University of Wisconsin-Madison College of Engineering

Research Review

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About This Newsletter

Distributed quarterly, Research Review is an electronic newsletter of the University of Wisconsin-Madison College of Engineering. If you aren't a subscriber, sign up to receive each edition in PDF format via E-mail.

New grants

The Trace Research & Development Center received a $4.25 million grant from the National Institute on Disability and Rehabilitation Research. The grant will focus on advancing accessibility and usability in existing and emerging telecommunications products for people with all types of disabilities. **Read more**.

With $6.9 million from the National Institute on Aging of the National Institutes of Health, Industrial Engineering and Population Health Sciences Professor Dennis Fryback will lead an international effort that could give researchers and policy makers a more accurate picture of U.S. residents' overall health. **Read more**.

Research News

THE ALLOYS THAT BIND, LOOSELY

Chemical and biological engineers have identified a new class of near-surface alloys that could help identify promising catalysts for a variety of chemical reactions. **Read more**.

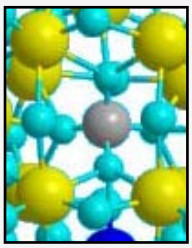
TRANSISTORS' STRENGTH IS IN THE ARM

A simple, room-temperature process will enable scientists to fabricate tiny, low-power single-electron transistors, allowing their easy integration into existing, silicon-based circuits. **Read more.**

NANO KNOWLEDGE

The college's latest National Science Foundation center examines templated synthesis and nanoscale assembly as well as the societal implications of nanotechnology. **Read more**.

HYDROGEN ADVANCE FUELS POSSIBILITIES



UW-Madison chemical and biological engineers developed a cost-effective, environmentally benign compound that not only removes carbon monoxide from gas streams for fuel cells, but also converts its energy content into a liquid that could be used to power a fuel cell. **Read more**.

PHOTOGRAPHING MEMORY

A team of scientists from UW-Madison and Argonne National Laboratory may understand why the memory inside electronic devices can worsen over time. **Read more**.

Patents granted

Faculty and staff in the College of Engineering are among the leaders in creating new intellectual property at UW-Madison. For licensing or other information, contact the ***Wisconsin Alumni Research Foundation****.*

Currently, most systems that fiber-optically transmit data over large distances use expensive, highly temperature-sensitive 1.55-micron distributed feedback (DFB) edge-emitting lasers. But the Type II Quantum Well Laser Devices invented by Electrical and Computer Engineering Associate Professor Luke Mawst and his former graduate student Nelson Tansu provide a low-cost, gallium arsenide-based alternative that exhibits high-performance operation in the 1.55-micron region, up to elevated temperatures. In addition, the lasers are simpler to fabricate than vertical-cavity surface-emitting lasers involving wafer-bonding, distributed Bragg reflectors, and offer high gain and low sensitivity to temperature.
Read more.

Because the method is more efficient, plasma-enhanced surface modification of materials has been performed mostly under vacuum. However, vacuum systems are complex and expensive to maintain, and existing methods require that materials be completely enclosed in a chamber, ruling out continuous, assembly-line processing. But the Device and Method for Plasma Modification of Materials at Atmospheric Pressure provides a novel plasma generator that operates at atmospheric pressure and can uniformly modify inorganic and organic substrates with large surface areas, enabling efficient, assembly-line-style materials processing. Professor Ferencz Denes of the Materials Science Program, Assistant Researcher Sorin Manolache and Irving Langmuir Professor of Engineering Physics Noah Hershkowitz developed the system.
Read more.

Engineers in the news

UW-Madison engineers are cited worldwide. Here are a few mentions of note.

• A Nov. 4 story on newscientist.com about a possible final location for ITER (International Thermonuclear Experimental Reactor) quoted Steenbock Professor of Engineering Physics Ray Fonck.

• The journal *Nature Materials* featured methods for investigating the atomic structure of metallic glass by Materials Science and Engineering Assistant Professor Paul Voyles and graduate student Bill Stratton.

Research news

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REDIRECTING RAIN RUNOFF

It's easy to blame Madison-area flooding on record-setting rains, but people are as much at fault as the weather. UW-Madison's new storm-water management policy is a big step toward a real solution.
Read more.

• Materials Science and Engineering Professor Chang-Beom Eom published research on enhancing ferroelectricity in strained barium titanate thin films in a recent *Science* magazine.

• A Sept. *5 Kansas City Star* story about the allocation of federal money to fight terrorism quoted Industrial Engineering and Engineering Physics Professor Vicki Bier.

• An Aug. 15 *New York Times* story about research reactor upgrades quoted Wisconsin Distinguished Professor of Engineering Physics Mike Corradini, Reactor Director Bob Agasie.

• The October *Popular Mechanics* featured a story by Harrison Schmitt, adjunct professor of engineering physics and former Apollo astronaut, about the benefits of space travel. Schmitt also is mentioned in the July 2004 *National Geographic* in a reprint of a September 1973 personal account of the Apollo 17 moon landing.

• Engineering Physics Professor James Blanchard was an author of an article in *IEEE Spectrum* about nuclear-powered microbatteries.

• The Aug. 14 edition of Canada's *The Globe and Mail* quoted Electrical and Computer Engineering Professor Ian Dobson about the cycle of electrical blackouts. *IEEE Spectrum* also highlighted Dobson's work in that area in its August cover story.

• *The Dallas Morning News*, Science Now, *Technology Review* magazine, SolarAccess.com and other sources cited Steenbock Professor of Chemical and Biological Engineering James Dumesic's process for capturing energy from carbon monoxide.