



"Nanoqueens" Carol Barry (left), Joey Mead (middle), and Julie Chen lead nanotechnology research at the University of Massachusetts at Lowell — and serve as role models for young women who want to pursue a career in science and engineering.

Boston Globe — 09/06/05

LOWELL - Officially, the three women leading nanotechnology research at the University of Massachusetts at Lowell are professors of engineering. But colleagues here have bestowed on them a more regal designation: "nanoqueens."

The professors, Julie Chen, Joey Mead, and Carol Barry, earned their lofty, if lighthearted, titles with a collaboration that has landed them more than \$8 million in grants; established two nanotechnology research centers on campus; and put UMass-Lowell at the forefront of an emerging field that builds structures and devices one-thousandth the width of a human hair.

This success has also led to promotions, of sorts, the professors added. They used to be known as mere "nanoprincesses."

While not unheard of, the leadership of Chen, Mead, and Barry in technical research in this case investigating methods to mass-produce nanotechnology products is still considered unusual. Women account for less than 8 percent of engineering faculty at US universities, and just 3 percent of full professors, according to the National Science Foundation.

Chen, a mechanical engineer, directs the Nanomanufacturing Center of Excellence, financed by a \$5 million grant from a state technology fund. Mead, a plastics engineer, is deputy director of a three-university Center for High-Rate Nanomanufacturing, overseeing research at the Lowell campus and the university's \$3.4 million grant from the National Science Foundation grant. Barry, also a plastics engineer, is associate director at both centers.

"Three women in charge of centers at a single engineering college?" said Bevelee Watford, a past president of Women in Engineering Programs & Advocates Network, a national group in Denver. "There are engineering colleges that don't have three tenure-track women faculty."

The question of why so few women succeed in science and engineering has been a particularly hot topic this year, following controversial remarks in January by Harvard President Lawrence Summers. At an academic conference, Summers suggested, among other possibilities, that differences in men's and women's "intrinsic aptitude" for math and science might explain the gender gap. Summers later

apologized, appointed two Harvard task forces to recommend ways to attract and retain women faculty, and underscored his commitment to diversity.

Women in science and engineering blame their low numbers on societal factors. They say girls and young women traditionally have received little encouragement to enter science and engineering fields, while popular culture gives them few role models.

Jeanne Sheehy, spokeswoman for the Society of Women Engineers, a professional association in Chicago, noted that women are often portrayed as doctors in movies and television, but rarely as engineers. Women account for 31 percent of physicians, but just 11 percent of engineers, according to the Commission on Professionals in Science and Technology in Washington.

At UMass-Lowell, however, Chen, Mead, and Barry provide strong role models for aspiring women engineers, colleagues say. For example, half of the 2005 graduates from the plastics engineering department were women, which department chairman Robert Malloy attributes in large part to the two women on his faculty, Barry and Mead.

One of the top graduates, Jessica Bielawski, 22, of Barre, returns to UMass-Lowell next month to pursue her master's degree in plastics engineering.

"It's very rare to see women in the engineering profession," she said, "and it was important to me to see these women at UMass- Lowell."

In recent interviews, Chen, Mead, and Barry said they certainly received encouragement to pursue science and math. Chen, 41, grew up near Rochester, N.Y., the daughter of a physicist (her father) and mathematician (her mother). She was not only encouraged, but expected to do well in math and science.

Mead, 46, grew up near Buffalo, N.Y., and she, too, was encouraged by a physicist father. Barry's father was a Natick firefighter who wanted all six of his children to go to college. When she developed a love for math and science, her father urged her to go for it.

Barry, 49, earned a degree in chemistry from Boston College and worked in industry for more than a decade before earning a doctorate at UMass-Lowell. Barry recalled that as she looked for jobs shortly before finishing BC, interviewers frequently asked, "Can you type?"

Barry was the first of the three women to join UMass-Lowell's engineering faculty, in 1996. Chen, who earned her bachelor's and doctoral degrees at MIT, followed a year later. Mead, who also earned her degrees at MIT, arrived in 1999. The three professors quickly connected, finding that Chen's work in fibers and composites, Barry's in plastics processing, and Mead's in polymers, of which plastics are the most common type, all intersected.

Their nascent collaboration soon after received a boost. Louise Griffin, then the university's director of research and now a vice chancellor, learned of an emerging field, nanotechnology. She encouraged the three engineering professors to pursue this field, sweetening the deal with \$5,000 to help them prepare a grant proposal to the Army.

That first proposal was rejected, but the three women followed with others, some successful, some not. Last year, their efforts paid off with the state and National Science Foundation nanomanufacturing centers.

Chen, Meade, and Barry remain in a distinct minority at UMass- Lowell, where 10 of 68, or 15 percent, of engineering professors are women. Still, they said, the university fosters a collaborative atmosphere that allows women to succeed, illustrated by a campus leadership where four of the seven top administrators under Chancellor William T. Hogan are women.

John Wooding, the provost, said both the university and College of Engineering have tried to create a hospitable environment for women. The reason, he said, is simple: "The more women are around, the more women are attracted."

Robert Gavin can be reached at rgavin@globe.com.