Research@MARYLAND
CONNECTING *the* UNIVERSITY *of* MARYLAND RESEARCH COMMUNITY
MARCH 2011 | VOL. 5, NO.2

UMIACS Broadens Its Research Agenda

Pioneering the research in hyperlinks that helped spark the meteoric rise of the Internet. Tracking global land-cover via remote sensing to predict the Earth's carbon cycle. Refining machine translation to assist the government in quickly interpreting non-English print and audio information.

Amitabh Varshney, director of UMIACS, says the multidisciplinary institute will expand its research in cybersecurity, robotics and cell imaging.

These innovations were all born at the University of Maryland Institute for Advanced Computer Studies, or UMIACS, a gateway for high-impact, multidisciplinary research that demands large-scale computing resources.

Established in 1985, the institute—under the leadership of its newest director—now seeks to expand its scientific repertoire. Recent UMIACS initiatives include providing startup funds for new cross-campus endeavors, partnering with UMD centers in robotics and cybersecurity and exploring novel technologies that can impact medicine and public health.

"We want to revitalize the same spirit of innovation and discovery we've had for the past 25 years and carry that momentum into the next quarter century," says **Amitabh Varshney**, a computer scientist who assumed the director's role in July.

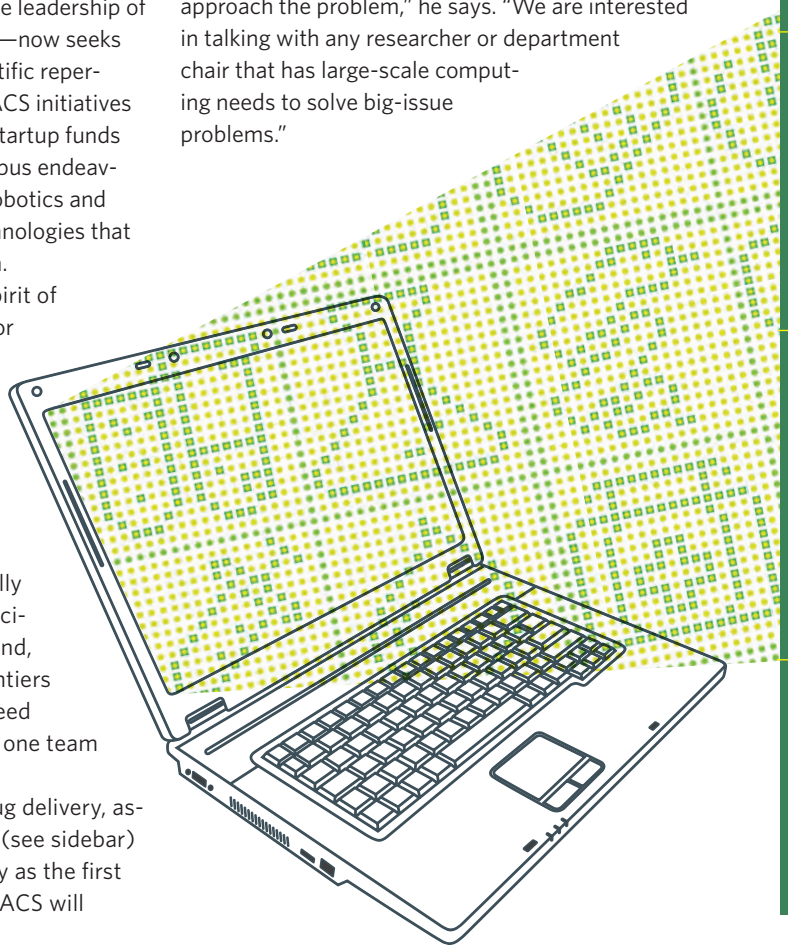
Varshney believes one way to refresh UMIACS is by involving new faculty from across campus—especially those in disciplines not normally associated with computer science. To that end, he established the New Research Frontiers Awards, a competitive, team-based seed grant program that stipulates at least one team member be from outside of UMIACS.

Three projects that can improve drug delivery, assist cancer patients and fight disease (see sidebar) each received $50,000 in seed money as the first cohort of awards. Varshney says UMIACS will continue to screen funding proposals from across campus "for the foreseeable future."

He also plans to expand the institute's commitment to research involving robotics and cybersecurity as well as live cell imaging, which uses high-performance computing and visualization tools that allow biologists to interact with live cells as they divide, attack and spread under a microscope.

All of these areas, Varshney says, fall under the criteria of any research undertaken in UMIACS: There has to be a significant problem being investigated—what scientists refer to as a "grand challenge"—and the project must rely on computing for the outcome.

"It has to be something that if you use computing, it will change the way that scientists fundamentally approach the problem," he says. "We are interested in talking with any researcher or department chair that has large-scale computing needs to solve big-issue problems."



PROJECTS FUNDED

Three winning proposals in the UMIACS New Frontiers Research Awards program join faculty and research scientists from across the College of Computer, Mathematical and Natural Sciences, or CMNS. "We felt this was an excellent opportunity to continue building our cross-disciplinary teams that are advancing science," says CMNS Dean **Stephen Halperin**, whose office provided part of the startup funds. The projects, with investigators, involve:

- designing computational models to understand how spatial organization in genomes—their 3-D structure—impacts a genome's function, particularly as it relates to disease. (**Michelle Girvan**, physics; **Sridhar Hannenhalli**, UMIACS and cell biology and molecular genetics; **Carl Kingsford**, UMIACS and computer science)
- using "small angle scattering," or deflections of beams of particles, to understand molecular mechanisms used for improved drug delivery and other medical applications. (**David Fushman**, chemistry and biochemistry; **Ramani Duraiswami**, UMIACS and computer science; **Nail Gumerov**, UMIACS; and **Konstantin Berlin**, chemistry and biochemistry)
- analyzing gene expressions for predicting survival rates of certain liver cancers. (**Wael Abd-Almageed**, UMIACS; **Jonathan Dinman**, cell biology and molecular genetics; and **Larry Davis**, UMIACS and chair of computer science)

THE FEDERAL CORNER

UPDATE FROM THE OFFICE OF FEDERAL RELATIONS

Next Up: The FY2012 Budget

Making a committed effort to bolster the nation's global competitiveness in research and innovation, President Obama's recently submitted FY2012 budget provides $148 billion for research and development, including more funding for several key federal agencies.

Funding for the National Institutes of Health would increase to $32.3 billion, a three percent jump from fiscal 2010. Likewise, the National Science Foundation may see an increase of 13 percent with the $7.76 billion in funding that the president has proposed for fiscal 2012. NASA would get an increase of 12 percent from 2010, and the Department of Energy's Office of Science would see a six percent rise.

The latest budget also includes $12 million for the Advanced Manufacturing Technology Consortia program, which supports innovation efforts at universities, government laboratories and businesses, particularly in areas like clean energy, advanced manufacturing technologies and cybersecurity.

In light of recent budget infighting between members of Congress and the administration, the big question, of course, is what will the House and Senate do with the president's proposal for next year? Stay tuned!

Look to the Federal Corner for more information regarding higher education and the federal government. If you have a specific matter you would like to see discussed in this column, please contact Rae Grad, director of federal relations, at rgrad@umd.edu.

A Second Chance for NIH Proposals

In 2010, the National Institutes of Health, or NIH, funded less than one quarter of the research proposals submitted to its 27 institutes and centers. Maryland researchers turned down for NIH funding should note that a nonprofit advocacy group, the National Health Council, recently launched an online registry that joins investigators who have meaningful, yet unfunded, projects with nongovernmental organizations looking to support medical breakthroughs.

The registry, at **www.healthresearchfunding.org**, is recommended by the NIH deputy director for extramural research and is meant to be "the Match.com of funding organizations," says **Anne Geronimo**, UMD's director for research development. Any researcher who has a proposal that NIH deemed worthy of peer review, but didn't fund, can post their abstract and contact information at no cost.

Only registered funding organizations, ensuring privacy and security, can search abstracts for projects they think are a fit for their organization. The site currently has 42 patient advocacy groups registered, including the American Cancer Society and the Alzheimer's Association.

NEW FACULTY

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

Dana Fisher is an associate professor of sociology. Her research includes a National Science Foundation-funded project to understand the relationship between civic stewardship and re-greening efforts in New York City.

Anya Jones is an assistant professor of aerospace engineering. Her research is focused on experimental fluid dynamics, including aerodynamics, vortex dynamics and flow control.

John McCauley is an assistant professor of government and politics. His research includes African politics, religious and ethnic politics and field experiments in social science.

Michael Kimbrough is an associate professor of accounting. His research focuses on corporate financial reporting, particularly firms' voluntary disclosure practices and on accounting for intangible investment.

Ayelet Lahat is an assistant professor of human development. Her research involves social cognitive neuroscience, including the neural correlates of children and adult moral and social decisions.

SPOTLIGHT

Digitally Tracking Biodiversity

Getting a detailed accounting of Mother Nature may depend on capitalizing on human nature.

Faculty and graduate students in the College of Information Studies, Maryland's iSchool, and the Department of Computer Science are developing Biotracker, a National Science Foundation-funded project that encourages everyday citizens to snap digital photos and collect other data on flora and fauna worldwide.

Assistant professor and project co-investigator **Derek Hansen** says Biotracker will help merge "people's innate desire to hunt down and collect things" with the precise rules used in computer calculations, called algorithms. He compared it to geocaching, a game that uses hand-held global positioning devices to find hidden objects, except Biotracker has the added "cache" of benefiting science.

Derek Hansen

"We want to develop technology-based motivational tools that inspire people to collect information useful for other scientists in identifying new species, or in tracking the migration patterns of known ones," he says.

The Maryland team expects the unique data from Biotracker to be incorporated into the Smithsonian Institution's Encyclopedia of Life, an online repository that aims to document all of the Earth's estimated 2 million living organisms.

FACULTY AWARDS & HONORS

UMD Faculty Named AAAS Fellows

Five faculty researchers from the College of Computer, Mathematical and Natural Sciences are among the 503 new fellows recently honored by the American Association for the Advancement of Science, or AAAS. The AAAS is the world's largest general federation of scientists, and election as a fellow is bestowed upon members "for scientifically or socially distinguished efforts to advance science or its applications." The UMD faculty are:

Richard L. Greene, physics, for contributions to the field of experimental condensed matter physics, particularly for discovery of superconductivity and other novel physics in organic and copper oxide materials.

Abolhassan Jawahery, physics, for contributions to the understanding of the physics of the bottom quark and of the differences between matter and antimatter.

Steven Rokita, chemistry and biochemistry, for contributions to the development of conformation and sequence selective methods of oxidation, alkylation and reduction of nucleic acids for fundamental and applied investigations.

Hanan Samet, computer science, for developing algorithms and data structures for applications involving spatial data in geographic information systems, or GIS, computer graphics, databases and image processing.

Heven Sze, cell biology and molecular genetics, for contributions to the field of membrane biology, particularly in the biochemical and molecular studies of plants.

UPCOMING EVENTS & CONFERENCES

DIVISION OF RESEARCH SEMINAR SERIES

Research Mission, Priorities and Future Plans at NIST

Featured speaker is **Patrick Gallagher**, director of the National Institute for Standards and Technology.

Tuesday, April 5, 11 a.m. to noon
Pepco Room, Kim Engineering Building
RSVP to vpr@umd.edu by April 1

Center for the History of the New America Forum

Featured speakers are **Ira Berlin**, distinguished university professor of history, and **Julie Greene**, professor of history.

Wednesday, April 13, 3 to 4:30 p.m.
Maryland Room, Marie Mount Hall
RSVP to vpr@umd.edu by April 11

DHS Science and Technology Priorities for Border and Maritime Security

Featured speaker is **Anh Duong**, director of the Borders and Maritime Security Division, Department of Homeland Security.

Wednesday, April 27, 11 a.m. to noon
Benjamin Banneker Room, Stamp Student Union
RSVP to vpr@umd.edu by April 25

UNIVERSITY OF MARYLAND

RESEARCH@MARYLAND
CONNECTING *the* UNIVERSITY *of* MARYLAND RESEARCH COMMUNITY

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

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 e-mail them to Anne Geronimo, Division of Research, at geronimo@umd.edu.

Produced by University Publications for the Division of Research
Norma Allewell, interim vice president for research

Executive editor: Anne Geronimo
Managing editor: Tom Ventsias
Art director: Jennifer Paul
Dana Fisher image by Kinny Chan Photography
Front page feature illustrations: iStock