

## Expanding Your Horizons

It's 6 a.m. on a Saturday in early March. A colleague and I drive a pickup around campus in the drizzle and dark, putting up signs. I've barely had my coffee and I'm wrestling sawhorses and signposts, staplers and duct tape, trying to turn an urban campus into an oasis for a thousand young women for the day.

7 a.m. The conference begins in two hours. Parents arrive with their daughters, asking anxious questions: Where can I park? Will my daughter be safe on campus? Are there any vegetarian lunches? Is there anyplace to get coffee? The buses from Monterey County arrive; the drivers want to know if they can bring their own daughters next year. A stream of women scientists and engineers enter the buildings, toting microscopes and liquid nitrogen dewars, computers, boxes of equipment and supplies, jars of sheep eyeballs. An airline pilot arrives in her uniform. More volunteers arrive to staff the lunch table, the snack table, the information table.

8 a.m. The signs are up, the parents are gone, business is brisk at the information table, the sun is shining, and hundreds of 12- to 16-year-old women sit in the auditorium, eagerly awaiting the start of the Expanding Your Horizons Conference at San Jose State University.

9 a.m. The 13th annual Expanding Your Horizons Conference begins. After an introduction by a university vice president, a marine biologist from Monterey Bay Aquarium begins her keynote speech, "Sisters, Sons and Seaweed: Celebrating a Life in Science." The audience of junior high and high school women giggle over the sea otters frisking across the screen and shriek at the dissected jelly fish. The speaker talks about her family and her education, and how much fun her job is.

Thirty minutes later, the girls stream out of the auditorium and on to their first workshop. I follow a few to the "Money, Metals and Microchips" workshop, put on by women graduate students from Stanford University's Materials Science and Engineering Department. During the one-hour workshop the kids measure the voltage developed across an orange, explore the ductile-brittle transition of balloons, look through a metallographic microscope at work-hardened paper clips, and build crystal models of styrofoam. Other girls attend workshops entitled "All Aboard for Mars," "Creative

Contraptions," "The Magic of Magnetism," "How to Play with DNA," "Physics of Toys," "Incredible Edible Science," and "Rockin' the Bay in the Geo-Logic Way." All of these workshops are led by women scientists, engineers, and students from various universities, laboratories, and corporations around the Bay Area.

Each of the 1,000 junior high and high school women at the all-day conference attended three hands-on workshops on science, math, or engineering. Sixty-five different workshops were offered on topics ranging from veterinary science and computer programming to microbiology. Expanding Your Horizons (EYH) is a nationwide program, held at more than 200 separate sites in 32 states. In the Bay Area alone there are four different conferences each March. The primary objective of EYH is to increase young women's interest and confidence in mathematics, science, and engineering by providing hands-on experiences led by positive women role models. EYH also increases their awareness of math and science career options. The conferences are sponsored by the Math/Science Network, an Oakland, California-based non-profit organization which promotes education and career information for women interested in science, math, and engineering. The conferences are planned and implemented at each site entirely by networks of volunteers. The San Jose State University conference is supported by more than 10 different local companies, including Intel, General Electric, Lockheed, Hewlett-Packard, and IBM.

The first EYH Conference was held at Mills College in Oakland, California in 1976. Since then, more than a quarter of a million young women nationwide have attended a conference; many of them have gone on to major in science or math in college and have pursued careers in these fields.

In 1992, the Math/Science Network

The Education Exchange highlights the experiences of scientists and engineers with local schools, along with helpful hints and resources. If you would like to share your own involvement in science education, contact: Finley Shapiro, Department of Electrical and Computer Engineering, Drexel University, Philadelphia, PA 19104, U.S.A. Phone (215) 895-6749; fax (215) 895-1695; e-mail: shapiro@ece.drexel.edu

received a grant from the National Science Foundation to hold a conference for EYH Conference organizers, which resulted in a startup handbook. As a result, step-by-step instructions are available for starting new conferences. Men are often involved in the planning stages, but most conferences encourage women to be the primary workshop leaders. It is impossible to overstate the importance of female role models as an incentive for young women to enter and stay in the fields of science and engineering.

I first got involved in EYH as a graduate student at Stanford. Along with several colleagues, I offered a workshop entitled "Living in the Material World." Our one-hour workshop introduced the structural, electrical, and mechanical properties of materials. The workshop was offered three times during the day, each time to a group of 20 girls. We divided them into three smaller groups of 6 or 7, and each small group circulated through three "mini-workshops," all in the same room. For example, we tested the conductivity of glass, pencil "lead," silicon wafers, copper wire, and water, using a circuit constructed from batteries, wire, a light bulb, and a mechanical switch. The test materials were inserted into the circuit and contacted using alligator clips. Each girl had the opportunity to insert the materials, attach the leads, close the switch, and observe whether the light bulb turned on. Many of them had never experimented with electricity; even if they had, measuring the conductivity of materials was a new concept. They were very surprised when the bulb lit using pencil lead but not using a silicon wafer. We then showed them a wafer with integrated circuits on it, and explained briefly how the "chips" were fabricated using different materials. In the other mini-workshops we built crystal models, demonstrated the fracture strength of metals, and performed the perennial favorite, a liquid nitrogen demonstration of the brittle-ductile transformation of familiar objects.

What impact does one day have on the future choices of young women? This question is best addressed in a letter from Rita, an 8th grader who attended last year's EYH Conference. She describes the keynote speaker Ophelia Long, the first nurse to become CEO of a major metropolitan hospital (Highland Hospital in Oakland):

"There she stood, a black woman, with around 1,000 pairs of eyes on her—all female eyes. The reason for us to have come here was a simple one: to expand

our horizons, to open our eyes to all the possibilities that lie before us, to think about what we, the women in this world, can become in the future. And maybe, hopefully, possibly to make all this work and effort worth something. Then we can learn to go the distance, to do all we can do to break the glass ceiling, the guidelines set for each and every woman in this world, the rule that says that women are mothers and stewardesses and secretaries. But here at San Jose State at this once-a-year meeting we hope to change all this...I haven't and never will part from the memories I got from one day at San Jose State...You helped make one of the most meaningful days in my whole life happen."

For more information on Expanding Your Horizons Conferences, or to find out if there is a conference happening near you, contact:  
Math/Science Network  
Preservation Park  
678 13th Street, Suite 100  
Oakland, CA 94612  
(510) 893-MATH

EMILY ALLEN

*Emily Allen is an assistant professor in the Materials Engineering Department and an EYH Planning Committee member at San Jose State University, San Jose, California. Questions about EYH can be sent to: allen@sjsuvm1.sjsu.edu.*

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Tribology Search Committee  
Room 3-173  
Department of Mechanical Engineering  
77 Massachusetts Avenue  
Massachusetts Institute of Technology  
Cambridge, MA 02139-4307

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**AD CLOSINGS:**

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