

A Fresh Approach to Food Safety

New director seeks interdisciplinary help in preventing contamination outbreaks

As CHINA AND THE UNITED STATES struggle to clean up tarnished reputations from food scandals in 2008, one of the world's leading experts in food safety is reaching out to professors across the university to encourage research on preventing food contamination.

Robert L. Buchanan in July became the director of the Center for Food Safety and Security Systems. The center was established by a \$1.2 million endowment from Robert Facchina, a 1977 alumnus and now CEO of yogurt and beverage maker Johanna Foods.

Reports of melamine contamination of baby formula in China dominated headlines last fall, but it was only months earlier that a salmonella outbreak in the United States vexed federal officials who mistakenly targeted tomatoes as the source of the bacteria. Buchanan intends for the center to take a systemic approach to preventing these types of crises, meaning that he wants to involve professors from fields as diverse as nanotechnology and economics.

"Our job is to make it easier for faculty to do the kind of research that's going to have an impact nationally and internationally," Buchanan says. "We have a lot of resources that can get them into places that they might not have thought of for getting funding."

The center, in the university's College of Agriculture and Natural

Resources, has already enlisted help from several departments within the college, as well as researchers from the A. James Clark School of Engineering, the Institute of Systems Research, the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA) and several other universities to apply for food protection research grants.

The Center for Food Safety and Security Systems, for example, is leading a University of Maryland team working on a multimillion-dollar proposal to establish a multi-university consortium to test new standards for farmers on how to grow vegetables—a national priority in light of the recurring outbreaks associated with lettuce, spinach, tomatoes and melons. The standards will include how often to test irrigation water, the control of environmental pathogen sources, the proper use of fertilizers and what temperatures best maintain fresh produce.

Mickey Parish, professor and chair of the nutrition and food science department, served as the acting director when the center was launched and led an international search to find a permanent director. Buchanan easily stood out, he says. Buchanan has 30 years experience teaching, conducting research in food safety and working in science and public health policy at the USDA and FDA. He is one of the co-developers of the widely used USDA Pathogen Modeling Program, which guides food handlers on the temperatures and other conditions needed to prevent or halt bacteria growth.

"He had established himself as the preeminent voice for food safety in the world," Parish says. "Having Bob Buchanan as director of the center puts us in the forefront of food safety and security."

Robert L. Buchanan, professor of nutrition and food science, is director of an interdisciplinary research center that is expected to address everything from bioterrorism to the intentional contamination of foods that could cause health problems, death or economic disruption to the nation's food supply.



EXPANDING RESEARCH IN FOOD SAFETY

The **Center for Food Safety and Security Systems** is looking to build upon already-established relationships between the university and the federal government concerning food safety and security. Key research across campus that joins university faculty with government food safety scientists includes:



- With government scientists at the nearby **Beltsville Agricultural Research Center**, everything from studying contagious diseases in livestock, to better understanding insects that can destroy and damage crops, to determining the safety of bioengineered foods.
- With government scientists in the **U.S. Food and Drug Administration's Center for Food Safety and Applied Nutrition**, located at the 124-acre M Square research park adjacent to Maryland's campus, conducting research to address health risks associated with food-borne chemical and biological contaminants.
- With FDA researchers participating in the university's **Joint Institute for Food Safety and Applied Nutrition**, or JIFSAN, providing expertise and mechanisms for exchanging technical information in areas of food safety, human nutrition and animal health as it relates to food production.

AAAS Honors Maryland Researchers

Five Maryland faculty researchers are among the 486 new fellows named by the American Association for the Advancement of Science, or AAAS, the world's largest general federation of scientists and the publisher of the journal *Science*.

Recognition as an AAAS fellow honors researchers whose work, either scientifically or socially, has significantly advanced science or its applications.



"We are pleased that our faculty continue to receive peer recognition at the highest levels for their excellence in research and scholarship," says **Nariman Farvardin**, provost and senior vice president for academic affairs.

The university's five 2008 AAAS fellows are:

Avis H. Cohen, professor of biology, who has focused on spinal regeneration and the development of the fields of computational neuroscience and neuromorphic engineering.

Nathan Fox, Distinguished University Professor of human development, who has worked on elucidating the basis of early temperament and social behavior in young children.



AVIS COHEN



NATHAN FOX



NICHOLAS HADLEY



K.J. RAY LIU



V.S. SUBRAHMANIAN

Nicholas J. Hadley, professor of physics, who has taken a leadership role in the discovery of the top quark and searched for phenomena beyond the standard model of particle physics.

K.J. Ray Liu, professor of electrical and computer engineering, who has contributed to discoveries in signal processing for wireless communications, multimedia, information forensics and security.

V.S. Subrahmanian, professor of computer science and director of the Institute for Advanced Computer Studies, who has contributed to advances in computer science and multidisciplinary computing, especially as it relates to forecasting group behaviors.

In the coming months, we will continue to introduce you to new faculty and research scientists in the Maryland research community.



John Carlo Bertot is a professor of information studies and director of the new Center for Library Innovation. His research interests are public library use of the Internet as well as telecommunications and information policy development.



Sandra Cerrai is an associate professor of mathematics. She taught at the University of Florence in Italy and moved from Pisa to Maryland last year to work at the university. Cerrai is interested in the study of solutions to stochastic partial differential equations.



Rafael A. Corredoira is an assistant professor of management and organization. His research examines how social networks shape semiconductor firms' search for innovations and drive upgrades at automotive and wine companies in developing countries.



Carlos Machado is an associate professor of biology. He is an evolutionary biologist interested in understanding how population and species diverge. He is studying the genetic consequences of evolution in subdivided populations, such as vinegar flies.



Xiaoli Nan is an assistant professor of communications. Her research looks at how people form health beliefs, what motivates people to take preventive steps against a health problem, and how the media influence individuals' health attitudes and behaviors. Nan is currently researching the effect of the media on teen smoking.

Grad student's research improves safety sensors

Tiny, portable sensors being developed by a University of Maryland graduate student might one day be used to detect toxic gases or biological agents in airports, subway stations and other public places.

Building on previous research, **Stephan Koev** designed and built a microchip to read the response of sensors that can detect dangerous pathogens in concentrations as small as a single atom. Previous devices required testing instruments that were too large to use outside of a laboratory, says Koev, an electrical and computer engineering doctoral student affiliated with the Institute for Systems Research.

"Ours is the first one that enables this type of portability," says Koev, who adds that the university's Office of Technology Commercialization filed a provisional patent on this device.

Koev works in the Micro-Electro Mechanical Systems (MEMS) Sensors and Actuators Lab, which has pioneered efforts in develop-

ing sensors that use microscopic cantilevers—very small mechanical arms—that vibrate and move when they detect a particular substance.

The cantilevers are coated with substances that allow molecules to attach to them.

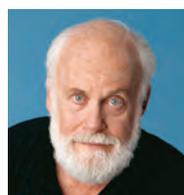
Once the molecules attach, the cantilevers vibrate and deflect a light beam transmitted through the sensor. A compact photodetector measures the amount of light captured and converts the information into an electrical signal capable of being read by a computer.

In addition to detecting potential terrorism risks, the sensors can be used to pick up other hazardous materials, such as the buildup of explosive gases in a coal mine.



Stephan Koev is designing microchips that are part of a portable sensing system able to detect dangerous pathogens.

FACULTY AWARDS & HONORS



MICHAEL A'HEARN, Distinguished University Professor of astronomy, received the 2008 Gerard P. Kuiper Prize in Planetary Sciences in recognition of his scientific contributions and leadership in the study of comets. A'Hearn was a principal investigator for NASA's Deep Impact mission, which delivered the first human-made object to strike the nucleus of a comet and study its composition.



SAMUEL GOWARD, professor of geography, received the 2008 William T. Pecora Award, presented annually by NASA and the U.S. Department of the Interior in recognition of outstanding contributions toward better understanding the Earth by means of remote sensing. Goward leads an interagency research team to quantify the recent history of forest disturbance for the North American Carbon Program.



JUDITH TORNEY-PURTA, professor of human development, received the 2009 American Psychological Association Award for Distinguished Contributions to the International Advancement of Psychology. The award recognizes her research and leadership in advancing psychology, particularly as it relates to civic education.

UPCOMING EVENTS & CONFERENCES



DIVISION OF RESEARCH SEMINAR SERIES IGERT: The New Graduate Education Paradigm

Featured speaker is **Paul "Wyn" Jennings**, who will discuss the National Science Foundation's Integrative Graduate Education and Research Traineeship (IGERT) program. Jennings is a program director in informal science education at the National Science Foundation.

Monday, Feb. 16, 10:30-11:30 a.m.
Marie Mount Hall, Room 100 (Maryland Room)
RSVP to VPR@umd.edu by Feb. 12
For more information: geronimo@umd.edu

Doctoral students involved in language diversity, cognition and neuroscience (shown above) or computational and neural modeling can join a new interdisciplinary program, Biological and Computational Foundations of Language Diversity, which is supported by IGERT.



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