

Maryland Is Becoming a Supercomputing Leader

The University of Maryland in May will launch a new research supercomputer that will be among the fastest at a U.S. university. The computer, known as Deepthought2, will allow researchers in astronomy, physics, geography, bioengineering and other disciplines to process huge amounts of data much more quickly and easily.

"This will take our research enterprise to the next level," says Vice President for Research **Patrick O'Shea**. "This will allow our scientists to deeply analyze many issues of major societal significance, such as climate change and virtual reality." Researchers in these areas often need powerful computing to work effectively. O'Shea notes that the new computer will also serve as a recruiting tool in drawing new faculty to the university.

Deepthought2 will be part of the new Cyberinfrastructure Center in the Rivertech Building, southwest of campus. The center will also house departmental computers, as well as space for UMD researchers to back up and store their work, centralizing functions that are now spread across campus.



Antonio Busalacchi

"We are really thrilled about it," says **Antonio Busalacchi** (atmospheric and oceanic science), director of the Earth System Science Interdisciplinary Center. "We haven't had this level of institutional high-performance computing on this campus before." One of Busalacchi's projects has been developing high-resolution regional climate models of areas such as the Chesapeake Bay watershed and the Gulf of Mexico, something that Deepthought2 and the Cyberinfrastructure Center will support.

Fran LoPresti, deputy chief information officer in the Division of Information Technology, estimates the number of researchers using Deepthought2 will be exceed 1,000, up from the 200 Maryland scientists using Deepthought, the university's current supercomputer, which was unveiled in 2006. In recent years, that supercomputer has lacked the power to handle the most complex scientific problems.

LoPresti, who was heavily involved in the development of Deepthought2 and the Cyberinfrastructure Center, hopes to attract researchers from a variety of disciplines.

One of the researchers who will use Deepthought2 is **Derek Richardson** (astronomy), who studies how individual particles combine to form planets and solar systems. To do this work, he creates models predicting the



Derek Richardson



Deepthought2 will significantly add to Maryland's computing capacity.

behavior and interactions of as many as 10 million separate particles. "In our field, we need a lot of high-performance computing," says Richardson.

Johan Larsson (mechanical engineering) is also looking forward to using the new setup. "It gives us the ability to attack more complex problems," says Larsson, who studies fluid mechanics, turbulence and predictive computation. All of these "require enormous amounts of memory and computational power," he says.



Johan Larsson

Deepthought2, which cost about \$4.2 million, will have that power: It will have a processing speed of about 300 teraflops, thousands of times faster than a typical desktop PC. (Deepthought has 35 teraflops of processing speed.) The new supercomputer can complete between 250 trillion to 300 trillion operations per second, and will have a petabyte (1 million gigabytes) of storage as well as a very high-speed internal network, allowing researchers to work remotely.

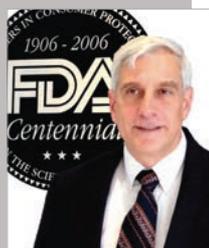
The center will have climate control and backup power, ensuring that important data are not lost. It will be energy-efficient, too, with a cooling system that recycles the intense heat given off by Deepthought2 and other processors. This will allow the center to keep its thermostat at 72 degrees rather than 68, saving thousands of dollars annually.

If you or your department are interested in finding out more about how to incorporate Deepthought2 or the Cyberinfrastructure Center into your work, please contact Fran LoPresti at 301.405.7779 or flopresti@umd.edu.

Schultheis Leads Regulatory Science Initiative

The University of Maryland has appointed **Lex Schultheis** director of the Regulatory Science and Innovation Initiative. In this new role, he will grow the university initiative in partnership with the U.S. Food and Drug Administration (FDA).

Scientists and engineers at UMD and the FDA have a long history of collaboration. UMD researchers in engineering, agriculture, natural sciences, public health and public policy are developing innovative, science-based processes to improve consumer safety and streamline government regulations.



Lex Schultheis

UMD regulatory science initiatives include the Joint Institute for Food Safety and Nutrition (JIFSAN), which helps ensure a safe food supply and infrastructure for national food safety programs and international food standards, as well as the FDA-supported Center for Excellence in Regulatory Science and Innovation with the University of Maryland, Baltimore aimed at developing new tools, standards and approaches to assess the safety, efficacy, quality and performance of FDA-regulated drugs and medical devices.

The new initiative will link these activities more closely with the FDA, and will encourage further development of research and education programs in partnership with the FDA. Schultheis plans to collaborate with JIFSAN on food safety, and hopes to use its approach as a model for other areas, such as medical devices, drugs and biologics. In addition, he is working with the Robert H. Smith School of Business on new strategies for risk communication, employing social media to allow patients to offer feedback on their use of new medicines and devices. He also plans to work with other UMD researchers, including **Pamela Clark** (public health), who last year received a \$19 million grant from the FDA and the National Institutes of Health to study how tobacco products are engineered.

Schultheis has over 20 years of experience as an anesthesiologist. Most recently, he was an expert medical officer in the FDA Center for Drug Evaluation and Research, and branch chief in the agency's Center for Devices and Radiation Health, where he reviewed anesthesia and respiratory medical technology.

UMD, Lockheed Begin Quantum Partnership

Lockheed Martin and the University of Maryland announced in March that they will work together to develop a quantum computer that can solve a range of complex problems in fields such as drug discovery and logistics. The agreement establishes the **Quantum Engineering Center**, which will involve researchers from Maryland as well as engineers and scientists from the aerospace, defense and technology company. **Ray Johnson** (l.), Lockheed's senior vice president and chief technology officer, **Mary Ann Rankin**, Maryland's senior vice president and provost, and **Patrick O'Shea**, UMD's vice president for research, signed a memorandum of understanding at a campus event on March 5.





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SPOTLIGHT



Scholars to Study Links Between Ancient Rome, Early America



Judith P. Hallett



Lillian Doherty



Jorge Bravo

A five-year, \$500,000 grant from the National Italian American Foundation to Maryland's Department of Classics will fund research to examine how ancient Roman ideas, arts, architecture and culture have influenced America from colonial times to the present. Maryland was chosen over 25 other applicants.

"This is a tremendous accomplishment for the department," says **Judith P. Hallett**, who is one of the grant's three principal investigators, along with **Lillian Doherty** and **Jorge Bravo**. Hallett says the grant will help illuminate how this country has conceived of itself in relation to, and in the context of, one of history's great civilizations.

UMD researchers will use the grant, which is named for its donor, Ernest L. Pellegrini, to sup-

port a variety of research. **Gregory Staley** (classics), for example, will explore why paintings in the U.S. Capitol (see above) are modeled on the ancient wall paintings of Pompeii.

Hallett notes that many of the founding fathers had a classical education and were very familiar with ancient Roman thought. "They held up ancient Rome as a model for what the new country could be," she says.

In addition to funding research, the grant will underwrite scholarships for undergraduate and graduate students, and will support as many as 20 students per year to study abroad or conduct research in Italy.

Executive editor: Anne Gerontimo
Managing editor: David Kohn
Art director: Jennifer Paul

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of Research, at gerontimo@umd.edu.

Office of the Vice President for Research
2133 Lee Building
University of Maryland
College Park, MD 20742-5121
www.umresearch.umd.edu

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FACULTY AWARDS & HONORS



ALBERT S. "PETE" KYLE, professor of finance, was selected as a member of the American Finance Association Society of Fellows. Kyle's research focuses on market microstructure, including informed speculative trading, market manipulation, price volatility and market liquidity.



HONG JIAO, associate professor of measurement, statistics and evaluation, received the 2014 Bradley Hanson Award from the National Council on Measurement in Education. The award honors significant contributions to the field of educational measurement. She focuses on item response theory and its application in solving psychometric issues in large-scale assessments.



WILLIAM E. BENTLEY, professor and chair of the Fischell Department of Bioengineering, received the 2014 Marvin J. Johnson Award in Microbial and Biochemical Technology from the American Chemical Society. Bentley was honored for his many contributions to biotechnology, especially his innovative molecular and metabolic engineering work on protein expression, RNA inhibition and biofunctional devices.

NEW FACULTY

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

Shawn Mankad is an assistant professor of business analytics. He researches new methodologies for finding and visualizing patterns from large amounts of data, especially in finance and health care.

Adriane Fang is an assistant professor of dance. She is also a choreographer with a keen interest in multidisciplinary collaboration and has developed performances working with professors in the UMD astronomy and physics departments.

Lint Barrage is an assistant professor of agricultural and resource economics. She studies public economics, with a focus on taxation, regulation and the intersection of macroeconomic and environmental considerations in policy design and analysis.

Ethan Hutt is an assistant professor in the College of Education. His research focuses on the historical relationship between schools, the law and education policy, particularly how the law has defined the purpose and organization of public education.

UPCOMING EVENTS & CONFERENCES

RESEARCH SEMINAR SERIES

NSF International Programs and Overall NSF Research Priorities

Wanda Ward, Head of the Office of International and Integrative Activities, National Science Foundation

Thursday, May 1, 11 a.m.
Pepeco Room, Room 1105, Jeong H. Kim Engineering Building
RSVP to vpr@umd.edu

Agilent Research Priorities, Vision for the Future, and Forging Strong Collaborations with Faculty Researchers

Jack Wenstrand, Director of University Relations and External Research, Agilent Technologies

Thursday, June 5, 11 a.m.
Pepeco Room, Room 1105, Jeong H. Kim Engineering Building
RSVP to vpr@umd.edu