

FACULTY newsletter

CPMS Physical and Mathematical Sciences



ABOVE One of Radebaugh's colleagues explores the Outback's unique linear dunes.

RADEBAUGH



"We can learn more about our own planet by studying the developments on Titan's surface."



The National Science Foundation bestows the ACI Fellowship on creative researchers.

Geology Professor Explores Moons, Outback

Jani Radebaugh, a professor in the Department of Geological Sciences, got more than she bargained for during her recent trip Down Under.

Radebaugh was presented with the opportunity while attending a conference on land surface geomorphology in Melbourne, Australia. The Outback trip presented the BYU professor with a unique opportunity to make observations linked to her research topic: the surface of Titan, one of Saturn's two moons.

Much of Titan's surface is covered with large sand dunes. In order to study the development of Titan and hopefully detect similarities to the development of Earth, Radebaugh and her colleagues often study certain geological features contained by both. These large dunes are one such similarity. The dunes on Titan are what Radebaugh calls "linear dunes," due to their elongated form. Most linear dunes are approximately one kilometer wide and can be more than 160 kilometers long. Formed by unique wind patterns, the dunes are uncommon on Earth's surface, with the Australian Outback providing one of the highest concentrations of linear dunes on the planet.

Radebaugh and her colleagues hoped to learn more about the formation of linear dunes on Titan's surface by observing their earthly counterparts.

"We really wanted to observe the dunes and see how they formed so we could learn more about geological activity

on Titan," she said. "We were able to see a lot of things, including what happens to the dunes when they come in contact with mountains."

According to the group's observations, the dunes either petered out as they reached mountains or split to move around the obstruction. Radebaugh also noted that the majority of the dunes seemed to be inactive, meaning they were not currently moving.

However, she said that was not the case for all the Outback's linear dunes.

"Some parts of the dunes were still active," Radebaugh said. "There was movement on the tops of the dunes, meaning the winds are still active and moving the sand."

Radebaugh said the observation of dunes, both on Earth and on Titan, helps researchers learn more about the surrounding atmosphere. For example, by studying the linear dunes on Titan, geologists can tell which way the winds blew to form them and thus identify wind patterns on the moon.

"Learning about how these things formed on Titan can allow us to begin to draw conclusions about how similar forms developed on Earth," she said. "We can learn more about our own planet by studying the developments on Titan's surface."

by: Steve Pierce

Physics Professor Named ACI Fellow By NSF

Gus Hart, a professor of physics in BYU's College of Physical and Mathematica Sciences, was recently named an American Competitiveness and Innovation (ACI) Fellow by the National Science Foundation.

The award will help fund Hart's research efforts, providing \$600,000 over a five-year span. Hart received the award primarily for his international research collaborations and his work with student assistants from underrepresented gender and ethnic groups. The fellowship expanded upon and extended an NSF grant of \$300,000

over three years that Hart had received previously.

Hart said he would use the funding to continue his research on how atoms organize in materials, particularly metallic alloys. His research team will focus on developing lightweight magnesium alloys that could potentially be used in automobiles. Such a material would make cars lighter and, therefore, more fuel-efficient.

Furthermore, Hart plans to research ways to improve the performance of platinum and palladium. These metals are most often used in the catalytic converters of automobiles, which reduce

story continues on next page...

- *Dana Griffen's Retirement Reception*
September 21, 2pm
N-209 ESC
- *BYU Career Fair*
September 30, 10am-3pm
WSC Ballroom
- *BYU Technical Career Fair*
October 7, 9am-3pm
WSC Ballroom
- *BYU Majors Fair*
October 14, 9:30am-3:30pm
WSC Ballroom
- *ORCA Student Deadline*
October 30
- *MEGs Deadline*
October 30
- *ORCA Mentor Endorsements due*
November 6
- *MEGs Chair Endorsements due*
November 6
- *Utah State Graduate Recruiting Fair*
November 9, 10am-2pm
TSC Ballroom
- *Weber State Graduate Recruiting Fair*
November 10, 9am-1pm
Union Ballroom
- *Westminster/Utah Grad. Recruiting Fair*
November 11, 10am-2pm
Westminster
- *BYU Graduate Recruiting Fair*
November 12, 10am-2pm
WSC Ballroom
- *UVU Graduate Recruiting Fair*
November 13, 10am-2pm
Grande Ballroom

•College NEWS• mathematics

The Department of Mathematics has launched a new Web site, WhenWillIUseMath.com.

The site, which can be accessed at www.whenwilliusemath.com, answers this perennial question by showing how math is used in many "math" and "non-math" careers, and in real life. It includes new discoveries in math, unsolved problems, and how to succeed in math.

The department hopes the Web site will be a useful resource to college faculty, high school teachers, parents and others trying to help students understand how important math is in real life. It can help junior high, high school and college students understand that math is extremely useful, even if they want to be a lawyer, a doctor, a stock broker or something else.

The site was well received at a recent conference and gained promotional support from the Mathematical Association of America.

Hart *continued*

the toxicity of engine emissions and account for over roughly 40 percent of the world's platinum and palladium usage. However, both elements are also frequently fashioned into jewelry, which Hart says his research would make tougher and more durable.

Hart's research team at BYU works in collaboration with three other groups around the globe. Using the university's supercomputer, Hart and his team develop "virtual experimental" models of various alloys, which are then physically created by a partner lab in

South Africa.

"We use the supercomputer to create simulations of different alloys," Hart said. "[Our collaborators] are the ones who actually make and test them after we send them the models. We have to work together."

The ACI Fellowship is awarded annually based on recommendations from NSF's Division of Materials Research. Recipients receive a monetary supplement to current grants and have those grants extended for two additional years for "special creativity," according to NSF.

by: Steve Pierce

Faculty And Staff Receive University Awards

Four professors and two staff members in the College of Physical and Mathematical Sciences (CPMS) were announced as recipients of prestigious awards from Brigham Young University on August 25th.

CPMS Associate Dean Thomas W. Sederberg, also a professor in the Department of Computer Science, has been awarded the university's most prestigious faculty award, the Karl G. Maeser Distinguished Faculty Lecturer Award. The award is provided through the generosity of the Karl G. Maeser Scholarship Society and celebrates the recipient's clear superiority in both teaching and scholarship.

Sederberg has made significant contributions in the areas of geometric modeling and algebraic geometry through his research. He developed the concept of free-form deformation, an essential technique that has profoundly affected many fields, from geometry to animation and beyond. An alumnus of both BYU and Purdue University, Sederberg has mentored many students at both the undergraduate and graduate levels and remains loved by his pupils and colleagues alike. His many years of devoted academic and administrative service will be honored with his receipt of this esteemed award.

Paul B. Farnsworth, professor of chemistry and chair of the Department of Chemistry and Biochemistry, was named a recipient of the Karl G. Maeser Excellence in Research and Creative Arts Award. Also provided through the Maeser Scholarship Society, the award honors faculty members for their outstanding research and creative accomplishments, such as Farnsworth's work with analytical spectroscopy. In addition to his groundbreaking research, Farnsworth has received national awards for his work, mentored numerous students and developed widely used teaching materials.

In addition, mathematics professor Jeff Humpherys received a Young Scholar Award from the university. The award aims to encourage and acknowledge outstanding promise and contributions by faculty in the early stages of their academic careers. A recent recipient of the National Science Foundation's prestigious CAREER Award honoring young professors, Humpherys has been recognized as one of the leading academics in his field.

Professor Matthew R. Linford of the Department of Chemistry and Biochemistry was also named a recipient of the university's Technology Transfer Award, along with colleague Barry M. Lunt. The award, which acknowledges faculty members who have made significant research contributions that have led to the development of useful commercial products, recognizes Linford and Lunt's contributions to the development of the "millennial disk," a new type of DVD disc that extends data reliability up to 1,000 years and will soon be released by university licensee Millenniata, Inc.

CPMS Assistant Dean E. Daniel Johnson and Janet J. Fonoimoana of the Department of Chemistry and Biochemistry both received the President's Appreciation Award. The award recognizes staff and administrative personnel for exceptional service, creativity and competence, qualities which both Johnson and Fonoimoana bring to their respective positions within the college.

Brigham Young University announces faculty awards on an annual basis, coinciding with the Annual University Conference in late August.

by: Steve Pierce

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