

This article was published in the IEEE Engineering Management Society Newsletter, Q4 2006.

Sally Ride Science

by Sue Dorward

In early October, I had the privilege of hearing former US astronaut Sally Ride speak at the *Grace Hopper Celebration of Women in Computing Conference*.¹ After showing us the obligatory, breathtaking photos taken on her two space shuttle flights in the 1980s, Ride focused on the gloomy statistics surrounding the future of engineering: young people today are increasingly choosing not to study engineering, and we are facing a significant talent shortage.

Ride, who has a PhD in Physics from Stanford, is currently on leave from University of California San Diego. In 2001, she founded Sally Ride Science, an organization that works to increase girls' interest and involvement in the sciences. They run Saturday science events on campuses across the US, where they provide hands-on activities and informational booklets about science careers for girls and their parents. The events often attract over 1,000 girls.

Encouraging Girls in Science

Given Ride's experience as the first female US astronaut, it is hardly surprising that she has chosen to encourage girls in science. In her talk and on her web site (sallyrides.com), she gives some startling US-centric statistics that support the need for her work:

- In 2000, 8 of the 10 fastest growing occupations were in science, math, or technology.
- A 2000 US national commission report stated that colleges needed to produce four times the number of computer science graduates to meet demand. (The bubble has burst since then, but certainly this has not reduced demand by a factor of four.) Meanwhile the supply of graduates dropped 40% between 2000 and 2004.
- A 2000 US Congressional report stated that if the number of women in IT were equal to that of men, this would take care of the shortage of IT professionals.
- In 2004, 11% of engineers were women, up from less than 1% in 1970. 20% of IT professionals were women. 20% of engineering PhDs and 25% of computer science and math PhDs went to women. This represents

¹ This conference was co-presented by the Anita Borg Institute for Women and Technology and the ACM, and was sponsored by leading technology companies, universities, and the National Science Foundation.

enormous progress since 1970, but there is still a lot of room to get more women into these fields.

- The only field to lose ground is computer science, which has a lower percentage of women earning bachelor degrees now than twenty years ago (22% in 2005, down from a peak of 37%). Signs point to a continuation of this downward trend, with only 17% of the 2005 computer science A Advanced Placement test-takers being girls. The gender gap for the harder computer science AB exam was the largest of all disciplines, with only 10% girl test-takers. (For comparison, the next-largest gender gap was for the electricity and magnetism physics exam, which had 23% girl test-takers.)

Ride noted that little kids love science, but somewhere along the line, "we beat it out of them." The impact is greater on girls than boys.

- A 1996 US Department of Education study examined children's attitudes towards science, and found that while 68% of boys and 66% of girls like science in 4th grade, these numbers decrease to 56% and 48% respectively by 12th grade. The study also found that 49% of boys and 41% of girls say that they are good at science in 4th grade, and these numbers decrease to 45% and 33% respectively by 12th grade.
- The same study examined children's attitudes towards math, and found that while 69% of boys and 70% of girls like math in 4th grade, these numbers decrease to 56% and 48% respectively by 12th grade. The study also found that 70% of boys and 61% of girls say that they are good at math in 4th grade, and these numbers decrease to 59% and 47% respectively by 12th grade.
- Children start losing interest in math and science in middle school (5th to 8th grades). A 2000 US Congressional report states that 8th grade girls and boys perform the same in math. Nonetheless, 8th grade boys are more likely than 8th grade girls to like math (58% versus 53%) and say that they are good at math (68% versus 59%), according to the 1996 study mentioned above.
- Girls who are well prepared in math and science nonetheless choose careers in those fields in disproportionately lower numbers than boys do.
- The gender discrepancy is due to a variety of factors, including image, role models, and parental support.

Another Sputnik?

Ride recalled the early days of the space program, particularly 1957 when Sputnik launched. Space travel captured the world's imagination, and international competition fostered a sense of urgency and national pride. Today

we need another Sputnik, she said, something to galvanize us and revitalize our interest in science and engineering. Ideally, that something would interest girls as well as boys.

Ride spoke briefly about the future of space exploration. NASA will be retiring the space shuttle in 2010. By 2018, their focus will return to going back to the moon. This will require a lot of design, simulation, and communication work. We will need larger data streams to support space probes and Mars rovers, something she referred to as an "interplanetary Internet." Will one of these initiatives be the next Sputnik that she is hoping will make science and engineering "cool" again?

A Global Talent Shortage

Ride mentioned that the US is producing fewer scientists and engineers than other countries, particularly China and India. That is perhaps cause for alarm, but according to a special report in *The Economist*,² finding enough qualified talent is a global problem. China and India's IT sectors are experiencing double-digit wage inflation, turnover reaching 40%, and a dearth of qualified managers. The Chinese also face the additional hurdles of language and cultural skills. According to the report, "China may have twice as many engineering graduates as America, but only 10% of them are equipped to work for a Western multinational." With China's one child policy, and baby boomer retirements having a larger impact on Europe and Japan than the US, the talent shortage is expected to worsen globally.

So if we look at the talent race like the race to the moon – which countries will win, which will lose – the US is not out of it yet. However, in today's global business environment, does it make sense to focus on one country versus another? As *The Economist* report points out, "America does not become less competitive because China invests more in science: indeed, outside highly proprietary areas, Chinese investment in science will help to advance scientific knowledge in general."

Which leads me to wonder, is Sally Ride Science planning any events outside the US? We need as many bright and talented engineers as we can get!

Sue Dorward, a tech management coach who coaches high-potential employees, spoke about "Coaching Geeks" at the Grace Hopper conference, immediately after Sally Ride's keynote. She is based in New Jersey and can be reached at sue@sudocoaching.com.

² "The search for talent: Why it's getting harder to find", 15 pages, October 7, 2006.