

Expanding the Research Enterprise

The University of Maryland has received major new and continued funding over the past few months in the areas of sustainability and climate change, quantum computing, cybersecurity and the safety of food, drugs and devices.

"Our research enterprise is robust, agile and continues to grow," said Vice President and Chief Research Officer **Patrick O'Shea**. "Thanks to the efforts of our research faculty and students, we are pushing forward in discoveries that impact in every aspect of our daily lives. The future of research at the University of Maryland is bright."

UMD research awards, key to innovations and discoveries, increased to approximately \$479 million during fiscal year 2014.

Highlights:

- UMD is leading the charge on a new generation of better batteries, "powerful and long-lasting because they are based on carefully designed nanostructures," says **Gary Rubloff**, director of the **Nanostructures Electrical Energy Storage Energy Frontier Research Center (NEES EFRC)**.



Gary Rubloff

Rubloff was thrilled to learn that the U.S. Department of Energy's Office of Science renewed its support for the NEES EFRC, first established in 2009. The new grant is \$2.8 million per year over four years.

- The **Cooperative Institute for Climate and Satellites (CICS-MD)**, part of the Earth System Science Interdisciplinary Center (ESSIC), has received an additional \$93 million in funding from the National Oceanic and Atmospheric Administration (NOAA). During the next five years, CICS-MD seeks to integrate and expand research on satellite observations and Earth system modeling for climate research, says Director **Hugo Berbery**.



Hugo Berbery

CICS-MD focuses on research in satellite observations and Earth system modeling in support of the NOAA National Environmental Satellite, Data and Information Service Center for Satellite Applications and Research and the National Weather Service/National Centers for Environmental Prediction.

- The **Physics Frontier Center** at the Joint Quantum Institute (JQI) received \$14.7 million in renewal funding from the National Science Foundation (NSF). The center investigates leading-edge experimental and theoretical ways to control and process quantum coherence and entanglement. It is funded through a cooperative agreement with

the NSF and operated within JQI, a partnership between UMD, the National Institute of Standards and Technology and the Laboratory for Physical Sciences.

- The **Maryland Cybersecurity Center (MC²)** received \$4.5 million in federal funding to establish a "Science of Security 'label'" that includes 15 faculty researchers from five departments: computer science, electrical and computer engineering, information studies, criminology and mechanical engineering.

"Much of the existing work in cybersecurity is reactive, and focuses on designing 'point solutions' to specific problems," says MC² Director **Jonathan Katz** and lead principal investigator of the label. "Our goal is to establish mathematical models that can be used to address cybersecurity threats more broadly, and to carry out empirical studies that can help validate those models."



Jonathan Katz

- For the next three years, **William Lamp** (entomology) and his research group will investigate how genetically modified Bt corn, which selectively kills caterpillars and beetle larvae that feed on the plant, affects aquatic organisms when excess vegetation ends up in streams after harvest. Lamp received a Biotechnology Risk Assessment Research Grant of nearly \$500,000 from the National Institute of Food and Agriculture.



William Lamp

"It's new technology, and any new technology has risks as well as benefits," Lamp says. "We are supported by public money and have to consider those risks because the companies don't."

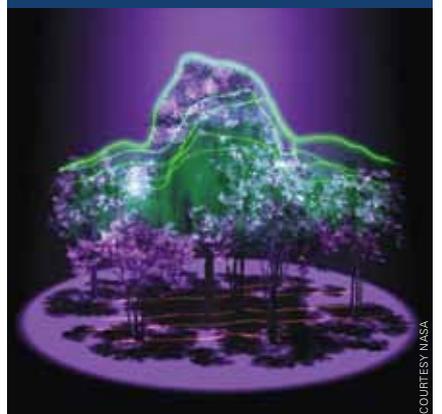


A New View From Space

A new instrument developed by UMD and NASA Goddard Space Flight Center researchers will be deployed on the International Space Station to provide observations about the Earth's forests and their response to changes in climate and land use.

The Global Ecosystem Dynamics Investigation (GEDI) Lidar will use a system of laser beams to create a three-dimensional map of vegetation structure to answer three key questions:

- How has deforestation contributed to atmospheric CO₂ concentrations?
- How much carbon will forests absorb in the future?
- How will habitat degradation affect global biodiversity?



An artist rendering of how the GEDI Lidar will reveal 3-D architecture of forests around the world.

"We've been trying for 15 to 20 years to get these measurements, and the missing piece has been this 3-D structure," says Ralph Dubayah, principal investigator (geographical sciences). "We want to know how much biomass these forests contain, to see how the earth's forests have changed as result of disturbance and their subsequent regrowth."

With the data collected, researchers can better advise policymakers nationally and internationally to help set standards for cap and trade programs or to verify if countries being paid to conserve their forests are actually doing so.

GEDI was awarded \$94 million and will be completed in 2018.

Unmanned Aircraft Systems Test Site Launched



From left: Ed Barrett, Patuxent Partnership vice president; William "Brit" Kirwan, University System of Maryland chancellor; U.S. Rep Steny Hoyer '63; Provost and Senior Vice President Mary Ann Rankin; Maryland Del. John Bohanan; Vice Adm. David Dunaway, Naval Air Systems Command commander; and Rose Mooney, Mid-Atlantic Aviation Partnership executive director.

The A. James Clark School of Engineering launched a new unmanned aircraft systems (UAS) test site in St. Mary's County, Md.

UMD will work with Naval Air Systems Command, industry leaders and federal, state and local governments to accelerate research in this area. The goal is to "safely and responsibly integrate and advance" unmanned aircraft systems.

"Our expertise in autonomous vehicles research, aerospace engineering, and rotorcraft technology has positioned the University of Maryland as a pioneer and strong partner in the advancement of UAS research," says Mary Ann Rankin, senior vice president and provost of UMD.



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IN THIS ISSUE:

UMD Research Enterprise Grows with Flurry of New Grants

Goddard, UMD Lidar System to Be Deployed on Space Station

Maryland Opens Unmanned Aircraft Systems Test Site

SPOTLIGHT

Drug-Use Warning System Funded

The use of designer synthetic compounds like “Molly” and synthetic marijuana are on the rise, and a UMD team is working to help public health experts respond quickly to outbreaks of such illicit drugs.

The Center for Substance Abuse Research (CESAR) has been awarded nearly \$3.5 million by the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health, to serve over the next five years as coordinating center for the innovative National Drug Early Warning System (NDEWS).

“The systems we used in the past primarily depended upon national data systems that took a long time—sometimes a year or two—to get data out,” says CESAR Director Eric Wish. “NDEWS promises to provide the country with critically needed real-time information about changing drug-use patterns.”

NDEWS will involve experts from the former Community Epidemiology Work Group sponsored by NIDA. NDEWS will build a virtual community of addiction experts, sentinel-site community epide-

miologists and concerned citizens to share data and information about emerging drugs. Other innovative methodologies to be employed by NDEWS include monitoring drug trends through social media and Web scans, drug-related listservs, biological testing and poison control center listservs.

NDEWS will also send a rapid response team to conduct on-site assessments of local drug outbreaks. Through quick dissemination of information to the public via www.ndews.net, NDEWS hopes to keep these problems from escalating or spreading.



The Division of Research publishes RESEARCH@MARYLAND several times per semester. Its goal is to better inform and connect the research community at the University of Maryland. Your comments and suggestions are welcome. Please email them to Anne Gerontimo, Division of Research, at gerontimo@umd.edu.
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FACULTY AWARDS & HONORS



Communication Professor **EDWARD L. FINK** was named a Fellow of the International Communication Association for his contributions to formal theory construction and methodological innovation. Fink is the first faculty member from UMD to receive this recognition.



The Society for Counseling Psychology awarded Professor **ROBERT W. LENT** the Leona Tyler Award for Lifetime Achievement in Counseling Psychology. Named “one of the most important scholarly voices of his generation,” Lent was lauded for his prolific research; dedication to education and training; and service and leadership roles in the field.



VIVIAN SISSKIN, clinical professor of hearing and speech sciences, was named Speech-Language Pathologist of the Year by the National Stuttering Association. She has presented her research through articles and workshops nationally and internationally, advocated for improved understanding of communications disorders through media and worked to help children with autism spectrum disorders.

NEW FACULTY

We introduce you to new faculty and research scientists in the Maryland research community.

Maria Polinsky is a professor of linguistics and will start at Maryland in fall 2015, also taking on the role of associate director of the Language Science Center. Her research is at the intersection of theoretical syntax and the study of cross-linguistic variation in sentence structure.

Michelle Mazurek is an assistant professor of computer science. Mazurek is the latest addition to the Maryland Cybersecurity Center, where she studies computer security with an emphasis on human factors.

Felipe Saffie is an assistant professor of economics. He researches quantitative macroeconomics, with a particular focus on the effects of international financial crises on aggregated productivity.

Michel Boudreaux is an assistant professor of health services administration. He studies the evolution of health and socioeconomic position over a lifetime and between generations, as well as health care access measurement in federal surveys.

UPCOMING EVENTS & CONFERENCES

RESEARCH SEMINAR SERIES

NASA's Science Mission Research Priorities and Future Directions

John Grunsfeld, Associate Administrator, NASA's Science Mission Directorate

Tuesday, Oct. 14, 11 a.m.

Margaret Brent B Room 2112, Stamp Student Union

Army Research Laboratory Research Collaboration Opportunities

Thomas Russell, Director, U.S. Army Research Laboratory

Monday, Nov. 3, 11 a.m.

Pepco Room, Room 1105, Kim Engineering Building
For both events, RSVP to vpr@umd.edu.

RESEARCH ON THE HILL

Disaster Resilience: The Intersection of Research and Policy

Co-sponsored by UMD's Division of Research and the Big Ten Committee on Institutional Cooperation

Tuesday, Oct. 21, Noon

Room HVC-201, U.S. Capitol Visitor Center, Washington, D.C.
RSVP to ter.ps/1021