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For Women in Sciences, Slow Progress in Academia

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It has been 12 years since Nancy Hopkins, a senior professor of molecular biology at the Massachusetts Institute of Technology, was crawling around the floor of her laboratory with a tape measure, intent on proving to a male administrator that she had 1,500 square feet less laboratory space than her male counterparts.

But the administrator ignored her data and refused to provide the 200 square feet she needed to expand her cancer research.

Since then, women in the sciences and in mathematics have made some highly visible gains. At M.I.T., Professor Hopkins, now 61, says that she and other senior female scientists have laboratories and salaries equivalent to those of their male colleagues. Female scientists now also lead M.I.T., the University of Michigan, Princeton, Rensselaer Polytechnic Institute and four campuses of the University of California.

And yet, as was made clear after remarks by Harvard's president, Lawrence H. Summers, about whether women lag in science and engineering because of "intrinsic aptitude," their overall progress at many of the country's top research universities has been slow, the gains uneven and fragile.

Even as the number of women earning Ph.D.'s in science has substantially increased - women now account for 45 percent to 50 percent of the biology doctorates, and 33 percent of those in chemistry - the science and engineering faculties of elite research universities remain overwhelmingly male. And the majority of the women are clustered at the junior faculty rank.

At Harvard, for example, there are 149 men with tenure in the natural sciences and just 13 women. Cynthia Friend, the chairwoman of the chemistry department, remains the only woman who has ever received tenure in chemistry at Harvard. (By comparison, women have done better in the humanities departments at Harvard, where 39 women and 98 men have tenure.)

Nor is Harvard's record unusual. The faculties of most elite institutions are not only mostly male, they are also overwhelmingly white. According to a 2004 survey by Donna Nelson, a chemistry professor at the University of Oklahoma, there are 13,235 professors on physical sciences and engineering faculties of the 50 top research universities, and only 468 are black or Hispanic.

Given the pipeline problems in some fields, as well as the glacial rate of faculty turnover in academia - tenured professors routinely hold their jobs for more than 30 years - the slow increase in the numbers of women is in part understandable, many experts say.

But there are also vast differences in the efforts that some universities have made to move women along.

Female scientists, and senior female professors in general, have been particularly concerned about Harvard's record in the past decade, including the last four years under Dr. Summers, with the number of tenure offers

to women on the faculty of arts and sciences dropping to 4 out of 32 last year from 14 out of 41 in the 1999-2000 academic year.

After the firestorm surrounding his remarks, Dr. Summers appointed two study groups to advise Harvard on how to recruit and retain more women. When the panels announce their findings next month, their recommendations will draw heavily from the handful of universities that already have such programs in place, including the Universities of Michigan, Wisconsin and Washington; Princeton; Stanford; and M.I.T.

Those campuses have instituted an array of programs, including workshops on unconscious bias, coaching women on how to negotiate for things like salaries, research funds and child-care money. (Such help is also available to men on faculties, but they generally bear much less of these domestic burdens.)

Three years ago, the University of Michigan had 55 departments in the sciences and engineering, only one of them headed by a woman. Today, eight are headed by women. In that time, the university has also tripled the number of tenure track offers to women in science and engineering to 41 percent.

Mel Hochster, a mathematics professor at Michigan, belongs to a committee of senior science professors that gives workshops for heads of departments and search committees highlighting the findings of numerous studies on sex bias in hiring. For example, men are given longer letters of recommendation than women, and their letters are more focused on relevant credentials. Men and women are more likely to vote to hire a male job applicant than a woman with an identical record. Women applying for a postdoctoral fellowship had to be 2.5 times as productive to receive the same competence score as the average male applicant. When orchestras hold blind auditions, in which they cannot see the musician, 30 percent to 55 percent more women are hired.

Professor Hochster said he was not inclined to join the committee until Abigail Stewart, a professor of psychology and women's studies who is leading Michigan's effort, made a presentation on sex bias to his department.

"I vastly underestimated the problem," Professor Hochster said. "People tend to think that if there's a problem, it's with a few old-fashioned people with old-fashioned ideas. That's not true. Everybody has unconscious gender bias. It shows up in every study."

In the last three years, the mathematics department, regarded as one of the best in the country, has hired two women with tenure and promoted one associate professor to tenure, Professor Hochster said, bringing the number of tenured women to 6, out of a total of 64 tenured and tenure-track professors. Two more women are on a tenure track.

Some universities have put pressure on their search committees to broaden their pools of qualified candidates, especially when it comes to graduate students who could apply for junior faculty positions.

Jo Handelsman, a professor of plant pathology who is leading Wisconsin's effort to recruit and retain more female science and engineering professors, said that at Wisconsin each member of a search committee was encouraged to come up with a list of 10 respected colleagues and graduate students around the country who would nominate qualified candidates, specifically qualified women and minorities. "If you have a committee of eight people and each one calls 10 colleagues, now you've got 80 people brainstorming," Professor Handelsman said.

With widespread concern that only about half the pool of women earning Ph.D.'s in biology and chemistry are even applying for junior faculty jobs at elite research universities, M.I.T. and other institutions are going out of their way to find outstanding young women in unusual places and encourage them to apply.

Catherine Drennan, 41, an associate chemistry professor at M.I.T., said she might still be teaching high school chemistry in Iowa, as she used to, were it not for JoAnne Stubbe, a prominent molecular biologist at M.I.T.

Professor Drennan was a Ph.D. candidate at the University of Michigan when she first met Professor Stubbe at a chemistry conference. She was stunned, Professor Drennan said, when Professor Stubbe later asked if she would be interested in applying to M.I.T. for a faculty job.

"I had never thought of myself as someone that a school like that would be interested in," said Professor Drennan, who arrived at M.I.T. five and a half years ago. She is now being reviewed for tenure, and is expected to receive it.

Some universities have also taken note of the disadvantage that women face in negotiating salaries, laboratory space and money for research, as well as the importance of building a reputation by publishing in high-profile academic journals and getting invitations to speak at prestigious conferences. Men have naturally picked up such crucial information, as well as speaking invitations, from male colleagues and mentors because of their greater numbers and influence. For example, Columbia University is now bringing in retired senior academics to coach women on its faculty in such areas.

Professor Hopkins, who in January walked out of the academic conference where Mr. Summers made his controversial remarks about women in science, said she nearly lost out on a large grant years ago because she had been left out of the information loop by some of her male colleagues. After reading in a newspaper that a biotech company was awarding grants to M.I.T. scientists, she asked a colleague if he knew how to apply for the money, she said. He told her he knew nothing about the grant, she said, though she later learned that he was urging another man in their department to apply for the money.

Professor Hopkins said she then went to her dean, who submitted her application to the company, asking for \$30,000. The company gave her \$8 million, which allowed her to expand her cancer research and led to the discovery of a pair of cancer genes.

Experts say they believe one reason women may not be applying for junior faculty positions at elite research universities is that they believe - mistakenly, senior female scientists say - that these jobs are incompatible with having children.

In a widely praised speech at Columbia three weeks ago, Princeton's president, Shirley M. Tilghman, a molecular biologist and mother of two, said that universities should do a great deal more to create an environment that "legitimizes the choice" to be a scientist and have a family. The first step, she said, "to paraphrase the political strategist James Carville, is to recognize, 'It's day care, stupid!' "

Princeton, like many other universities, offers one-year tenure extensions for each child and workload relief to new parents, men and women. But Princeton found that men were more likely to take advantage of the tenure extension than women, who were afraid that requesting the extra year would be interpreted as a sign of weakness or lack of confidence. Princeton has recently made the tenure extension automatic so that it will have no value judgment attached to it, Dr. Tilghman said.