



The Nuclear Magnetic Resonance Spectrometer (NMR) was delivered to the Department of Chemistry. Funded in part by donors, including Carol Ammon, M.B.A. '79, '10 (Hon.) and Adelphi Professor Emeritus Sung Moon, the NMR provides students with hands-on training using this important tool to analyze the structure, interaction and underlying forces of molecules.

Mary Klement '71, M.S. '73, former program manager and proposal leader at Northrop Grumman

Shantell Adams '11, M.S. '13, (anticipated) mechanical engineering, University of Pennsylvania

Alyssa Grieco '12, M.S. '14 (anticipated), architectural historic preservation, Columbia University

BUILDING A BETTER FUTURE FOR WOMEN IN PHYSICS AND ENGINEERING

By Ela Schwartz

THE HIT TV SERIES *THE BIG BANG THEORY* follows the adventures and misadventures of three physicists and an engineer. All four are highly intelligent, socially inept—and male. The main female cast member is their opposite, a beautiful, socially savvy waitress and aspiring actress whose intellectual pursuits run to pop culture rather than particle accelerators.

While the show can be applauded for bringing nerd culture to the masses, it also reflects that there's a dearth of women in physics and engineering: According to the American Institute of Physics, women earn just 21 percent of bachelor's degrees and 17 percent of Ph.D.s in their field, and a 2009 report by the National Science Foundation puts undergraduate female enrollment for engineering at a scant 17.7 percent.

Does *The Big Bang Theory* reflect a hard fact that physicists and engineers prefer a woman's role to be that of playing beauty to the guy geeks? Not according to the Adelphi female physics alumni interviewed. Just as *Big Bang* evolved to add two woman scientists (one of whom is the only cast member to actually have a Ph.D. in a science in real life), our alumni, who have gone on to earn or pursue advanced degrees, are optimistic that women will continue to make inroads in physics and engineering.

Taking a problem-solving approach, we presented these alumni with some current theories regarding the shortage of women in physics and engineering and asked them to offer possible solutions.

PROBLEM: MATH AND SCIENCE ATTRACTS MORE YOUNG BOYS THAN GIRLS.

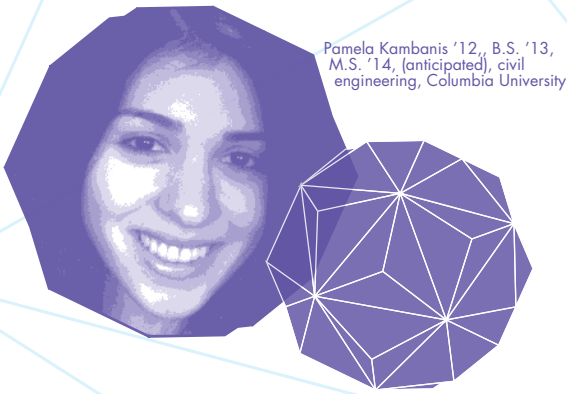
SOLUTION: ENCOURAGE GIRLS TO EXPLORE THE SCIENCES AND PROVIDE FEMALE ROLE MODELS.

In 2005 Lawrence Summers, then president of Harvard University, suggested that the lack of girls pursuing science could be due to neurobiological factors. What followed was a flurry of controversy. Is it enough to steer girls to blocks and construction sets rather than dolls and dress-up? Or do boys possess better mathematical and spatial skills while girls' brains are wired for language and socialization?

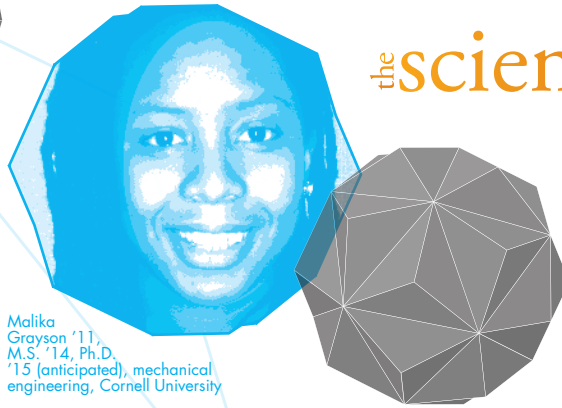
There is no lack of analytical abilities in our physics alumni. Even as little girls you could find them fixing cars, solving puzzles or taking apart locks and mechanical devices. By high school, they'd already excelled in math and science and were hooked on using their skills to come up with innovative ways to solve problems.

"We need to encourage girls, and get them while they're young," Mary Klement '71, M.S. '73, said. One way to do this is to bring female engineers—like herself—into the schools to show girls what engineers and physicists do. She tells about the time she spoke to high school students about her career at Northrop Grumman and her work as program manager for such projects as the Global Hawk, a highly sophisticated intelligence-surveillance-reconnaissance unmanned air vehicle. After her talk, the young women lined up to get her autograph.

Malika Grayson '11 is researching variable blade geometry to optimize wind power so that it can be obtained at lower speeds. Pamela Kambanis '12 is interested in structural engineering projects such as large-scale bridges and buildings. Shantell Adams '11 would like



Pamela Kambanis '12, B.S. '13, M.S. '14, (anticipated), civil engineering, Columbia University



Malika Grayson '11, M.S. '14, Ph.D. '15 (anticipated), mechanical engineering, Cornell University

to focus on energy storage and renewable energy.

All three point out that girls—and all students, for that matter—may be inspired by how science can benefit humanity. Ms. Adams calls it “engineering a better world” and hopes her degree concentration in heat transfer and fluid mechanics will translate into harnessing solar, wind and tidal energy to decrease dependence on nonrenewable sources.

It can be intimidating. I sometimes feel like I have to work harder than everyone else to prove myself.”

Other women report more positive experiences. Ms. Kambanis related how she participated in a group project where she was the only girl on her team. “The boys I worked with didn’t treat me any differently. I think this generation of young men doesn’t have the misconceptions the older one had.”

“Adelphi was definitely the best three years of my life,” Ms. Grayson added. “Yes, there was a heavy workload, but because Adelphi is also an artsy school, with theatre and music, I found that balance, which I see a lot of engineering students lack. “

PROBLEM: ONCE ESTABLISHED, WOMEN LEAVE THEIR FIELDS AT HIGHER RATES THAN MEN.

SOLUTION: SEEK SUPPORT AND ADVICE OF FEMALE MENTORS.

Ms. Adams has made plenty of male friends as a graduate student at the University of Pennsylvania. “I found it wasn’t about who I was

According to a study by the National Science Board’s *Science and Engineering Indicators 2012*, 16.1 percent of women in the sciences and engineering between ages 30 and 55 were out of the labor market, compared to 2.2 percent of men. The study found women’s salaries to be about 18 percent lower than those of men at comparable levels, and more women identified family as a reason to leave the field: 69 percent as opposed to 15 percent of the men.

“I found out it wasn’t about who I was or how I looked, but about what skill set I had.”

Students may also be intrigued with how science can be applied to the arts. Alyssa Grieco '12 said that her physics background has proven to be “incredibly helpful” in her master’s program in architectural historic preservation and that her classmates often turn to her for advice on construction or materials.

or how I looked, but about what skill set I had,” she said.

Sean Bentley, Ph.D., associate professor, noted that the Adelphi physics department is almost 30 percent female, as opposed to about 10–15 percent on average in other universities, with roughly 10 physics majors in each graduating class. The small number of students and open-door policy of faculty members create a family environment for students who share the same interests. “They’re into the same things, like video games, solving puzzles and other geeky stuff,” Dr. Bentley said.

Joining an organization for women offers opportunities to find support and advice. These groups link physicists and engineers, from budding elementary school scientists to seasoned professionals. Ms. Grayson is a graduate mentor for the Society for Women Engineers. Ms. Adams is a fundraising co-chair for the National Society of Black Engineers and mentors elementary and high school students.

PROBLEM: FEMALE DEGREE CANDIDATES DON’T ALWAYS STICK WITH THEIR PROGRAMS.

SOLUTION: CREATE AN INCLUSIVE ATMOSPHERE AND OFFER SUPPORT.

Keeping up with a physics or engineering program is challenging for any student, male or female. Universities can take steps to ensure that women don’t leave because they feel like the only girl in the comic-book store. Ms. Grayson said, “I’m currently the only female in my lab.

When Ms. Adams entered Adelphi as a transfer student, she said her classmates were welcoming. “I met students from China, Mexico, Trinidad, Haiti and Nepal. Everyone treated each other the same and we had so much fun together.”

Ms. Klement further supports physics majors through the Mary Ann Barracco Klement Endowed Fund for Physics Research, which will enhance faculty and student research and scholarships in the physics department. **A**



Adelphi science alums and faculty gathered for a cocktail reception, Legends: Honoring the Sciences, at Long Island’s Allegria Hotel. The event was held to honor several legendary professors from the College of Arts and Sciences. Faculty hosts for the event included Sean Bentley, Ph.D., physics; Lawrence Hobbie, Ph.D., biology; and Joseph Landesberg, Ph.D., chemistry. For more information about Adelphi’s annual Legends event, visit alumni.adelphi.edu/events.