Key Issue: Mentoring

Women have trouble finding senior scientists to guide them toward career success.

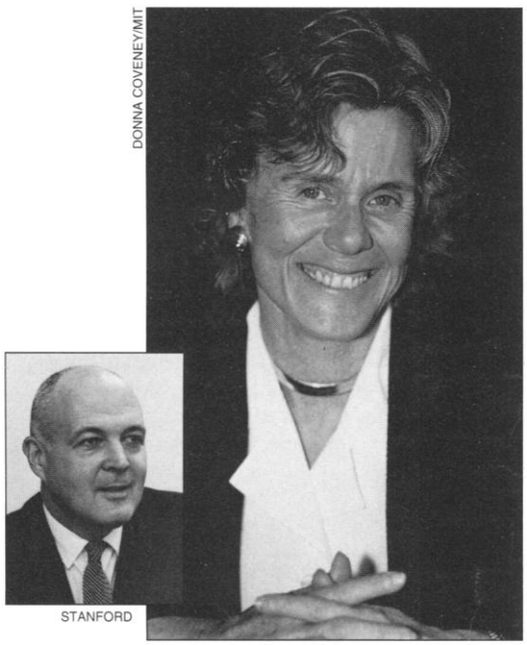
by Ann Gibbons

By any measure, Sheila Widnall is a scientific success story. At 53, she is associate provost of the Massachusetts Institute of Technology (MIT) and the Abbey Rockefeller Mauzé professor of aeronautics and astronautics. One of the first women to win tenure and full professorship at MIT—in the early 1970s—she went on to win prestigious research and career achievement awards and fellowships in major engineering and science societies, including serving as president of the American Association for the Advancement of Science.

None of this would ever have happened, says Widnall, without a touch of mentoring at a crucial moment. "It didn't occur to me to go to graduate school until my mentor—a faculty member in our department—for some reason took a special interest in my career development," says Widnall. "He pushed me and pushed me and urged me to go to graduate school." And that pushing from Professor Holt Ashley (now at Stanford University) made the difference: Widnall was the only woman of the 12 in the MIT class of 1960 to go directly to graduate school.

Mentoring is a crucial part of the maturation of any young scientist into a senior researcher. Through a mentor a young scientist makes all-important contacts with meeting organizers, journal editors, and other researchers that lead to career advancement. The mentor can also help a young scientist develop his or her own scientific "style," choosing from among the welter of possible problems whose solution will lead to the greatest intellectual reward and career advancement. And finally, as in the case of Widnall, the mentor offers a precious commodity in a harshly competitive scientific world—encouragement.

Unlike Sheila Widnall, most women have a tough time getting this important guidance. At the top levels of science there are few women, and because of what Bernice Sandler, a psychologist and an expert on mentoring who works at the Center for Women Policy Studies in Washington, calls the "clone factor," men feel more comfortable mentoring other men. A recent study of female scientists by sociologists Kathryn B. Ward of Southern Illinois University and Linda Grant of the University of Georgia shows that many women lack mentors and that those who do have guides find them later in life than men do.



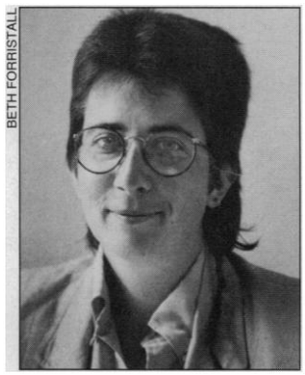
Mentor/mentee. Holt Ashley, Sheila Widnall

The price female researchers pay for lack of mentoring is often exacted at the beginning of their careers. "One of the things I'm finding is that some of these women seem to be coming out into the field less well prepared and socialized," says Ward, who examined 600 questionnaires from university physicists, chemists, and sociologists, which included detailed answers from more than 50 scientists about mentoring experiences. Those with no mentoring or negative experiences "seem to be floundering the first few years, in terms of grants and getting published. They often seem to get into jobs that are not a good fit, or are of marginal status."

But the fact that the traditional route to mentoring—working closely with a senior colleague—is often not available to women doesn't mean women get no mentoring. Indeed, female scientists report reaching out to find mentoring in unorthodox ways, beginning early on. "When I was in fifth grade, my father gave me his high school physics book," says Joyce Freiwald, a mathematician who is director of operations for General Atomic's Distributed Computing Solutions division. "When I was in seventh grade, he started teaching me nuclear and atomic physics. A lot of the women I know usually had a father who was very important in it all." Other women married scientists who supported their career choices at key times.

In addition, sociologist Ward notes that many early female scientists came from women's colleges, where they were mentored well by both male and female faculty and formed long-lasting alliances. A similar networking model is now being applied in electronic form by computer scientists who look to their female peers for support, encouragement, and inside tips (*see box on facing page*).

Although these strategies are innovative, the ultimate solution is likely to be increasing the number of senior women in science who can serve as mentors for younger female colleagues. As women like Widnall and Freiwald reach the highest ranks, they are raising consciousness by their example. In addition to mentoring their own students and younger colleagues, women like Susan Brainard, director of the Women in Engineering Initiative at the University of Washington, are actively lobbying and convincing universities to start programs to help keep women in engineering and science. The University of Washington's program now connects some 700 female engineering students with faculty mentors or senior students every year.



Surveying the field. Kathryn Ward's data show women have more difficulty finding mentors than men do.

These women are also spreading the word about the importance of mentoring—hoping to change male attitudes. "I always point out to my male colleagues that it is absolutely crucial to urge women to go to graduate school," says Widnall. "If that doesn't happen," she adds, "the chances of women getting graduate degrees are greatly reduced." It seems possible that from this patchwork of solutions—changed attitudes among male scientists, more females in senior positions, and innovative networks—the "mentoring deficit" for young women may soon be filled.

Creative Solutions: Electronic Mentoring

A persistent problem for women scientists is a lack of the crucial contacts in the research community that young male scientists develop through mentoring and networking. In 1987 at an Austin, Texas, computer science conference, an innovative solution emerged in an unusual place: the ladies' room. Out of 400 conference attendees, only about 30 were women, recalls Anita Borg, a computer scientist at Digital Equipment Corp.'s Western Research Laboratory in Palo Alto, California. "We didn't run into each other except in the ladies' room," she says. "A few of us started talking about women's issues in there, and every time someone came in, they stayed. Pretty soon, we ended up with 10 women deep in conversation."

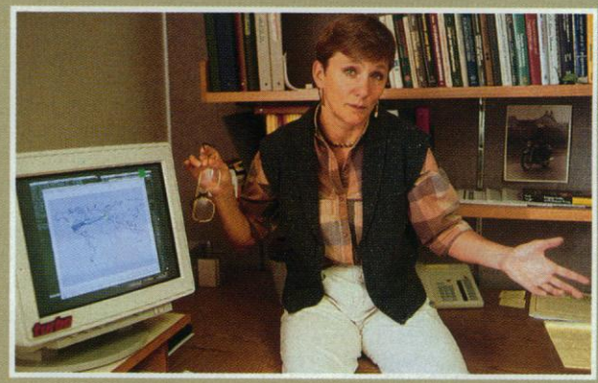
Soon there was the Systers network for female computer scientists—named from wordplay on "sisters" and "systems." The network has 900 members ranging from undergraduates to senior faculty. Their communications cover a broad spectrum: pleas for career advice, questions about who is doing research on a particular topic, requests for guidance on writing papers, even on what to wear when they present them at conferences (the answer: leave cocktail dresses at home and wear sensible clothes with a place to attach a microphone).

Systers, which Borg runs from her computer terminal at Digital (and which Digital underwrites), has made a real difference in the lives of some of the women who use it, including Ursula Wolz. In 1988 Wolz was a 32-year-old graduate student, wrapping up her Ph.D. in computer science at Columbia University, who was on the verge of abandoning her career in academics. She had always wanted to teach—she had a master's degree in education—but she had become discouraged by the atmosphere at Columbia, where she "watched the junior faculty go crazy" trying to juggle the demands of teaching, doing research, and having children.

Before bailing out of academia, Wolz, in a last-ditch effort, sent out a message on Systers—and the answers changed her mind. The one that had the greatest effect was from Nancy Leveson, a highly regarded professor of computer science at the University of California, Irvine, whom Wolz had never met. "She said, 'Don't give up on teaching,'" recalls Wolz. "She told me there are less conventional ways of having an academic career, and, as a result, I applied to all different levels of colleges and universities."

Today, Wolz is an assistant professor in computer science at Trenton State College in New Jersey. "I'm ecstatic," she says. "I like the department. I like the collegial atmosphere. I adore teaching." Without the electronic interaction—which amounted to a kind of mentoring—Wolz says she might not have been able to see that there was more than one way for a woman to have an academic career in computer science. "The women at Columbia are very committed to being research scientists in an academic setting," says Wolz. "If they had been my only role models, it would have been a tough decision."

Borg says: "There is something very useful about being able to get together with other women whom you have so much in common with....As a result of Systers, there are women's get-togethers, lunches, or dinners at almost every computer science department....Someone will send out a message saying they're going to a conference and can we organize a lunch? Sometimes it is depressing when you realize there are only 10 women at a conference. But sometimes, it is quite wonderful." **A.G.**



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Sister of invention. Anita Borg.

Speaking Out

PRINCETON

Shirley Tilghman

Princeton University molecular biologist Shirley Tilghman says she didn't encounter gender discrimination in her highly successful route to being a senior scientist. Her parents and teachers were so supportive that she says, "In a way I've lived a Mary Poppins sort of existence." Indeed, until recently she believed women face few obstacles in becoming scientists. But recent experiences, including some at conferences, changed her mind.

"My conviction is that the unconscious biases against women are the last frontier that we face. But these are so subtle, so unintentional, and culturally bound that we must be ever-vigilant. Here is a serious example: In 1988, I ran a Gordon Conference on molecular genetics which was funded by the NIH. About 33% of the speakers and 45% of the attendees were women. Two years later, another conference on the same topic was arranged by some of my male colleagues. And only two of the speakers were women. I don't think you can attribute this to anything but an unconscious bias. In the biological sciences, there's been a tendency to think that we are doing so well that the problem is over. And most women would like to believe this. I believed it. But that is nonsense." **Virginia Morell**

Virginia Morell is a free-lance writer based in Ashland, Oregon.