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## I. Databytes

### TRACKING ENGINEERING DEGREES AWARDED TO WOMEN

Eighteen percent of engineering bachelor's degrees were awarded to women in 2007-08. That's the lowest percentage since the mid-1990's. Women increased their undergraduate enrollment share slightly from 17.5 percent in 2006 and 2007 to 17.9 percent in 2008. The percentage of engineering graduate degrees awarded to women is at or near the historical highs at the masters' (23 percent) and doctoral (21.1 percent) levels.



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## BACHELOR'S DEGREES BY GENDER, 2008



	1999	2000	2001	2002	2003	2004	2005	2006	2007
Female	21.2%	20.8%	19.9%	20.9%	20.4%	20.3%	19.5%	19.3%	18.1%
Male	78.8%	79.2%	80.1%	79.1%	79.6%	79.7%	80.5%	80.7%	81.9%

Other data trends can be viewed at [www.asee.org/colleges](http://www.asee.org/colleges).

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## II. Congressional Hotline

### FUTURE LOOKS GOOD FOR CLEAN-ENERGY RESEARCH HUBS

The Waxman-Markey energy-and-climate bill faces an uncertain fate in the Senate after its narrow win in the House. But its provision for eight clean-energy research "hubs" incorporates a key element of the Obama administration's agenda and could survive in other legislation. Energy Secretary Steven Chu envisions these as mini-Bell Labs, collaborations among universities, national laboratories and industry. Under Waxman-Markey, successful research would be quickly commercialized. Rep. Edward Pastor, chairman of the energy appropriations subcommittee, made no mention of the hubs in describing the 2010 appropriation, but did say his panel provided \$4.9 billion for the Office of Science, close to the administration's request, and \$2.25 billion for energy efficiency and renewable energy. Climate and energy bills are moving on separate tracks in the Senate. Environment and Public Works Chair Barbara Boxer plans hearings on the climate part, including controversial cap-and-trade provisions.



Bipartisan energy legislation has already emerged from Jeff Bingaman's Energy and Natural Resources Committee, but has lost support of leading environmental groups. The Brookings Institution's Mark Muro urges the Senate to increase research and development considerably over what Waxman-Markey provides, saying \$20 billion or more is needed "simply to approach the federal R&D engagement level in, say, the health care sector."

### N-POWER STILL VIABLE, SAYS NATIONAL LAB EXPERT

Nuclear power shouldn't be ignored, according to testimony before the House science committee. The Argonne National Laboratory's Mark Peters pressed for "long-term, science-based R&D programs for developing transformational technologies and options."

### M.E.S. SPELLS ENERGY'S MISSING LINK

MES: Those letters stand for "massive electricity storage." This is the missing link in turning intermittent wind and solar energy into enough dispatchable power

to shoulder a big share of U.S. electricity needs, according to Capitol Hill briefing. But MES technology is not yet ready for American Electric Power said it won't be enough for the govt encouraged "all the way to deployment." As to renewables National Research Council report says it can be done.



**ENGINEERING.COM**

## BEYOND THE GATHERING STORM? A NEW DEBATE

In 2005, members of Congress asked the National Academies to recommend science and technology steps needed for the U.S. to compete in the global economy. The resulting landmark study, *Rising Above the Gathering Storm*, brought new attention to STEM education and led to the 2007 America COMPETES Act. Now, four ranking senators and House members handed the Academies a new request: Identify 10 actions that would maintain excellence in research and doctoral education at U.S. research universities. The request was prompted in part by two trends, a House staff member said: threats to higher-education funding at the state level and competition from foreign universities for top researchers. Members hope recommendations will be ready when Congress takes up reauthorization of COMPETES, due to expire in 2010.

In an interview with the *Chronicle of Higher Education*, Association of American Universities President Robert M. Berdahl suggested the nation may need "fewer but better" top research universities. Not so, says Peter McPherson, president of the Association of Public and Land-grant Universities. He added: "As our country's research needs grow, presumably we should not be cutting existing capabilities. . . . The question is how we best complete that research -- not how many schools should do it."

## EXTRA BUCKS FOR NASA IN SENATE PANEL'S SPENDING BILL

The Senate Appropriations committee approved, 30-0, its \$64.9 billion version of the Commerce-Justice-Science bill, funding the National Science Foundation (\$6,916.4 million), NASA (\$18.68 billion), National Oceanic and Atmospheric Administration (\$4.77 Billion) and the National Institute of Standards and Technology (\$878.8 million). The bill, a key source of research money, provides \$500 million more for NASA than the \$64.3 billion House-passed version. A House subcommittee, meanwhile, approved \$26.9 billion for the Energy Department, including \$4.9 billion for the Office of Science.

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## III. Teaching Toolbox

### A Broader Perspective

Once an almost impossible feat, studying overseas while studying engineering is making its way into the mainstream

*By Margaret Loftus*

As a civil engineering student who grew up in Manchester, N.H., all Caitlin Malley knew about Denmark was that it was a small country in Europe. As for the concept of car-sharing? She'd never heard of it. But the Worcester Polytechnic Institute (WPI) senior got a crash course in both during her junior year as a technology consultant at a Copenhagen nonprofit that offers its members a time-share in cars instead of condos. Malley's eight-week Danish gig was part of a WPI program designed to expose students to problem-solving outside their majors and, often, outside of the United States. While she admired the Danes' balance of

An advertisement for ZeBu-UF Ultra Fast Emulator. The top half features the text "Think Fast." in large white font, followed by "ZeBu-UF Ultra Fast Emulator" in a smaller white font. Below the text is a photograph of a white and green Formula 1 race car. At the bottom, it says "Now Available for Universities" followed by the "UNIVERSITY" logo, which includes a graduation cap icon. A small orange banner at the very bottom contains the text "Contact: university@eve-usa.com for more information".

work and family and she became a veritable expert on the automation of billing and booking in car-sharing nonprofits, the real boon was a new global sensibility. "It's the most important thing I've done in college," she says. "It made me grow as a student and a professional."

Time was, study abroad was what humanities majors did. Engineering students, on the other hand, pretty much stayed put, lest their sequential coursework be disrupted. A rigid schedule and precious few electives didn't allow for a semester spent lollygagging in Europe, much less a full year—or so many believed. But in the last decade, the number of engineering students studying abroad has boomed as more U.S. engineering schools introduce ways—like short-term projects such as Malley's and Georgia Tech's immersive International Plan—to incorporate the experience into the curriculum. The trend, say educators, is critical to the future of American engineering in an increasing global economy. "We're at an incredible disadvantage as a nation if our engineers are not trained to work with people across cultures and languages," warns John Grandin, director of the University of Rhode Island's (URI) International Engineering Program.

Indeed, an engineer is far more likely to work for a multinational corporation than is, say, a doctor or a lawyer. "Engineering is a profoundly international field now," says Michael Vande Berg, the vice president of academic and external affairs at the Council on International Education Exchange (CIEE) based in Portland, Maine. "Increasingly, what engineers are faced with is that they have the technical ability to achieve major solutions, but they can't come in with a one-size-fits-all solution without working closely with people on the ground." And these days, many of those people are likely to live beyond U.S. borders. Having lived and learned outside the country helps to foster an understanding of the context of any project, be it building a water treatment plant in Central America or designing the next MP3 player for the Asian market. "Anyone who has lived abroad is more sensitive to other ways people view things that may not exactly be how you grew up," explains John LaGraff, director of Syracuse University's Engineering Year Abroad Program.

Meanwhile, experience abroad can mean the world to potential employers. Natalie Mello, WPI's director of global operations, has found that engineering students who have studied abroad are much more desirable to recruiters. In fact, says Georgia Institute of Technology Vice Provost for Institutional Development Jack Lohmann, kids who don't go abroad may ultimately be at a disadvantage.

But while the number of engineering students who go abroad is at an all-time high, the percentage is still minuscule compared with other disciplines. While "the trend is in the right direction . . . we aren't anywhere near the proportion of engineering students [in the country]," says Carl Herrin of NAFSA: Association of International Educators.

What's still keeping engineering students at home? "There's been a certain level of American arrogance that we are the best," claims Herrin. In fact, it wasn't that long ago that the United States was in the driving seat, Rhode Island's Grandin explains. "If people wanted products, they always looked toward us." But while the realities of the marketplace have shifted seemingly overnight, attitudes in engineering schools are still catching up. "The message tacitly is that study abroad is not important," Lohmann says. At the same time, the last thing engineering students want is a wrench in their coursework. "We are talking about students who tend to be risk-averse," Mello argues. "They are not prone to taking a lot of chances."

Nevertheless, some colleges have had great success in creating and promoting programs for their engineering students to study and intern in other countries. In 1974, WPI overhauled its entire curriculum to one that is project-based, which means that every student is required to complete three semester-long projects. While many students opt for domestic assignments—sponsors have included Goddard Flight Center in Maryland and Gallo Wineries in California—fully half go farther out still, from designing energy-efficient housing in Namibia to collecting data from Thailand's hill tribes. Language proficiency isn't required, but students are prepped in survival skills, like how to order in a restaurant and how not to offend their hosts. Going abroad does require planning up to a year in advance, but the results are well worth it, WPI's Mello says. "The cool thing is that you send a student out into the world once and they want to go again."

Other schools take a more traditional approach. The Engineering Year Abroad Program at Syracuse, for example, was started in 1980 by LaGraff, a mechanical and aerospace engineering professor who had completed his graduate work in London. He tapped his British contacts to help him iron out conflicting school schedules so that Syracuse students (the program is now open to non-Syracuse engineering students also) could study at The City University of London for the appropriate Syracuse credits. "We've always insisted it be a year because we want them to have an authentic experience and do the exams with the British students at the end of the year," LaGraff says. The program steadily attracts some 20 students a year and is now offering a semester in Madrid.

Coordinating sequential courses has always been a challenge in sending engineering students overseas, which is why URI's International Engineering Program incorporates a fifth year of study and a B.A. in a language. German professor Grandin came up with the idea in 1987 with then-engineering Dean Hermann Viets (now at Milwaukee School of Engineering). "We had a meeting of the minds and decided that we were doing very little to prepare engineers for the global economy," Grandin recalls. The program started by sending fourth-year students to the Technical University of Braunschweig in Germany for a semester and then on to a six-month internship somewhere in Germany. Today, the program has expanded to include French and Spanish options

with a Chinese program in the works. And last fall, URI introduced an international Ph.D. program with the Technical University of Braunschweig.

Perhaps most comprehensive of all international engineering programs is Georgia Tech's International Plan. While the school has had a long history of sending engineering students abroad—roughly one-third of graduates have some experience outside the United States—the degree-long program introduced last fall integrates international studies into a major. In what school administrators hope will become their signature program, the plan requires coursework in global economics, international relations, regional interests and a capstone course. Students must gain a proficiency in a language and spend at least two terms abroad. The program is designed so students will graduate in four years with an International Plan designation on their diploma. Vice Provost Lohmann says the plan will immerse students in another culture, rather than just expose them to it. "It's not an add-on, it's integrated into the context of your major," he says. Because of the language requirement, most participants will have to join the program during their freshman year. Lohmann says that instilling "global competence" is critical to the education of engineers today. "Students need to graduate with an understanding of how their profession is practiced on a global scale."

While most students who go abroad still head to the capitals of Europe, the numbers heading for Latin America, Asia and Africa are inching up. Georgia Tech, for instance, has programs in China and Singapore. And Purdue University's Global Engineering Alliance for Research and Education program sends students to Mumbai (Bombay). "Many of these countries we perhaps have the least understanding of, so it's important to have an opportunity to experience and study in places like China, India, Japan and the Middle East," says William DeLauder, executive director of the Lincoln Commission, a bipartisan group of policymakers who are working to increase and diversify study-abroad opportunities, especially with underrepresented groups. In its report to Congress, the commission recommended the launch of a Lincoln Fellowship Program it hopes will increase the numbers of students who study abroad by 10 percent a year, reaching 1 million by 2017.

Some say that's a tall order, but CIEE's Vande Berg is optimistic. He says the 2000 ABET criteria have given engineering schools the flexibility to carve out more opportunities abroad for students. "We're very confident that we are going to be sending an increasing number of engineering students abroad in coming years," Vande Berg predicts. "We are on the verge of a truly revolutionary turnabout."

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## IV. JOBS, JOBS, JOBS

Job-hunting? Here are a few current openings:

1. Civil Engineering Technology -- 1 opportunity
2. Computer Science -- 1 opportunity
3. Dean -- 1 opportunity
4. Mechanical Engineering -- 2 opportunities
5. Information Technology -- 1 opportunity

Vist here for details:

<http://www.asee.org/classifieds>

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## V. COMING ATTRACTIONS

Engineering, Go For It! -- The Website!

When the latest edition of ASEE's *Engineering, Go For It!* -- the biennial magazine that helps middle- and high-school students, and their parents, teachers and counselors realize how exciting and relevant careers in engineering can be -- comes out in September, it will



be joined by a new, interactive, media-rich website that's just as colorful and fun to read as the print edition. The website goes beyond the magazine, too, offering readers not only articles, but videos and additional pictures and profile. Since it will be regularly updated, students can sign up for an eGFI newsletter that will alert them when new content is added. Oh, and teachers will find a wealth of additional information and resources there, too. All this and more will soon be just a click away.

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