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Progressive ENGINEER PROFILES

Shanon Reckinger

In a dual role, the mechanical engineering professor at Fairfield University aims to improve computational methods for modeling oceans and climate while she advocates for women in engineering.

By Tom Gibson

As a mechanical engineering student, Shanon Reckinger could've pursued a conventional career of designing cars, airplanes, or some other product in a manufacturing and industrial setting. Or she could've steered toward designing MEP (mechanical, electrical, plumbing) and HVAC systems for buildings, like many consulting engineers do. "None of that interested me. I really liked working on projects that had more of a societal impact, and that was really natural with ocean modeling because most of the work is done to further understand the climate and climate change," she relates.

A unique and noble career choice indeed, but the interesting part is that it may involve another factor besides helping society. "I think that's really common for most women," Reckinger says. She would know about this from her vantage point as the Clare Boothe Luce Professor in the Mechanical Engineering Department at Fairfield University in Connecticut, a position that has her advocating for women in engineering.

Across the nation, growth in the number of women enrolling in engineering curriculums has stagnated and shown inconsistencies. For example, Fairfield's Mechanical Engineering Department has 55 freshmen, and 8 are women. "That's pretty low," Reckinger says. "It's very discipline specific. Some of the engineering disciplines like civil, biomedical, environmental, chemical are really popular with women. Lots of places you can find a fifty-fifty split, but for disciplines like mechanical engineering or electrical or computer/software engineering, the ratio is still really off." Why? "There are still not many women in faculty positions in those disciplines. I think it's hard for female students to connect, and sometimes they might feel like they're not in the right place because they're so different from everyone around them."

But Reckinger doesn't think we should focus just on increasing the percentage of women in engineering. She acknowledge that there may be times a woman is exposed to science and engineering and fully understands the possibilities but just doesn't have an interest in it. "I don't want women to be scared or

Profile

Tate Rogers:
In the developing world, billions of people don't have access to modern sanitation. This environmental engineering graduate student is filling a niche with a design for emptying pit latrines.

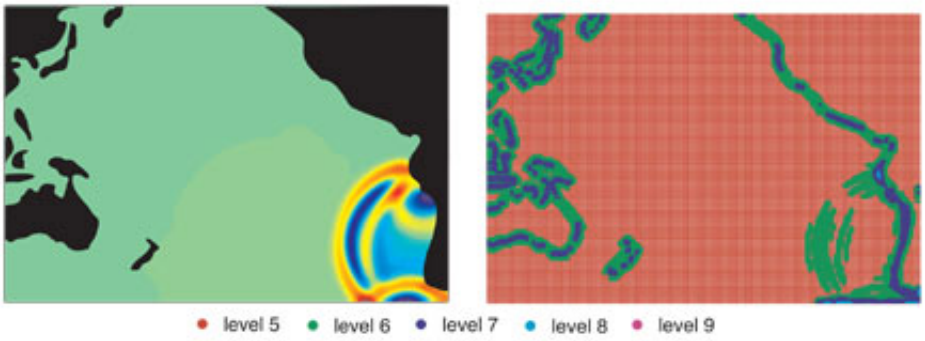
Profile

Shanon Reckinger:
Mechanical engineering professor specializes in ocean modeling at the same time she crusades for women in engineering.

uncomfortable or unwelcome. Or anyone, because there are many minority groups that are underrepresented in engineering," as she puts it. "I really enjoy being a role model and just encouraging everyone to find their path in life."

Reckinger, 28, grew up in Omaha, Nebraska, and her father was a civil engineer."I always liked math and physics in high school," she recalls, and her guidance counselors helped her select a college that offered engineering. This led her to the University of St. Thomas in St. Paul, Minnesota, where she tried engineering. "I really liked it."

Then Reckinger further narrowed her career choice. "I really like the breadth of mechanical engineering, and it's also the field that has fluids, which I really like because of its strong math and physics," she explains. St. Thomas didn't have any fluids courses when she went there, "but I had little peeks of it here and there, and then I took it my first year of graduate school. That's when I really started to get into it." She got her M.S. in mechanical engineering and Ph.D. from the University of Colorado. Her advisor in graduate school specialized in applying computational methods to fluids and showed her a project he was working on, Reckinger recalls. "When I saw it, it was by far the most interesting of the ones I had seen."



This sampling of Reckinger's ocean modeling work shows a simulation of the 2010 Chile Tsunami.

Ocean modeling requires a strong fluids background, and this in turn requires a strong math and physics background. "I was taking a ton of applied math courses. Then there's a ton of programming," Reckinger recalls. "I became familiar with large parallel machines and computing. I had to also get the general ocean knowledge versus general fluids – what's different about the ocean; how do the equations change?"

Most of Reckinger's research focuses on developing advanced numerical techniques to improve the accuracy and efficiency of ocean models. "You change these equations that are analytic in such a way that you can solve them on the computer. There are all these numerical methods that have to be formulated to do that," she says. "I'm improving methods that can be used in some of these big ocean models used at the lab."

Reckinger says she sees it as filling a need. "There's a general mechanical engineering fluids CFD community, and then there's this totally separate ocean community, and they don't always share information. The general fluids area is much further advanced in their numerics than the ocean community. That was part of the motivation for the projects I worked on." The gap is closing. "The ocean models used for the last 50 years are considering these new methods that have been used for quite awhile now in the other community."

With her doctoral thesis entitled "Adaptive Wavelet-Based Ocean Circulation

Modeling," Reckinger takes an integrated approach for modeling common ocean phenomena such as tsunamis, boundary currents, and sea ice. Her research has taken her to the Los Alamos National Research Lab in New Mexico and the Swiss Federal Institute of Technology in Switzerland. At Los Alamos, she worked with a researcher doing ocean modeling in an effort to simulate the entire global climate.

After getting her doctoral degree, Reckinger conducted a full national search to find a faculty position. She sought a teaching school but also wanted to do research, and “I’ve always wanted to live on the east coast,” she adds. Having landed at Fairfield, she’s excited about the Clare Booth Luce program and the funding and opportunities it presents. She teaches fluid dynamics and numerical methods at the undergraduate and graduate levels, including courses in numerical methods, thermodynamics, fluid mechanics, heat transfer, computational fluid dynamics, and gas dynamics.

The Henry Luce Foundation's Clare Boothe Luce Program awarded Fairfield a $404,439 grant to create the professorship Reckinger holds. It was earmarked for mechanical engineering and covers three years of salary, three years of benefits, and five years of support for a career development fund.

Reckinger (second from left) is mentoring mechanical engineering students on a project to collect rainwater from a campus building roof for watering lawns and shrubs on campus as part of a senior design course taught by Shahrokh Etemad (left).

In Clare Boothe Luce's bequest establishing this program, she sought "to encourage women to enter, study, graduate, and teach" in science, mathematics, and engineering. The 21-year-old program has become the single most significant source of private support for women in those fields. Clare Boothe Luce was a playwright, journalist, U.S. Ambassador to Italy, and the first woman elected to Congress from Connecticut as well as the widow of Henry R. Luce, the magazine publisher who created icons such as Time, Fortune, Life, and Sports Illustrated.

Reckinger works in the STEM (science, technology, engineering, and mathematics) disciplines with engineering faculty and colleagues in the College of Arts & Sciences. She works closely with female students in the School of Engineering and elsewhere at Fairfield. “I just try to connect with them personally and have them be comfortable around me. Since we have such a small school and small population of women, I’m doing it more on a personal level,” she says.

As Reckinger puts it, “I’m trying to give them some perspective and broaden their view of these fields and have them not think of mechanical engineers as one particular type of person in one particular field. It’s so broad. It’s just about making people feel comfortable and making them understand that a variety of personalities and experience levels and perspectives are welcome in the field.”

Her advocating work has Reckinger getting involved with a WISTEM (Women in Science, Technology, Engineering, and Mathematics) program, and she wants

to start a Society for Women in Engineering chapter at Fairfield. She interacts with high schoolers that come to Fairfield and carries out community events like the Discovery Museum and an event for Women's History Month at nearby Bridgeport. A camp on Fairfield's campus for high school women has them learn about science and engineering, and Reckinger has a group of five or so from Bridgeport do a research project with her for two weeks.

In the final analysis, Reckinger says, "I really just want people to do whatever they like. I don't like them to be scared away for the wrong reasons. Maybe you just don't know exactly what interests you and how to apply it. I feel like that's part of the faculty's job to explore that with the students and let them think about it."

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