

## UMD, NIST Look to Expand Alliance

**A longstanding partnership** between the university and a federal agency known for advancing industrial competitiveness and cutting-edge science is set to grow even stronger.

**Patrick Gallagher**, undersecretary of commerce and director of the National Institute of Standards and Technology, or NIST, visited the University of Maryland last month to meet with faculty researchers and administrators, previewing his vision for expanding their robust research and educational collaborations.

"We have a rich alliance, aided greatly by our close proximity, and also by our common goal of providing scientific leadership, innovation and economic prosperity to the region and the nation," Gallagher said to the standing-room-only crowd.

Gallagher spoke at length about the need for the nation's research community to be the driving force behind innovation, noting that NIST and UMD are already involved with science and outreach efforts designed to

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help U.S. manufacturers create and retain jobs, increase profits and save time and money.

He also highlighted the established collaborative programs already in place with the university—including research in neutron scattering, quantum physics and nanotechnology—and previewed new research thrusts at NIST that match well with the university's strengths, including work in biophysics, cybersecurity, cloud computing and health information technology.

"Our scientific community is well-positioned to align ourselves with any new priorities at NIST," says **Norma Allewell**, interim vice president for research. "We really couldn't ask for a better opportunity, both for our faculty researchers and for our graduate students."

One successful partnership is a NIST-funded fellowship program that sends 50 fellows per year to work

at NIST laboratories in Gaithersburg, Md., and Charleston, S.C., where they can use the latest technologies to study weight and measurement. Funded last year with \$15 million in federal stimulus funds, the fellowship program is administered by the university's Institute for Research in Electronics and Applied Physics.

In another collaborative effort, ongoing for almost two decades, faculty, post-docs and students in the Department of Materials Science and Engineering have worked with the NIST Center for Neutron Research. There, groundbreaking research in neutron scattering—a powerful method for characterizing the nanoscale structure of solids, liquids and macromolecules—is advancing science and technology projects crucial for maintaining U.S. leadership in the world economy.

"The opportunity for Maryland scientists and students to use the world-class research facilities at NIST is unparalleled," says **Robert Briber**, department chair and principal investigator of several NIST-funded projects involving neutron scattering research.

At the Institute for Bioscience and Biotechnology Research in Shady Grove, Md., the university partners with NIST and others on research involving nanobiotechnology, drug and vaccine discovery and the study of disease processes.

A key component of the alliance between NIST and UMD is the Joint Quantum Institute, or JQI, focused on advancing a basic understanding of the universe, as well as developing technologies for cryptography, advanced computing and the design and use of sensors.

A NIST-funded Laboratory for Advanced Quantum Science, part of the JQI, is set for completion in 2013, part of the university's new \$128 million Physical Sciences Complex now under construction.



Patrick Gallagher, NIST director, spoke last May at the groundbreaking for the Physical Sciences Complex that will house the NIST-funded Laboratory for Advanced Quantum Science.

## 2011 Seed Grants

Research projects that track insulin resistance in diabetes patients, diagnose cardiac arrhythmias with robotics and model how financial strain affects older adults have been recently funded by a collaborative seed grant program between the University of Maryland and the University of Maryland, Baltimore.

Now in its fourth year, the program provides startup funds to cross-institutional teams in hopes of increasing the number of successful grant proposals submitted to the National Institutes of Health. The goal is to encourage collaboration and to provide proof-of-concepts that can position these teams for success.

From the 40 proposals submitted this year, seven were funded from a total of \$525,000 in seed money. They and their PIs are:

— **Balakumar Balachandran** from UMD and **Rao Gullapalli** from UMB are studying how shock waves, whether used in neurosurgery or suffered in military action, can damage the human brain.

— **Eva Chin** from UMD and **Andrew Goldberg** from UMB are examining the role that skeletal muscle abnormalities can play in insulin resistance, a serious problem for those with Type 2 diabetes.

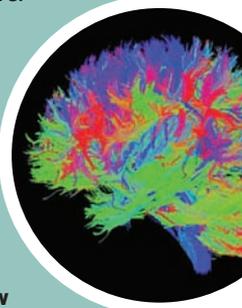
— **Donald Milton** from UMD and **Mark Cowan** from UMB are exploring novel methods for collecting and analyzing biomarker proteins in exhaled breath, a noninvasive way to determine what's going on inside a human lung.

— **Matthew Roesch** from UMD and **Joseph Cheer** from UMB are studying the role of dopamine—molecules that serve as neurotransmitters—in observational learning, particularly as it might relate to autism.

— **Jaydev Desai** from UMD and **Timm-Michael Dickfeld** from UMB are developing a robotics-based diagnostic tool that can identify and then treat cardiac arrhythmias emanating from pulmonary veins.

— **Sridhar Hannenhalli** from UMD and **Christy Chang** from UMB will use their combined expertise in molecular genetics and bioinformatics to better predict the genetic basis of complex diseases, including cardiovascular disease.

— **Joan Kahn** from UMD and **Dawn Alley** from UMB will assess demographic data and develop predictive models on how financial strain, especially in older adults, affects health.



## Division of Research Launches Expertise Database

Looking for someone to crunch numbers on your cell migration research? How about an art historian to validate that odd-looking artifact from your urban studies project?

The Division of Research recently launched a database that allows Maryland faculty and staff to search for scientific and academic expertise across campus. The database, at <http://expertise.umd.edu>, encourages collaboration and helps faculty find the right expert, or group of experts, to complement their own research and scholarship.

It also will help Maryland researchers put together extramural funding proposals that require a documented interdisciplinary approach, says **Ken Gertz**, associate vice president for research development. "It's a powerful tool that provides a wealth of usable information and makes for a more robust and interconnected research enterprise," he says.

The database is supported by the Office of Information Technology and requires a valid UMD directory ID to log on. Once on the secure website, Maryland researchers can access a variety of information from public sources as well as material indexed from each other's most recent Faculty Activity Report, or FAR, which is updated annually.

The site contains more than 22,000 academic papers filed in FARs, says **Anne Geronimo**, director of research development, who adds that the database is continuously being updated to include the newest published papers and other data that can assist researchers.

For information, contact [geronimo@umd.edu](mailto:geronimo@umd.edu).



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



**Holly Brewer** is an associate professor of history. Her research explores the ideological origins of slavery in the British Empire and early Virginia and the transformation of laws on domestic relations in early America.



**Zhihong Nie** is an assistant professor of chemistry and biochemistry. His research combines work in nanochemistry, plasmonics, bioinspired materials, and biomedicine and medical diagnostics.



**William Reed** is an associate professor of government and politics. His research includes mathematical and statistical models of international conflict and cooperation as well as experimental studies of conflict bargaining.



**Kalyani Chadha** is an assistant professor of journalism. Her research analyzes trends in international communication and at the impact of television programming on society.



**Garegin Papoian** is an associate professor of chemistry and biochemistry. His research involves statistical mechanics, polymer physics, computational protein modeling and bioinformatics.

## Investigating Low-Carbon Business Decisions in Emerging Global Markets

What motivates private firms in countries experiencing rapid growth and industrialization to make environmentally friendly business decisions?

**Nathan Hultman**, an assistant professor of public policy, is conducting a comparative analysis of choices that companies in India, Brazil, South Africa and South Korea consider when investing in solar or wind technologies to power their factories and manufacture their goods.

"Scientists estimate that firms in emerging economies could produce up to 95 percent of Earth's carbon emissions over the next 30 years, so understanding their decision making as it relates to low-carbon investments is imperative," Hultman says.



Funded by a National Science Foundation CAREER grant, one of the organization's most prestigious awards given to new research faculty, Hultman's latest project builds upon previous work on international climate policy and risk-versus-benefits analyses of nuclear energy.

His initial data show that some of the overseas businesses might be influenced by financial incentives in the form of carbon credits or penalties, while others find low-carbon technologies to be more efficient.

Other factors involve how a firm's technology needs and business models interact with overlapping international and domestic energy policies.

"Understanding the decisions these companies make is key to evaluating a successful and sufficiently ambitious long-term international approach to transitioning to a low-carbon economy," Hultman says.



Nathan Hultman

## FACULTY AWARDS & HONORS

### ARHU Faculty Named Guggenheim Fellows

Two faculty members in the College of Arts and Humanities have been awarded Guggenheim Fellowships for 2011.

**Matthew Kirschenbaum** and **Heather Nathans** join a diverse group of 180 scholars, artists and scientists—chosen from more than 3,000 applicants—recognized by the John Simon Guggenheim Memorial Foundation "for productive scholarship or exceptional creative ability in the arts."

Kirschenbaum, an associate professor of English, will use his fellowship for a new project, "Track Changes: Authorship, Archives, and Literary Culture after Word Processing," which looks at the impact of digital media throughout all sectors of contemporary literary composition, publishing, reception and archival preservation.

Nathans, a professor of theatre, received the fellowship to support her latest book project, "Hideous Characters and Beautiful Pagans: Performing Jewish Identity in the Antebellum American Theatre."



Matthew Kirschenbaum



Heather Nathans

### CMNS Faculty Elected to American Academy of Arts and Sciences

Physicist **Jim Gates** and geologist **Roberta Rudnick**, both from the College of Computer, Mathematical and Natural Sciences, are among a distinguished group of 212 new members elected to the American Academy of Arts and Sciences. The academy is one of the nation's most prestigious honorary societies and a leading center for independent policy research.

Gates, the John S. Toll Professor of Physics at Maryland, is renowned for his fundamental contributions to string theory, a key component of modern physics.

Rudnick, who will chair the geology department starting in July, is an expert on the origin and evolution of the continents, particularly the lower continental crust and the underlying mantle lithosphere.



Jim Gates



Roberta Rudnick

## 2011 Celebration of Scholarship and Research

An annual gathering of the university's research community started on a high note when President **Wallace D. Loh** told the 200-plus attendees that their work "was like a world-class symphony: individually or in small groups you can create great things, but it's only when we come together that it becomes a powerful masterpiece."

The May 10 reception, sponsored by the Division of Research and the provost's office, provided an opportunity for faculty and administrators from different schools and colleges to celebrate the scholarly and research accomplishments of their colleagues. "It's also a great way for researchers from across campus to network in an informal, congenial atmosphere," says **Norma Allewell**, interim vice president for research.



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