

# Defeating the Myths

## More Women Moving Toward STEM Careers

By Symone C. Skrzycki

**B**arbie has been an iconic figure since her debut in 1959. While her shapely body has been controversial at times, the doll has primarily represented an evolution of girls growing into young women.

In 1992, those girls could push a button prompting the doll to say several phrases – one of them being, “Math class is tough!” Likely intended as an innocent expression when it was created, for others it was an unnecessary negative reinforcement of male/female stereotypes.

Twenty years later, women have made great strides, but there is still a prevailing message – unintentional or not – that STEM (science, technology, engineering and mathematics) careers are better suited for men.

Partially to blame are common misperceptions about those professions.

Universities throughout the state have launched initiatives to correct some of those “myths” and attract more women to pursue STEM careers.

It’s paying off with significant enrollment growth.

Last fall, Purdue University’s College of Engineering saw an unprecedented jump in enrollment of first-year women, resulting in a nearly 31% increase from the previous year. In addition, the total number of female engineering majors soared to 1,534.

In Terre Haute, female enrollment at Rose-Hulman Institute of Technology has continued to increase over the past two years. Currently, women account for 20% of the student population (the national average for female engineers is 18%).

Meanwhile, Indiana University Bloomington’s School of Informatics and Computing (SoIC) nearly doubled the number of female technology majors (from 75 to 148) – part of a two-year goal established in November 2009. The milestone took place six months ahead of schedule.

“We as a nation are currently not supplying the nation’s needs for people in the (information technology) field,” asserts SoIC Dean Bobby Schnabel. “If you look at any of the projections from (the U.S. Bureau of Labor Statistics), we actually fall way short of the number of IT professionals. We need people – male and female – to understand what the field is about.”

### Sending the right message

Setting the record straight centers around collaboration, curriculum and community.

Schnabel emphasizes that it’s critical to “get an accurate picture of what the field is like out to people.

Purdue University offers engineering outreach programs for females of all ages. High school students (left) participate in a half-day lab session on mechanical engineering. Brooke Elliott (right), a chemical engineering major, shows elementary students the proverbial ropes.



“It goes all the way from the recruiting side to the introductory courses to the community as you go through the program,” he maintains. ... “Then you look at how are courses taught? To what extent is teamwork a part of the course? That’s important in improving the diversity there. We work with instructors on introductory courses to think about, ‘How do you make both the atmosphere and content of the course one that’s gender neutral; if you will, welcoming?’ ”

Beth Holloway, director of Purdue University’s Women in Engineering Program (WIEP), remarks, “When we look at what girls and women tend to like to do, they like to work with other people, not in isolation. If there’s a general perception that all engineers do is sit in their cubicle all day and stare at a computer and do stuff – whatever that stuff is – that doesn’t sound very exciting at all. We focus on the collaborative aspect, not because it’s more appealing to women, but because it’s more indicative of what engineers in the workforce do.”

She says the new Ideas to Innovation Learning Laboratory (at Purdue’s Neil Armstrong Hall of Engineering) for first-year engineering students has helped increase enrollment.

“The faculty in the first-year engineering program could redesign the courses the way they wanted because of the space we moved into (traditional classrooms have more limitations). We’ve also tried really hard (to make sure) that students see those first-year spaces when they come to campus,” Holloway shares.

She also attributes much of Purdue’s recent success in recruiting women to a 2008 landmark report by the National Academy of Engineering called *Changing the Conversation: Messages for Improving Public Understanding of Engineering*.

“The way we talk about what engineering is and the kinds of things you do with engineering and what you can do (in those fields) have changed over time and have really been influenced by this report,” she observes.

The study identified several career motivators for girls and women. Among them were job flexibility and the opportunity to make a difference.

Lisa Norton, director of admissions at Rose-Hulman, comments, “I think that (variety of career options) is really exciting for some of the young ladies – that they are not just chained to a desk. You can do a lot of different things with an engineering career. It opens a lot of doors for you – whether it’s continuing education or going straight into the workforce.”

## Beyond nuts and bolts

While developing technical skills is crucial, mastering “soft” skills is equally important.

“What Purdue has done is really revamped the curriculum over time so that students learn collaboration skills during their undergraduate years,” Holloway explains. “(That way), when they graduate, they will have practiced working with others in a team environment, solving problems, figuring out proper ways to communicate, figuring out different work styles and realizing that their work style is not the only work style out there and how to adapt.”

At Rose-Hulman, the Rose Building Undergraduate Diversity



**Rose-Hulman Institute of Technology students Angelica Patino (top) and Katie McNear (middle) take a hands-on approach to their studies. Carlotta Berry, assistant professor of electrical and computer engineering, shares a laugh with students as they explore robotics concepts.**

(ROSE-BUD) scholarship program, created to attract more women and minorities to STEM-related careers, also emphasizes teamwork. It’s geared toward electrical and computer engineering majors.

Activities revolve around advising, mentoring, professional development and networking.

“The benefit of ROSE-BUD is that it doesn’t just develop the professional, it develops the person,” asserts Carlotta Berry, program co-director and assistant professor of electrical and computer engineering. “Typically what engineering school does is give you lots of technical skills – math, calculus, etc. You may walk out the door and have the professional, technical person developed, but not the (whole) person.

“If I can’t communicate effectively, no one will care that I graduated with a 4.0.”

In 2010, Rose-Hulman introduced a multidisciplinary minor in robotics.

Each student is required to complete a senior design project, which provides a training ground for future workforce experiences.

“We tell them, ‘You are the domain expert for your major, but when you leave this project you ought to be able to articulate other disciplines you’ve learned. Don’t parcel out the project. Talk together (because) that’s what you’ll do when you graduate,’ ” Berry explains.

She calls the ROSE-BUD and robotics minor programs “awesome recruiting tools.”

## Sparking an interest

Elementary, middle and high school students can get an early start exploring engineering through a variety of university programs.

Purdue’s Imagination, Innovation, Discovery & Design (I2D2) afterschool program introduces children (kindergarten through fifth grade) to engineering concepts. In addition, Exciting Discoveries for Girls in Engineering (EDGE) – a week-long summer residential camp for incoming high school sophomores and juniors – focuses on hands-on projects.

The annual Women Exploring Engineering overnight program for high school girls, organized by Rose-Hulman’s Society of Women Engineers chapter, features a mix of practical exercises. Each participant is paired with a current Rose-Hulman freshman, who serves as hostess.

SoIC’s Schnabel praises the Indiana Aspirations in Computing Award competition for celebrating high school females’ achievements.

“That one is really neat,” he declares. “That’s something that the NCWIT (National Center for Women & Information Technology, which he co-founded) started, first just on a national basis to both encourage high school girls who were getting interested in computing and also to publicize what they’re accomplishing. There are now roughly 30 regional competitions (in addition to the national competition).”

A January awards banquet honored 40 students from high schools throughout Indiana.

“It’s more than recognition,” Schnabel stresses. “We then try to tie that into the universities in the area and try to get scholarships for those girls to go into computing fields.”

## Speaking from experience

Emily Keen, a Purdue senior majoring in mechanical engineering, began volunteering with Purdue’s WIEP as a freshman. Currently, she participates in the Personal Connection Program, which reaches out to prospective women students.

She says it’s a great way to build relationships.

What drew Keen to engineering was the chance to blend her artistic and technical talents.

“I was always really good at math and science, and I was really interested in art,” she recalls. “I was talking to my dad and he said, ‘You should consider a career in that. Why don’t you meld together the creative aspects of art with your technical abilities?’

“My (high) school happened to offer engineering courses and I took a few, and I really liked it.”



The Indiana Aspirations in Computing Award competition honors talented high school females with an interest in technology-related careers.

Fellow Purdue senior Victoria Liem, a chemical engineering major, also devotes time to recruiting new students. She notes that some of the females she talks with are intimidated by engineering.

“Engineering has been predominately a more male-dominated field,” she confides. “So there’s always (the) question of female-to-male ratio of students in engineering (classes). We try to address that and say what our experiences have been in the classroom.”

Both Keen and Liem have obtained post-graduation jobs. Keen will work at GE Transportation, while Liem will be a process engineer with consumer products at Procter & Gamble.

## Great minds may not think alike

Would you rather have a group of similar employees seated around a table brainstorming solutions to a problem or people with different backgrounds and life experiences doing so? That’s the question Holloway poses when considering the benefits of combining talents and skills from a wide group of people.

“When employers talk about having diversity in their workforce, women can be an aspect of that,” she points out. If everyone seated around the table thinks the same way, “you’ll probably find a solution, but it might not be the best solution.”

Schnabel adds, “Diverse teams come up with a better product. So, almost any business – unless your business is only catering to one race or one gender – is better off having a team in there that reflects that.”

While the Barbie math phrase described earlier may have contributed to a negative perception, one can go back earlier – to a 1980s commercial – to find a much more positive message from the popular doll. Meant to inspire young girls, it’s one that could describe the progress women have made in education and career circles in recent years: “We girls can do anything!”

### INFORMATION LINK

**Resources:** Bobby Schnabel, Indiana University Bloomington’s School of Informatics and Computing, at [www.soic.indiana.edu](http://www.soic.indiana.edu)

Beth Holloway, Purdue University’s Women in Engineering Program, at <https://engineering.purdue.edu/WIEP>

Carlotta Berry and Lisa Norton, Rose-Hulman Institute of Technology, at [www.rose-hulman.edu](http://www.rose-hulman.edu)