



NEW HORIZONS IN ENGINEERING RESEARCH

Cross-Cutting Research Themes in the UW-Madison College of Engineering

Engineers will be key contributors to the public good by addressing some of this century's top challenges, including sustainable energy, human health and improved infrastructure. These challenges require major increases in the breadth of engineering. The most successful engineering research will forge alliances across engineering disciplines and across the university into fields such as biology, medicine, physics and computational science. These interdisciplinary research areas represent high-impact opportunities for the UW-Madison College of Engineering.

ENGINEERING & HEALTHCARE

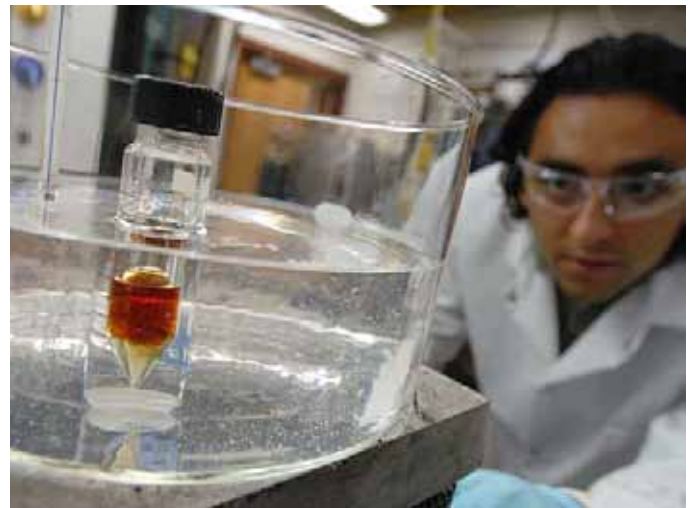
Increasingly, engineering research contributes to improvements in healthcare areas such as minimally invasive medicine, accurate medical records, and systems to accelerate patient recovery. This interdisciplinary research area is a forte for faculty in the college, highlighted by the fact that engineering faculty were selected as leaders for the majority of the research thrusts in the new Wisconsin Institutes for Discovery. The Biomedical Engineering Center for Translational Research, a partnership with the Wallace H. Coulter Foundation, has provided \$1 million per year since 2005 to sponsor translational research to accelerate transition of research advances to patient care. The Coulter Foundation offered UW-Madison \$10 million to create a translational research endowment, and a top College of Engineering goal is to secure \$10 million in required matching support. Coulter support is awarded only to the top institutions in biomedical research.

REINVENTING MANUFACTURING

The U.S. manufacturing industry today faces a highly competitive international playing field. Given Wisconsin's national leadership in the manufacturing economy, COE is devoted to research that helps define and strengthen manufacturing competitiveness. Leadership areas include research on new product development time, production lead-time; flexibility in responding to changes in demand, quality and price; and responsiveness to customer delivery requirements. COE also is investigating state-of-the-art materials, processes and technologies, including nanotechnology, to help transform 21st century manufacturing. COE has a goal of becoming a national center for new thinking and research on manufacturing competitiveness.

ENERGY & SUSTAINABILITY

UW-Madison conducts more than \$75 million annually in energy research, a great deal of which is focused in the College of Engineering. The college has strengths in near-term, mid-term and long-term energy technologies. Near-term expertise includes smart grid technology, engine and fuel efficiency, and green building construction. Mid-term efforts focus on advanced nuclear and wind technology, cellulosic biofuels and advanced energy storage. Long-term efforts include nuclear fusion and photovoltaics. This comprehensive approach to renewable and sustainable energy will be strengthened by the addition of the Wisconsin Energy Institute building, which will create an energy research corridor linking the College of Engineering with energy research hubs across campus.



A graduate student conducts a process for making fuel with simple sugars from renewable resources.

TRANSPORTATION INFRASTRUCTURE

The broad impact of transportation systems and land development on all aspects of society requires an interdisciplinary approach to the planning, design, construction, operation, and maintenance of these systems. Technical solutions must be integrated with social, economic, political and environmental concerns. COE has a wide range of research devoted to urban transportation planning, highway engineering, traffic engineering safety, highway materials and design, intelligent transportation systems and other fields. COE is home to the Midwest Regional University Transportation Center, the Wisconsin Traffic Operations Safety Laboratory, and the Highway Materials and Pavement Design Laboratory.

HOW YOU CAN SUPPORT THE COLLEGE

- **Named Professorships.** The foundation of a world-class public research university is its faculty. Private funding support now plays a key role in retaining and supporting the top faculty needed to maintain cutting-edge research excellence. Named professorships, which range in support levels from \$2 million for a Distinguished Chair to \$500,000 for a Bascom Professorship, support established research leaders and offer laboratory and research start-up packages to help early-career faculty thrive.
- **Graduate Fellowships.** Graduate students are essential contributors to both quality undergraduate instruction and a high-performing research environment. Universities are becoming more aggressive in their efforts to recruit top prospects. First-year fellowship support is now a common strategy to attract the top graduate school talent. Endowed graduate fellowships can be tailored to address high-priority research areas and enable the college to stay competitive internationally for top graduate talent.
- **Sponsored Research.** Targeted funding support from corporations or individuals in any of these cross-cutting areas would help advance research areas that are especially ripe for near-term commercial potential.

“Leading thinkers in the public and private sector recognize that the next big discoveries—and the next big solutions—will likely be found at the intersections of the powerful disciplines we have constructed.”

— Paul S. Peercy, Dean, College of Engineering



Samples from a project aiming to make asphalt more environmentally sustainable.

FOR MORE INFORMATION

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