

## How Are Solar Systems Formed?

**Is there life on other planets?** What feeds a black hole?

Maryland researchers could soon offer substantial insight into these topics, and more, through several scientific partnerships under way or in development.

University and federal officials are exploring the creation of a Center for Planetary Origins, which would join UMD faculty and graduate students with scientists at nearby NASA Goddard Space Flight Center. Collectively, they would study the origins, composition and evolution of planets and smaller celestial bodies like comets and asteroids.



Stuart Vogel, chair of astronomy at UMD

"Between this university, NASA Goddard and other experts within an hour's drive, the region has more world-class planetary scientists than anywhere I know of," says **Stuart Vogel**, chair of Maryland's astronomy department. "We want to use this cohesive, common group to address some challenging scientific questions."

The planetary origins group would mostly involve Maryland researchers in astronomy, physics and geology, with faculty in chemistry, biology and atmospheric science also participating.

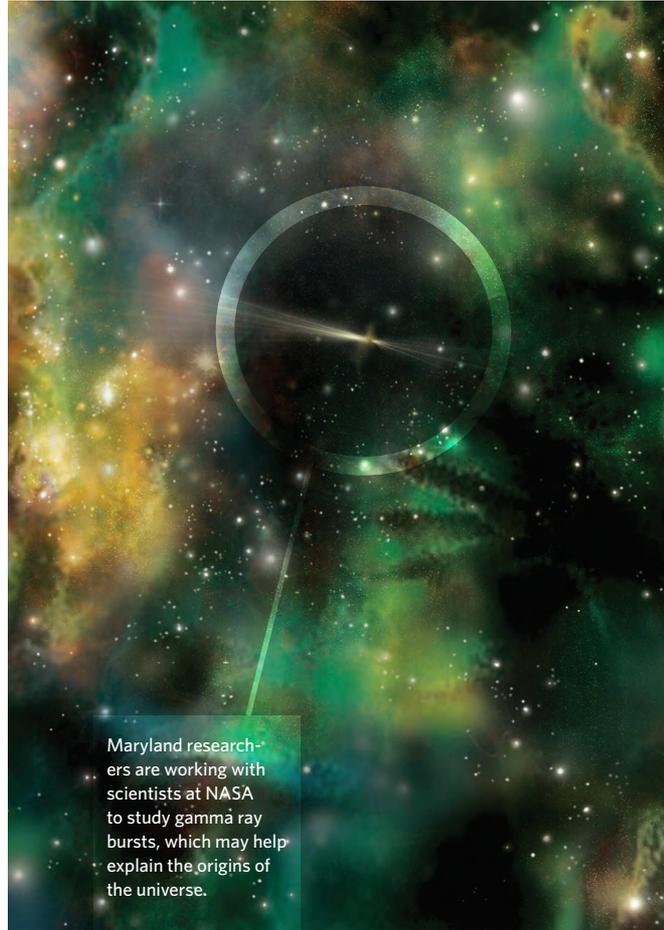
They would work with government scientists to collect and analyze data gathered from NASA satellites, looking for chemical or geological markers that might identify whether other planets can support life.

"We're excited at the possibilities. We can do the chemical analysis of whatever [types of samples] they bring in," says Maryland geologist **William McDonough**.

The proposed center would build upon an almost 50-year relationship between the university and NASA Goddard, which hosts 29 UMD scientists who have joint appointments or are conducting research while on sabbatical.

This includes Maryland astronomer **Sylvain Veilleux**, who's at NASA Goddard designing and building a rapid-response infrared imager and spectrometer—a key component of the high-powered Discovery Channel Telescope.

The telescope, set to go "live" later this year, is a joint project between Discovery Communications and the Lowell Observatory in Arizona. It will be used to conduct research on the physical properties of comets, the evolution and structure of small galaxies, and the masses of stars, among many other topics.



Maryland researchers are working with scientists at NASA to study gamma ray bursts, which may help explain the origins of the universe.

Veilleux's team is developing technology to "target" gamma ray bursts occurring in deep space. These bursts may signal the birth of a black hole or a neutron star, he says, and the imager will identify the bursts quickly, guiding the telescope to a precise location for a closer look.

In related news, **Jessica Sunshine**, professor of astronomy, is leading a high-profile project called Comet Hopper, a joint effort between UMD, NASA Goddard and Lockheed Martin. The university is one of three finalists to develop a vehicle that would land on a frozen comet orbiting beyond Jupiter in 2016. The vehicle would "hop" around the comet as it travels closer to the sun, studying gasses and other particles that are released as the comet's surface heats up.

NASA is expected to select the winning proposal for the \$425 million project in June.

### NASA-Funded Projects

The University of Maryland has almost 250 active awards through NASA that total \$200 million, making UMD the fourth-largest academic recipient of NASA funding.

"The breadth of these awards—from deep space missions that may reveal the origins of the universe to climate and weather models that help farmers predict next year's soybean harvest—speak well to our scientific diversity," says **Jayanth Banavar**, dean of the College of Computer, Mathematical and Natural Sciences.

Examples of projects include:

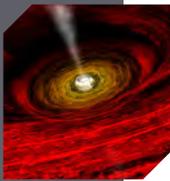
#### A Space Systems

**Laboratory** in aerospace engineering, where a neutral buoyancy tank allows researchers to test spacesuits and other tools used by astronauts in space. UMD's **David Akin** is the PI.



#### A Joint Space-Science

**Institute**, where scientists study the strong gravity in black holes, high-energy astrophysics and astroparticle physics, cosmology and gravitational waves. UMD's **Christopher Reynolds** is the PI.



#### The Earth System Science

**Interdisciplinary Center**, which uses data from NASA satellites and other tools to understand and forecast climate change and its impact. UMD's **Antonio Busalacchi** is the PI.



### UPDATE FROM THE OFFICE OF FEDERAL RELATIONS

#### Obama's 2013 Budget Has Both Highs and Lows

President Obama's fiscal 2013 budget presents a mixed bag for science and innovation. It calls for \$142.2 billion in federal R&D spending, up \$1.7 billion from last year.

The majority of this increase is for nondefense R&D, including additional funding for the Department of Energy's Office of Science, the National Science Foundation and the National Institute of Standards and Technology.

Priority research areas in the proposed budget are cybersecurity, clean energy, advanced manufacturing, smart infrastructure and wireless communications.

The president is also requesting a 6 percent increase for climate research, primarily through projects coming out of NASA, the National Oceanic and Atmospheric Administration and the Department of Energy.

There is concern, however, over flat funding for the National Institutes of Health (NIH) and NASA. The space agency's planetary science efforts might suffer a 20 percent cut, though the budget proposes a 6 percent increase for human exploration and commercial spaceflight.

Critics of the flat funding to NIH say a lack of resources may jeopardize jobs and the development of new therapeutic treatments. These are debates that will surely be taken up in Congress, where the president's budget is now headed.

Look to the Federal Corner for information on higher education and the federal government. If you have a specific topic you'd like to see discussed, contact Rae Grad, director of federal relations, at [rgrad@umd.edu](mailto:rgrad@umd.edu).

### MITH Wins 4 Grants

The Maryland Institute for Technology in the Humanities (MITH) recently received four of 20 digital startup grants awarded by the National Endowment for the Humanities. The grants are intended to encourage innovation by supporting the planning stages of projects. The MITH researchers and their respective projects are:

— **Travis Brown**, who received \$41,000 to develop a tool to improve optical character recognition in humanities text collections.

— **Jennifer Guliano**, who received \$24,000 for a workshop on topic modeling with large-scale humanities datasets. She will also work with a researcher at the University of South Carolina to convert digital texts in the humanities into Braille.

— **James Dickie and Trevor Muñoz**, who received \$50,000 to develop a Web-based editing tool to prepare humanities texts with markup based on the Text Encoding Initiative.



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



**Jon Froelich** is an assistant professor of computer science. He designs, builds and evaluates technology that addresses issues like environmental sustainability, computer accessibility and personalized health and wellness.



**Shirley Micallef** is an assistant professor of plant science and landscape architecture. She researches the use of bacterial models to investigate crop contamination via human-produced pathogens.



**Jade Wexler** is an assistant professor of special education. She investigates learning and reading disabilities, particularly for those in the juvenile justice system, and dropout intervention.



**Hiroyuki Iseki** is an assistant professor of urban studies and planning. He researches transportation economics and finance and how to apply geographic information systems to planning and policy analysis.



**Rafael Dix-Carneiro** is an assistant professor of economics. He researches international trade and labor economics, including trade liberalization and labor market dynamics.

## UMERC Researcher Developing Efficient, Affordable Energy Storage Systems

No matter how clean energy is produced today, whether by wind, biomass enzymes or solar panels, the challenge remains of how to store the energy for later use.

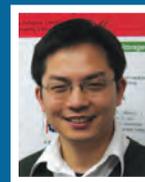
**Liangbing Hu**, an assistant professor of materials and science engineering, is tackling this issue on several fronts. By combining his research in nanoscale materials with his entrepreneurial experience as co-founder of a Silicon Valley startup, Hu hopes to develop energy storage systems that are efficient and affordable.

"Nanotechnology will enable the performance, and novel methods of large-scale manufacturing will enable the low cost," says Hu, who came to Maryland seven months ago.

Hu says his research could lead to scalable energy storage technologies, ranging in size from a flexible battery for a cell phone to a system able to run a power grid for a large city. He envisions systems that are two to three times cheaper than what is available now, with 10 times the performance capabilities.

Much of the research is taking place in the University of Maryland Energy Research Center (UMERC), where Hu and his team of graduate students and postdocs have access to the latest nano-fabrication labs and testing equipment.

"Engineering is really about producing practical devices," Hu says. "So that philosophy at UMERC, combined with the great interdisciplinary collaboration and facilities here, fits well with my personal research goals."



Liangbing Hu



## FACULTY AWARDS & HONORS



**HU LIAO**, an associate professor of management and organization, recently received the 2012 Cummings Scholarly Achievement Award. Given by the Organizational Behavior Division of the Academy of Management, it honors Liao for her outstanding early- to mid-career research in organizational behavior, leadership and human resources.



**DONNA WISEMAN**, dean of the College of Education, was named to a national commission whose goal is to ensure that every American classroom has an effective teacher. The Commission on Standards and Performance Reporting, part of the Council for the Accreditation of Educator Preparation, will develop rigorous accreditation standards that focus on outcome data and program characteristic data.



**NORMAN WERELEY** is the new chair of aerospace engineering, effective April 15. A noted researcher in control theory, Wereley previously served as director of facilities and as associate dean. "He has strengthened the laboratory facilities and reinvigorated the undergraduate aerospace engineering honors program, all while continuing to lead a most productive research agenda," says Clark School Dean Darryll Pines.

### SAVE THE DATE:

## 5th Annual Celebration of Scholarship and Research

Mark your calendars for this year's Celebration of Scholarship and Research, where faculty, administrators and others from across campus celebrate the achievements of their peers.

Sponsored by the Office of the Provost and the Division of Research, the annual event is great way for Maryland researchers to network in an informal, collegial atmosphere.

**DATE:** Wednesday, May 2

**TIME:** 4 to 6 p.m.

**LOCATION:** Atrium of the Art-Sociology Building

Please RSVP to [vpr@umdedu](mailto:vpr@umdedu)



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