



Research *Review*

Summer 2004

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.

Food protection grant

UW-Madison is a partner in the new three-year, \$15 million Homeland Security Center for Food Protection and Defense, headquartered at the University of Minnesota. Center partners will conduct research on new ways to protect the country's food supply against terrorism, develop new technology, and establish best practices for preventing and detecting intentional contamination in food production, packaging and delivery. Research at UW-Madison will focus specifically on detecting toxins and contamination using biosensors to detect changes in, or the presence of, certain chemicals or biological materials.

[Read more.](#)

Research News

THE RIGHT TREATMENT?

Microorganisms in wastewater treatment systems should decompose infectious proteins. But a multidisciplinary research team is studying whether that's the case for stubborn prion proteins, which are linked to Mad Cow Disease.

[Read more.](#)

SUPER POWER

After nearly two years of planning and upgrades, the Pegasus Toroidal Experiment is back on track and better equipped to address the challenges facing low-aspect-ratio toroidal fusion experiments.

[Read more.](#)



THE NEEDLE'S NEWEST EYE

A new optical technology will add an extra element of information during breast biopsies and can increase the chance for an accurate clinical diagnosis of breast cancer.

[Read more.](#)

QUICK MICRO-MIXER

In less than an hour, Dave Beebe can fabricate a palm-sized "lab" that requires no assembly and contains no electronics—yet is powerful enough to detect botulinum neurotoxin in a tiny drop of blood.

[Read more.](#)

MEMORIAL'S INFO FOR ALL

Visitors to the National World War II Memorial in Washington, D.C. can find service information using touch-screen kiosks that incorporate UW-Madison accessibility technologies.

[Read more.](#)



Engineers in the News

UW-Madison engineering staff and faculty are cited worldwide. Following are a few mentions of note.

The June 26 *Chicago Tribune* quoted Biomedical Engineering Associate Professor David Beebe about the Midwest's leadership in inventing medical devices and therapies using modified cells, proteins and tissue instead of artificial drugs.

July worldwide online stories featured Biomedical Engineering Assistant Professor Nimmi Ramanujam and graduate students Carmalyn Lubawy and Changfang Zhu, who developed a fiber-optic probe that could help doctors take fewer, more accurate biopsies for breast cancer.

Read one.

The July/August issue of *Technology Review* magazine features Electrical and Computer Engineering Assistant Professor Jack Ma for his work on improving transistors in the power amplifiers of wireless devices. Ma's GaAs heterojunction bipolar transistors provide easier and more uniform heat dissipation. The improvement increases signal strength while saving battery power.

The May 23 *Nature Materials* quoted Materials Science and Engineering Assistant Professor Paul Evans about ferroelectrics. Evans and researchers at Argonne National Laboratory are studying ways to predict more accurately the onset of fatigue and understand how to improve ferroelectric memories.

Studies by Civil and Environmental Engineering Professor Craig Benson and Assistant Professor Katherine McMahon aimed at investigating the impact of prions on wastewater treatment facilities were featured May 27 on ScienceDaily.com.

Read more.

Patent News

*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**.*

Student's invention gives little brother more freedom

When Jesse Waldman goes to the movies, the quadriplegic now can feed himself popcorn, thanks to a device invented by a student team led by his big brother, John.

Read more.

For licensing information, contact **Nadia Sifri** at the Wisconsin Alumni Research Foundation.

PATENTS GRANTED

- Using advanced interferometric lithographic techniques, a team that includes Chemical and Biological Engineering Professor Paul Nealey, Howard Curler Distinguished Professor of Chemical and Biological Engineering Juan de Pablo and McFarland-Bascom Professor of Electrical and Computer Engineering Franco Cerrina has created chemically patterned surfaces that act as templates for the self-assembly of block co-polymer films. The patented work provides a new strategy for controlling the ordering of micro-phase separated domains in thin films of self-assembling block copolymers. **Read more.**
- A team that includes Associate Professor Ferencz Denes of the Materials Science Program and Biological Systems Engineering in the College of Agricultural and Life Sciences has developed a new method for disinfecting liquids via a dense medium plasma. In a series of experiments with a prototype device, the group reduced bacterial spore concentrations by 98 percent after a 20- to 30-minute exposure to a plasma generated with stainless steel or titanium electrodes. Silver electrodes were even more effective, reducing spore viability by 94 percent after only 5 minutes of treatment. **Read more.**