition regarding the safety of new foods and food ingredients, safe exposure limits for food contaminants, and the labeling of foods.

## American Society of Microbiology

- James Tiedje, professor of microbiology and molecular genetics, President Elect, 2004

## ASPET

- American Society for Pharmacology and Experimental Therapeutics: Division of Toxicology Best Paper,
- Jim Luyendyk, student of Bob Roth

## EPA

- John Giesy, permanent member of the Environmental Protection Agency Scientific Advisory Panel

## Journal of Current Analytical Chemistry

- James Watson, professor of biochemistry and molecular biology, Editorial Board

## MI Department of Environmental Quality

- Victoria McGuffin, professor of chemistry, Advisory Committee Member on water quality-based effluent limits

## MSU Environmental Science and Policy

- Stephen Boyd, appointed Associate Director of the program

## NAS NRC Committees

National Academy of Science National Research Council Committee Service (see page 7):

- Norbert Kaminski, CIT director and professor of pharmacology and toxicology
- Timothy Zacharewski, associate professor of biochemistry and molecular biology
- John Giesy, professor of zoology
- Jack Harkema, professor of pathobiology and diagnostic investigations

## NIEHS

National Toxicology Program:

- Lawrence Fischer, director emeritus, appointed as visiting scientist, served on expert acrylamide panel
- John Giesy appointed to the Board of Scientific Councilors

## Society of Toxicology

- Norbert Kaminski, CIT director and professor of pharmacology and toxicology, Treasurer Elect (see page 5)

## Soil Science Society of America

- Joe B. and Martha Dixon Soil Mineralogy Award: Jacqueline Arroyo, student of Stephen Boyd and Brian Teppen, Spring 2004
- M.L. Jackson Soil Science Award: Stephen Boyd, professor of environmental chemistry, Fall 2004 (see page 6)

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## NAS, from page 7

evaluate the U.S. Navy's current and proposed 1-hour and 24-hour emergency exposure guidance levels and 90-day continuous exposure guidance levels for selected chemical contaminants (e.g., carbon dioxide, ozone, xylene, formaldehyde) that may be found in the air within the cabins of submarines.

